COMPUTER ENGINEERING

Government Polytechnic Aurangabad

(An Autonomous Institute of Government of Maharashtra)

Curriculum Document 2017-18

Diploma in Computer Engineering

6th Revision (Outcome Based Education)

PREFACE

Government Polytechnic, Aurangabad, is one of the oldest institute in Maharashtra was established in the year 1995-96. Over the period of time the institute, through its untiring efforts has created its own niche and has been functioning as a Lead Technical Institute in the State of Maharashtra to serve the Industry and Society by producing excellent technical manpower.

Government Polytechnic, Aurangabad has expanded quantitatively from an intake of 180 in 1995 with three programmes to 720 Intake in eight programmes. The Institute has been striving relentlessly for achievement of excellence in technical education. Government Polytechnic, Aurangabad has been functioning with 'the Autonomous Institute status', since 1994.It is presently functioning in three shifts, by running Diploma Programmes in I Shift (Regular), II shift and Part Time Diploma programmes in evening shift. I am proud to share that, the Institute has been ably rewarded with three state level awards for its best performance in the state of Maharashtra.

Institute has revised the curricula five times in the past and the sixth revision which was due, was initiated in the year 2015 and finally , the revised(sixth) curricula which is the outcome of, search conference under the guidance of NITTTR, Bhopal ,several workshops and deliberations, has been implemented with effect from 2017-18 with the approval of Programme wise Board of Studies (PBOS) Board of Studies (BOS) and consent of Governing Body .

The hallmark of sixth revision is, adopting 'Outcome Based Education Philosophy' as the basis for Curriculum Design and Development process. The 'Vision & Mission' of Institute and programme offering Departments, and with programme Educational Objectives (PEOs), Programme Outcomes as mandated by National Board of Accreditation (NBA) have been considered as points of reference for curriculum revision. Taking into account the need/ demand of industry and society, the courses such as 'Vocational Training (Industrial/ In-plant Training), Seminar and Development of Life Skills for all the programmes have been introduced as compulsory. To accommodate these additional courses and other requirements, the credits of each programme have been enhanced from 184 to 194.

‘Skill India’, ‘Digital India’ and ‘Make in India’ the flagship programmes/ initiatives of Government of India and State of Maharashtra have been the basic considerations in the curriculum revision process.

I deem this is as an opportune moment to recall the following proverb/quote which I view as highly relevant, on the occasion of writing the preface.

"If you are planning for a year, sow rice; if you are planning for a decade, plant trees; if you are planning for a lifetime, educate people." – A Chinese proverb &

As the Indian Education Commission of 1964-66, also known as the *Kothari Commission*, it is stated that

“The destiny of our country is being shaped in our classrooms”.

I take great pride in appreciating the efforts of Faculty of all Departments. All Faculties have taken determined efforts under the guidance of NITTTR Bhopal, Industry experts, academicians and Curriculum Development & Implementation Cell (CDIC) in the revision of curricula. I appreciate the contribution of alumni, students and faculty by making valuable suggestions / feedback for the revision of curricula.

I wish to assure, that the curriculum of all programmes will be implemented in true spirit to achieve the intended educational objectives of the programme.

(Prof. F.A.Khan)
Principal
Government Polytechnic,
Aurangabad

INDEX

Government Polytechnic Aurangabad

(An Autonomous Institute of Government of Maharashtra)

Vision

"To become internationally accredited institute that contributes in the development of competent professionals and entrepreneurs on the platform of technology based systems blended learning through highly qualified & trained staff".

Mission

"To educate & train globally competent individuals, professionals, technicians & skilled human resources through world class curriculum, student centric academic systems, team of committed, trained faculty & staff contributing to the students successful employment & entrepreneurship with a spirit of patriotism and concern for environment".

Diploma in Computer Engineering

Vision

*"A center of excellence in the domain of Computer Science & Engineering to cultivate "**digital artifacts**" for society.*

Mission

- *To impart education in computer hardware and software required for industry and business.*
- *Developing skills resembling problem solving, interpersonal skill, high order thinking skill and logical reasoning for entrepreneurship and employment.*
- *Developing values and ethics for lifelong learning in the system environment.*

SCOPE

DIPLOMA IN COMPUTER ENGINEERING PROGRAMME

In this era of Information Technology revolution, the computer systems are playing an important role in every aspect of human life for automation, from simple office automation to decision support systems, production planning to e-commerce, communication, online education etc. To ensure effective/ proper utilization of these computer systems by the software professionals it is necessary that the electronic components of the computer system and its associated peripheral devices and network, work efficiently without breakdown. This demands technicians having good knowledge and skills of computer engineering in maintaining computer hardware easily and quickly. In addition, the continuous changing technologies in the field of Microelectronics, Communication technology and Computer Technology have created newer and changing demands for new knowledge and skills in Diploma pass-outs implying a positive attitude towards self-learning and adaptability.

Therefore, this Diploma in Computer Engineering programme envisages in developing competent technicians with a number of professional skills who can perform their jobs in the industry or as an entrepreneur effectively and efficiently. In the industry or in small business/ educational establishments the technician with necessary skills will be able to plan, procure and install computer hardware and software, test and certify them.

The programme will develop the competency required to assemble computer system, maintain the computer resources in running condition and troubleshoot and repair the computer hardware in the case of breakdown. The technicians will also be able to install and manage computer networks. As an entrepreneur he will be to manage his computer-related enterprise and market his products and services. At the same time the skills related to software that are required to manage the computer hardware and networks will also be developed. The basic competencies that are required for designing and developing software systems will also be developed in the technicians in case he wants to take it as a career. This programme apart from developing the above mentioned professional skills would also develop some of the soft skills like communication skills, social skills and life-long learning skills that are required by the industry.

AREA OF WORK:

S. No.	Type of industries/ organizations	Capacity (Designation) in which employed
i)	Computer Hardware	H/W maintenance Engineer
ii)	Computer Services	Customer support Engineer, Supervisor
iii)	Consultancy services	Providing services to customer, organizations
iv)	Software Development	S/W Testing/Trainee/Customer Support Programmer, Database Administrator
v)	Electronics and communication organizations	Trainee Technician
vi)	Desktop Support technician	Network Analyst
vii)	System Network administrator	Network Administrator
viii)	Self-Taught Computer Repairman	H/W maintenance, assemble
IX	Technical Support Analyst	Trainee Engineers
X	Web developer	Web Application developer

PROGRAMME AIM

To provide students with a balance of Computer engineering theory and practical skills that will enable them to develop a sound knowledge and analytical ability allowing them to develop professionally in pursuit of future employment at junior level in the computing sector and higher studies.

COMPETENCIES REQUIRED BY COMPUTER ENGINEERING TECHNICIAN:

- Use and operate computers for data processing and communication.
- Efficient use of software packages.
- Diagnose the faults/viruses and remove it.
- Maintain the computer system and Network.

- Project management Skills.
- Plan, estimate, procure and install Hardware and Software.
- Analyze and design systems.
- Administrate and Manage Networks.
- Programming Skills.
- Web based application skills.
- Web server administration skills.
- Entrepreneurial skills.
- Life long learning and ability to acquire new knowledge and skills on self-learning basis.
- Ability to work in multidisciplinary and multinational teams.
- Positive attitude towards work and social responsibility.
- Develop S/W using open software Technology
- Develop S/W using .NET technology

CURRICULUM DESIGN & DEVELOPMENT

DIMENSIONS OF CURRICULUM:

This Curriculum has been designed on the systematic approach based on competency-based curriculum of educational technology and theories of learning. The data is collected in following ways

- Feedback of alumni
- Feedback of staff
- Past experience of 3 years.
- Through observational records
- By study of documents used in industries, expert reports, newspapers and trade literatures etc., their views on different aspects of the curriculum.
- Through a series of discussions in programme committee.

Taking into account the knowledge, skills/competencies, attitudes etc. required to be possessed by the diploma pass outs the content of different courses is designed.

While designing the curriculum emphasis is given on following points.

- New/emerging technologies being used in the world of work.

- Personal values and social skills required to be possessed.
- Skills related to life-long learning and independent study.
- Professional skills required for different jobs along a career path.

Describing roles/ functions of a technician

A technician, say for example in a medium size engineering enterprise, working at middle level management position may have to carry out jobs in different departments. These are identified as

- Installation, inspection, production & control
- Repair & maintenance
- Marketing and sales
- Purchase & Store
- Observation at Site
- Analysis, Design and Costing.
- Research & development

Designing content of each curriculum area

- Different courses are categorized as
    - Foundation Level
    - Basic Level
    - Allied Level
    - Applied Level
    - Diversified Level
- Curriculum scheme of each course along with course code is given at the beginning
- Competencies to be developed are identified and written.
- Rationale of each course is highlighted.
- Objectives of each course are highlighted and written.
- Content outline in descriptive form was derived. Generally the content outline of a subject was divided into chapters and then from chapters into topic outline.
- Having derived the total content outline i.e. Theory. At the end of the theory content list of practical is added for each course, following were arrived at by consensus-
    - Time required by a teacher to teach the prescribed theory and practical parts
    - Number of courses per term to be taken.
    - Total no. of hours required to teach the entire course.
    - Total no. of lectures and practicals per week.

- Approach to the assessment of student's learning and types of assessment techniques to be used were decided. An assessment scheme was designed, which is a suitable mix of (a) continuous evaluation of term-work (b) progressive test (c) Term end examination.

- Implementation strategies for each subject were identified.

- Learning resources for students were prescribed such as
    - Teacher's lecture notes
    - Basic text-book covering most of the topics in the curriculum and other books
    - Monographs, handbooks, periodicals, articles, journals etc.
    - Data-books, manuals, standards etc

In all these activities, views of senior teachers regarding relevance of course contents and implementation strategies being presently followed are sought.

OUTCOME BASED EDUCATION (OBE) PHILOSOPHY

Introduction:

After conferring academic autonomy to Government Polytechnics during Second Technician World Bank Assisted Project (Tech Ed II) implemented from 1992 to 1999 the curriculum revision process is being carried out after every 4-5 years. Our Institute, being Academically Autonomous since 1994, has been following the same practice and hence this sixth revision of curriculum for all programmes.

Curriculum, as per Colombo Plan Staff College Manila (1984), means ***'an educational programme designed, developed and implemented to attain predetermined educational objectives.'*** Therefore curriculum ought to be designed for achieving purpose, objectives, outcomes that are decided well in advance. More over curriculum at any level, let it be at unit, at course, at course category or at programme level at the top, comprises of (Ralph Tylor 1949) rationale, objectives/ outcomes, content, Learning -Teaching strategies (LTS) and finally student's assessment and evaluation.

We are in the era where technical manpower in general and engineering technicians in particular are required to solve or assist in solving engineering problems from Nano – micro level to mega level (Jeff Lohmann 2009). It is expected from him/ her in that case to use knowledge of not only technology but also natural sciences (animate, inanimate and psycho socio sciences) and mathematics. Moreover he/ she is required to use advance IT based tools and techniques in diagnosing faults and carry out maintenance. Further technical manpower should have ability to work in team, communicate effectively, and remain updated of technologies they are expected to deal with.

As per research on curriculum in engineering and technology, education carried out in different parts of world it is concluded that philosophy, framework, approach and model that is to be used for developing technical manpower with such profile should be Interdisciplinary – integrated curriculum.

Therefore the philosophy of curriculum development used in revising sixth curriculum has been integrated – interdisciplinary in nature to achieve outcome based technical education.

Even though all prevailing & necessary apt theories of curriculum design are used in the curriculum development process the existing curriculum has been questioned for its ability to provide clearly stated learning outcomes and therefore it is right time that the revised curricula requires that it should give enough clarity as regards intended learning

outcomes to all concerned – first to the student, then to the teachers and the industry, followed by all the other stakeholders. This meant that the curriculum should explicitly state as to what are the observable and measurable 'competencies' expected by the industry. Such 'competencies' comprising of measurable 'Course outcomes' in the 'cognitive domain', measureable associated practical outcomes in the form of practical exercises in the 'psychomotor domain' and measurable social skills related to the 'affective domain' will help the students and teachers in knowing the 'length, breadth and depth' of the course necessary to achieve the competency.

Therefore Curriculum needs to be outcome-based where competencies / program outcomes and course outcomes are measurable. We are in the era of accords viz. Washington, Sidney, Dublin Accords in which gradation of any engineering and technology Programme is carried out using outcome based criteria in signatory countries. It was the outcome based criteria, which was devised for the first time by Accreditation Board for Engineering and Technology (ABET), that is being followed in USA for grading programmes for their quality since 1998. It is the industry which made educational institutes to go for outcome based criteria popularly known as EC 2000 where main emphasis is over outcomes – what he/ she knows and what he/ she is able to do.

National Board of Accreditation (NBA) has been practicing outcome based criteria in grading educational programmes of institutes awarding diploma and degree in engineering and technology. In that case the board empowered to undertake exercise of accrediting programmes has developed indigenous criteria for diploma programmes as follows:

i. Vision, mission and programme educational objectives
ii. Programme outcomes
iii. Programme curriculum
iv. Students performance
v. Faculty
vi. Facilities and technical support
vii. Academic support unit and teaching learning process
viii. Governance
ix. Institutional support and finance resources
x. Continuous improvement

As All India Council for Technical Education (AICTE) has made it mandatory to institutions to follow curricular processes for extending Outcome Based Technical Education and get programme accredited from NBA.

Philosophy for Sixth Revision of Curriculum adopted at Government Polytechnic Aurangabad:

Sixth revision of Curriculum uses model, approach, philosophy evolved over the years in other part of the world and accepted by our nation through National Board of Accreditation (NBA) being signatory of Washington Accord. It is the curriculum development philosophy that will enable institutes to impart Outcome based education (OBE). It is essential in that case to design a programme curriculum, develop resources for implementing it, implement it and undertake student's assessment and evaluation to impart OBE.

As regards, sixth revision of curriculum, which is based primarily on Outcome Based Education philosophy, follows the following stages.

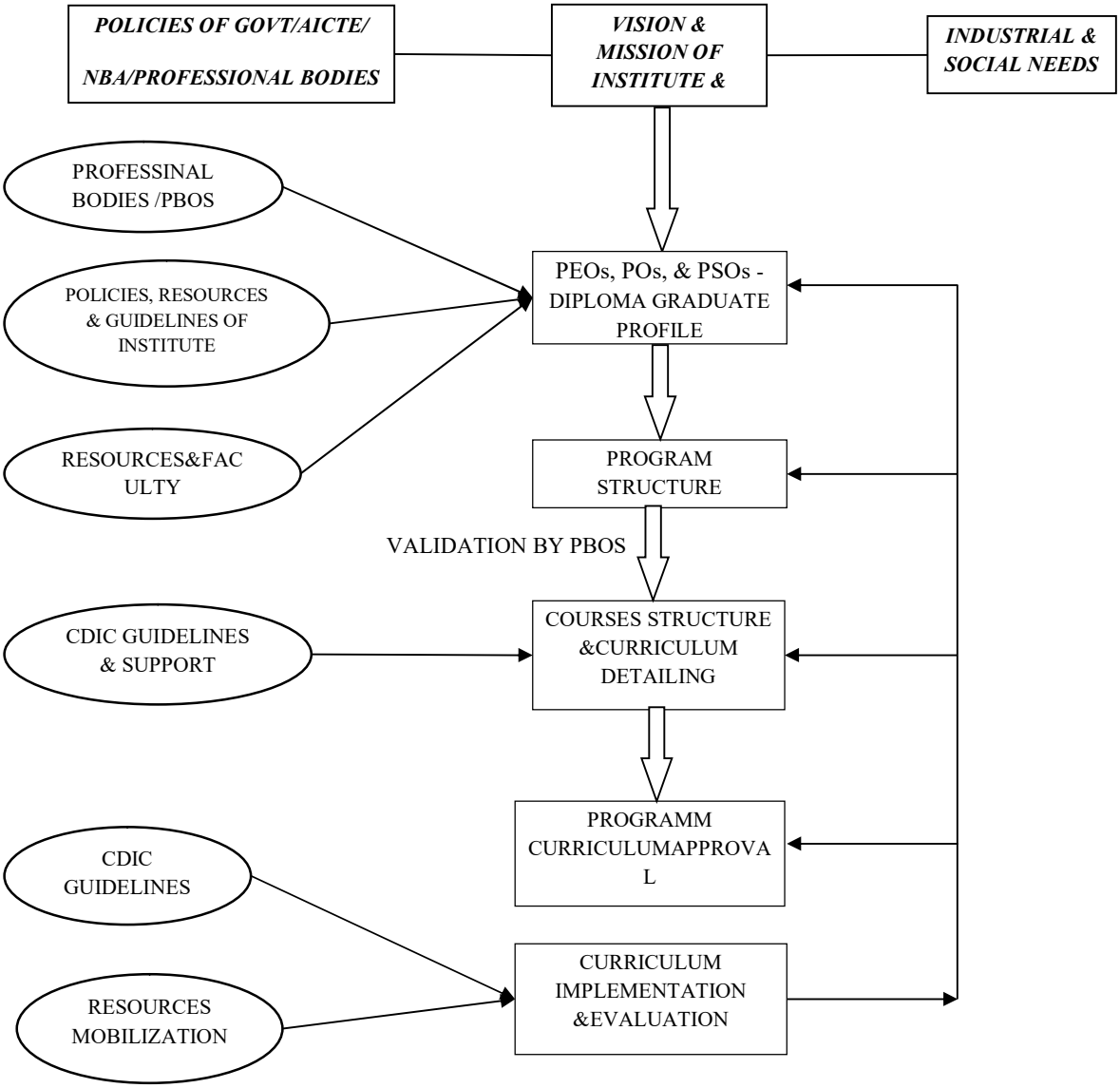
1. Occupation analysis.
2. Formulation of Vision & Mission of Institute/Department.
3. Formulation of Diploma graduate attributes and Programme Educational Objectives.
4. Evolve Program Structure.
5. Evolve Course structure, Course Competencies, Course Outcomes & Curriculum detailing of each course.
6. Approval of Curriculum
7. Implementation of Curriculum.

Approach to Curriculum Design and Development for Sixth Revision of Curriculum based upon above stages has been elaborated and depicted schematically as below.

In line with above stages, the institute ,under the guidance of NITTTR Bhopal organized the search conference/workshop involving industry personnel from several industries in the region covering all sectors related to 8 programmes run in the institute . This led to occupation analysis, knowing industry and society expectations as regards diploma graduate / engineer to arrive at profile of diploma engineers.

Institute also carried meetings and deliberations with stake holders to formulate the renewed Vision & Mission of Institute and departments as well. The Vision & Mission so formulated have been considered as the terms of references in curriculum revision process.

Flowchart of Design & Development of OBE



CURRICULUM DEVELOPMENT APPROACH

SKILL

IDENTIFICATION / JOB FUNCTION

Skill identification has been done after analysing the feedbacks of alumni, students and faculties, suggestions from search conference, PBOS members and industry persons.

Sr. No.	Type of skills	List of skills
1.	Technical Skills	1. Programming Skill 2. Webapplication development using computer languages 3. Apply database management concept 4. Test the software using automated tools 5. Apply Software Engineering concept to industry 6. Mobile application development. 7. Troubleshoot & Maintain network at workplaces. 8. Design desktop application according to requirements of users.
2.	Soft Skills	1. Communication (Oral & Written) 2. Team work 3. Problem solving 4. Develop lifelong learning 5. Multidisciplinary Practices 6. Recourse management 7. Time management 8. Creativity 9. Presentation skills 10. Leadership

Programme Educational Objectives (PEOs)

1. To provide the essential knowledge of science and engineering concepts fundamental for a computer professional and equip the proficiency of mathematical foundations and algorithmic principles for competent problem solving ability.
2. To design, model, program and test software systems and applications in varying domains including networking, web related services and storage management.\

3. To inculcate professional and ethical attitude, communication skills, teamwork, lifelong learning, multidisciplinary approach into student to relate computer engineering issues with social awareness.

Programme Outcomes (POs)

A Diploma in Computer Engineering graduate must demonstrate

1. **Basic Knowledge:**An ability to apply basic knowledge of mathematics, science, and engineering to develop logic for related programming technologies.
2. **Discipline Knowledge:**An ability to apply knowledge of networking with wireless technologies, multimedia technology and distributed computing, software testing and topics of current relevance to Software & IT industry.
3. **Experiments & Practices:**An ability to interpret the knowledge of best practices of experiments in software development in industry.
4. **Engineering Tools:**An ability to design, develop and evaluate acreative solutions for computer-based system, process, or program using techniques, skills and modern software engineering tools necessary for IT practice.
5. **The Engineer & Society**: An ability to comprehend of professional, legal, security, social issues and responsibilities.
6. **Environment & Sustainability:**An ability to analyse the impact of engineering solutions in global, economic, environmental and societal context.
7. **Ethics:** An ability to inculcate professional and ethical responsibilities and marshal in all situations.
8. **Individual & Teamwork:**An ability to function effectively in multi-disciplinary environment as an individual and in team.
9. **Communication:**An ability to communicate technical topics in written and verbal forms effectively.
10. **Life Long Learning:** An ability to apply knowledge & skills of computing discipline in the competitive examinations, higher education and / or seek employment to engage in life-long learning.

Programme Specific Outcomes (PSO)

1. **Technical Support Analyst:**Ability to use, analyse and develop computer programs in the areas related to algorithms, System and application software, multimediatechnologies, web design, networking, troubleshooting & maintenance for efficient design of computer-based systems of varying complexity.
2. **Software Developer:**Ability to apply standard practices and strategies in software project development using Free and open source software (FOSS) to deliver a quality product for business application.

MAPPING OF MISSION AND PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO Statement	M1	M2	M3	Justification
PEO1	H	H	L	(Mission 1) strongly support to achieve PEO1, as objective is to provide the essential knowledge of science and engineering concepts fundamental for a computer professional and equip the proficiency of mathematical foundations and algorithmic principles. (Mission 2) strongly support PEO1 to develop skills like resembling problem solving& logical reasoning supports for overall development of graduates and to strengthen their technical skills & interest. (Mission 3) slightly support in achieving PEO1 as social awareness. Overall, a department mission reasonably supports PEO1.
PEO2	H	M	M	(Mission 1) strongly support to achieve PEO1, as fulfilling needs of industries and society in various domains. Developing skillsresembling problem solving, interpersonal skill, high order thinking skill and logical reasoning (Mission 2) moderately supports helps to make employable & entrepreneur. (Mission 3) moderately supports in lifelong learning in

				system environment. Overall, a department mission highly supports PEO2.
PEO3	M	M	H	Mission 1 and 2 moderately support to achieve PEO3 with respect to communication skills, teamwork and multidisciplinary approach. Mission 3 highly support to achieve PEO3 w.r.t professional and ethical attitude&lifelong learning. Overall, a department mission highly supports PEO3.

MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) AND PROGRAMME OUTCOMES (POs)

Sr.No	POS\PEOS	PEO1	PEO2	PEO3
1	**PO1**	1	-	-
2	**PO2**	3	2	2
3	**PO3**	3		2
4	**PO4**	3	3	-
5	**PO5**	3	2	2
6	**PO6**	2	1	-
7	**PO7**	2	1	3
8	**PO8**	3	2	-
9	**PO9**	-	3	3
10	**PO10**	3	2	3

MAPPING OF PROGRAMME OUTCOME AND COURSES

Sr. No.	Lis of POs	List of Couses
1	**PO1**	1. Basic Mathematics 2. Engineering Mathematics 3. EEE 4. Fundamentals of Computer & Information Technologies 5. Digital electronics 6. C programming
2	**PO2**	1. Static web Page Designing 2. Object oriented Programming Using C++ 3. Software Engineering 4. Multimedia Techniques 5. Operating System 6. Java Programming 7. Software Development Tools 8. Elective-I
3	**PO3**	1. Java Programming 2. Software Development Tools 3. Elective-I 4. Advanced Java Programming 5. Software Testing 6. Object Oriented Technology using UML 7. Relational Database Management System 8. Advanced Microprocessor & Micro-Controllers 9. Computer Hardware and Maintenance with Troubleshooting

		10. Linux Programming 11. Computer Network
4	**PO4**	1. Java Programming 2. Software Development Tools 3. Elective-I 4. Advanced Java Programming 5. Software Testing 6. Object Oriented Technology using UML 7. Relational Database Management System 8. Advanced Microprocessor & Micro-Controllers 9. Computer Hardware and Maintenance with Troubleshooting 10. Linux Programming 11. Computer Network
5	**PO5**	1. Entrepreneurship Development 2. Environmental Science 3. Vocation Training 4. Project
6	**PO6**	1. Entrepreneurship Development 2. Environmental Science 3. Vocation Training 4. Project
7	**PO7**	1. IOM 2. ERP 3. Computer Security & Cyber Laws
8	**PO8**	1. Vocation Training 2. Project 3. EDP 4. ERP
9	**PO9**	1. Vocation Training 2. Project 3. EDP 4. ERP 5. Linux Prograaming

10	**PO10**	1. All Courses of level IV &V 2. Elective-II 3. Elective-III 4. Linux Programming 5. Computer Network

PROGRAMME STRUCTURE

SR NO	LEVELS	COMPULSORY COURSES	OPTIONAL COURSES	CREDITS			MARKING SCHEME		
				COMPULSORY	OPTIONAL	TOTAL	COMPULSORY COURSES	OPTIONAL COURSES	TOTAL
1	Foundation	04	Nil	18	--	18	500	--	500
2	Basic	11	Nil	54	--	54	1300	--	1300
3	Allied	07	02/15	25	04	29	625	--	625
4	Applied	09	02/07	50	10	60	1300	275	1575
5	Diversified	07	01/03	28	05	33	775	150	925
	TOTAL	**38**	**05/25**	**175**	**19**	**194**	**4500**	**425**	**4925**

Scheme at a glance:

Total number of courses offered : 63

Number of Compulsory courses : 38

Number of Optional courses : 05 out of 25

Total courses to be opted : 43

Total Marks : 4925

LEVEL- I: (FOUNDATION LEVEL COURSES)

Sr No	COURSE CODE	COURSE TITLE	TEACHING SCHEME					EXAMINATION SCHEME					
			TH	TU	PR	CR	TERM	PT	TH	PR	TW	OR	TOTAL
01	**6G101**	Basic Mathematics (BMT)	03	01		04	I	20	80	--	--	--	100
02	**6G102**	Engineering Mathematics (EMT)	03	01		04	II	20	80	--	--	--	100
03	**6G103**	Engineering Physics (EPH)	03		02	05	I	20	80	@25	25	--	150
04	**6G104**	Engineering Chemistry (ECH)	03		02	05	II	20	80	@25	25	--	150
								80	320	50	50	--	
		TOTAL	**12**	**02**	**04**	**18**		**400**		**100**		**--**	**500**

Note:
'G' Courses are common to all branches
'P' Courses are for Diploma in Computer Engineering
'S' Courses are common to Diploma in Computer Engineering & Information Technology

Scheme at a glance:

Total number of courses offered : 04

Number of compulsory courses : 04

Number of optional courses : Nil

Total courses to be opted : 04

Total Credits : 18

Total Marks : 500

LEVEL II: (BASIC TECHNOLOGY LEVEL COURSES)

Sr No	COURSE CODE	COURSE TITLE	TEACHING SCHEME					EXAMINATION SCHEME					
			TH	TU	PR	CR	TERM	PT	TH	PR	TW	OR	TOTAL
01	**6G202**	Workshop Practice (WP)	-	-	03	03	II				50		50
02	**6G203**	Basics of Computer System	-	-	02	02	I	--	--	@25	25	--	50
03	**6S201**	Fundamentals of Computer & Information Technology (FCIT)	01	-	04	05	I	--	--	@50	50	--	100
04	**6S202**	Electronics & Electrical Engineering (EEE)	04	-	02	06	II	20	80	--	25	@25	150
05	**6S203**	Digital Electronics (DE)	03	-	02	05	III	20	80	@25	25	--	150
06	**6S205**	Static WPDL (SWPDL)	-	-	02	02	II	--	--	@50	50	--	100
07	**6S204**	C Programming (CP)	03	-	04	07	II	20	80	#25	25	--	150
08	**6S206**	Multimedia Techniques (MMT)	01	-	04	05	III	--	--	#50	50	--	100
09	**6S207**	Data Structures (DS)	03	-	04	07	IV	20	80	@25	25	--	150
10	**6S208**	Object Oriented Programming using C++ (OOPS)	03	-	04	07	III	20	80	#25	25	--	150
11	**6P201**	Computer Hardware & Maintenance with Troubleshooting (CHMT)	03	-	02	05	III	20	80		25	@25	150
		TOTAL						120	480	275	375	50	
			21	**00**	**33**	**54**		**600**		**700**			**1300**

Note:
'G' Courses are common to all branches
'P' Courses are for Diploma in Computer Engineering
'S' Courses are common to Diploma in Computer Engineering & Information Technology

Scheme at a glance:

Total number of courses offered : 11

Number of compulsory courses : 11

Number of optional courses : Nil

Total courses to be opted : 11

Total Credits : 54

Total Marks : 1300

LEVEL - III: (ALLIED LEVEL COURSES)

Sr No	COURSE CODE	COURSE TITLE	TEACHING SCHEME					EXAMINATION SCHEME					
			TH	TU	PR	CR	TERM	PT	TH	PR	TW	OR	TOTAL
01	**6G301**	English (ENG)	02	-	02	04	I	20	80	--	25	--	125
02	**6G302**	Communication Skills (CMS)	01	-	02	03	II	--	--	--	50	@25	75
03	**6G303**	Development of Life Skill(DLS)	--	-	02	02	I	--	--	--	25	@25	50
04	**6G304**	Environmental Science (EVS)	--	-	02	02	I	--	--	--	50	--	50
05	**6G305**	Industrial Organization Management (IOM)	03	-	02	05	V	20	~80	--	25		125
06	**6G306**	Entrepreneurship Development (EDP)	02	-	02	04	VI	--	--	--	50		50
07	**6P301**	Microprocessor & Programming (MPP)	03	-	02	05	IV	20	80		25	@25	150
08	**6G311 To 6G325**	NON-EXAM	--		2	2	II & III	--	--	--	--	--	--
09	**6G311 To 6G325**	NON-EXAM	--		2	2	II & III	--	--	--	--	--	--
								60	240		250	75	
		TOTAL	**11**	00	**18**	**29**		**300**			**325**		**625**

Note:
'G' Courses are common to all branches
'P' Courses are for Diploma in Computer Engineering
'S' Courses are common to Diploma in Computer Engineering & Information Technology

Scheme at a glance:

Total number of courses offered : 22

Number of compulsory courses : 07

Number of optional courses : 02 out of 15

Total courses to be opted : 09 out of 22

Total Credits : 29

Total Marks : 625

LEVEL-IV: (APPLIED LEVEL COURSES)

Sr No	COURSE CODE	COURSE TITLE		EXAMINATION SCHEME								
			TH	TU	PR	CR	TERM	PT	TH	PR	TW	OR	TOTAL
01	**6P401**	Advanced microprocessors & Micro-controllers(AMM)	04		02	06	V	20	80	--	50	#25	175
02	**6P402**	Mobile Computing(MOC)	03		02	05	V	20	80	@25	25	--	150
03	**6P403**	Computer network (CN)	04		02	06	V	20	80	--	25	#25	150
04	**6P404**	Linux Programming Lab(LP)	01		04	05	V	--	--	#50	75	--	125
05	**6S401**	Relational DB Management Systems (RDBMS)	03		04	07	III	20	80	#25	25	--	150
06	**6S402**	Software Development Tool(SDT)	00		04	04	IV	--	--	#50	75	--	125
07	**6S403**	JAVA Programming (JP)	03		04	07	IV	20	80	#25	25	--	150
08	**6S404**	Operating Systems (OS)	04		02	06	IV	20	80	--	25	@25	150
09	**6S405**	Software Engineering(SE)	03	01	--	04	III	20	80	--	25	--	125
10	**ELECTIVE –I (Any one from group I)**												
10.1	**6S406**	PHP programming(PHPP)	1	--	04	05	IV	--	--	#50	75	--	125
10.2	**6S407**	Ruby programming (RP)	1	--	04	05	IV	--	--	#50	75	--	125
10.3	**6S408**	Python Programming(PythonP)	1	--	04	05	IV	--	--	#50	75	--	125
10.4	**6S409**	Android Programming(AP)	1	--	04	05	IV	--	--	#50	75	--	125
11	**ELECTIVE –II (Any one from group II)**												
11.1	**6P405**	Information Storage Mgmt System(ISMS)	03	02		05	V	20	80		25	@25	150
11.2	**6P406/6T406**	Data Warehousing & Mining(DWM)	03	02		05	V	20	80		25	@25	150
11.3	**6P407/6T407**	Cloud Computing(CC)	03	02		05	V	20	80		25	@25	150
								160	640	175	500	100	
		TOTAL	**29**	**03**	**28**	**60**		**800**		**775**			**1575**

Note:
'G' Courses are common to all branches
'P' Courses are for Diploma in Computer Engineering
'S' Courses are common to Diploma in Computer Engineering & Information Technology

Scheme at glance:

Total number of courses offered : 16

Number of compulsory courses : 09

Number of optional courses : 02 out of 07

Total courses to be opted : 11 out of 16

Total Credits : 60

Total Marks : 1575

LEVEL-V: (DIVERSIFIED LEVEL COURSES)

Sr No	COURSE CODE	COURSE TITLE	TEACHING SCHEME					EXAMINATION SCHEME					
			TH	TU	PR	CR	TERM	PT	TH	PR	TW	OR	TOTAL
01	**6S501**	Seminar (SMR)	--		2	2	V	--	--	--	50	#25	75
02	**6S502**	Project Work (PW)	--		4	4	VI	--	--	--	100	#50	150
03	**6S503**	Implant Training (IT)	--	--	04	04	V	--	--	--	50	@50	100
05	**6S504**	Advanced JAVA Programming(AJP)	03		04	07	VI	20	80	#25	25		150
06	**6S505**	Software Testing(ST)	03		02	05	VI	20	80	#25	25		150
07	**6P501**	Computer Security & Cyber Laws(CSCL)	04		02	06	VI	20	80	@25	25		150
08	**ELECTIVE –III (Any one from group III)**												
8.1	**6P502/ 6T502**	Advanced Database Management Systems (ADBMS)	03		02	05	VI	20	80	--	25	#25	150
8.2	**6P503/ 6T503**	Geographical Information System(GIS)	03		02	05	VI	20	80	--	25	#25	150
8.3	**6P504**	Object Technology & UML(OTU)	03		02	05	VI	20	80	--	25	#25	150
								80	320	75	300	150	
		TOTAL	**13**	**00**	**20**	**33**		**400**			**525**		**925**

Note:
'G' Courses are common to all branches
'P' Courses are for Diploma in Computer Engineering
'S' Courses are common to Diploma in Computer Engineering & Information Technology

Scheme at glance:

Total number of courses offered : 10

Number of compulsory courses : 07

Number of optional courses : 01 out of 03

Total courses to be opted : 08 out of 10

Total Credits : 33

Total Marks : 925

Sample Path (After 10th Pass Students)

Year I		Year II		Year III	
SEMESTER-1	**SEMESTER-2**	**SEMESTER-3**	**SEMESTER-4**	**SEMESTER-5**	**SEMESTER-6**
ODD	**EVEN**	**ODD**	**EVEN**	**ODD**	**EVEN**
6G101 Basic Mathematics (BMT) (03+01+00)	**6G102 Engg Mathematics (EMT)** (03+01+00)	**6P201 Computer Hardware and Maintenance with Troubleshooting (CHMT)** (03+00+02)	**6S207 Data Structures (DS)** (03+00+04)	**6P403 Computer Networks (CN)** (04+00+02)	**6G306 Entrepreneurship Development (EDP)** (02+00+02)
6G103 Engg Physics (EPH) (03+00+02)	**6G104 Engg Chemistry (ECH)** (03+00+02)	**6S203 Digital Electronics (DE)** (03+00+02)	**6P301 Microprocessor & Programming (MPP)** (03+00+02)	**6G305 Industrial Org Management (IOM)** (03+00+02)	**6P501 Computer Security & Cyber Laws (CSCL)** (04+00+02)
6S201 Fundamentals of Computer & Internet Technology (FCIT) (01+00+04)	**6G202 Workshop Practice(WP)** (00+00+03)	**6S206 Multimedia Techniques (MMT)** (01+00+04)	**6S402 Software Development Tool (SDT)** (00+00+04)	**6P401 Advanced Microprocessor & Micro-Controllers (AMM)** (04+00+02)	**6S502 Project Work (PW)** (00+00+4)
6G203 Basics Computer Systems (BCS) (00+00+02)	**6S202 Electronics & Electrical Engineering (EEE)** (04+00+02)	**6S208 Object Oriented Programming using C++ (OOPS)** (03+00+04)	**6S403 JAVA Programming (JP)** (03+00+04)	**6P402 Mobile Computing (MOC)** (03+00+02)	**6S504 Advanced JAVA Programming (AJP)** (03+00+04)
6G301 English (ENG) (02+00+02)	**6S204 C Programming (CP)** (03+00+04)	**6S401 Relational DBMS (RDBMS)** (03+00+04)	**6S404 Operating Systems (OS)** (04+00+02)	**6P404 Linux Programming Lab (LP L)** (01+00+04)	**6S505 Software Testing (ST)** (03+00+02)
6G303 DLS() (00+00+02)	**6S205 Static WPDL (SWPDL)** (00+00+02)	**6S405 Software Engineering (SE)** (03+01+00)	**Elective –I** (01+00+04) **6S406 PHP with MY-SQL** **6S407 Ruby** **6S408 Python** **6S409 Android Programming**	**Elective –II** (03+02+00) **6P407 Cloud Computing(CC)** **6P405 Info. Storage Management System(ISMS)** **6P406 Data Warehousing & Mining(DWM)**	**Elective –III** (03+00+02) **6P503 Geographical Information System(GIS)** **6P502 Advanced Database Management Systems(ADBMS)** **6P504 Object Technology using UML(OTU)**
6G304 Environmental Science (EVS) (00+00+02)	**6G302 Communication Skills (CMS)** (01+00+02)	**Non exam credit course** (00+00+02)		6S501 **(SMR) Seminar** (0+0+2)	**6S503 Implant Training (IT)** (00+00+04)
	Non exam credit course (00+00++02)				
Total Credits:190+4=194					
24	**32**	**35**	**34**	**34**	**35**

Following is the list of courses for the award of diploma programme in Computer Engineering

Sr. No.	Course Code	Course Name	Credit	Marks
1	6P403	Computer Network(CN)	06	150
2	6S404	Operating Systems (OS)	06	150
3	6P401	Advanced microprocessors & Micro-controllers(AMM)	06	175
4	6P404	Linux Programming Lab	05	125
5	6S502	Project (PRJ)	04	150
6	6S501	Seminar (SMR)	02	75
7	6S406-409	Elective-I	05	125
8	6P405-407	Elective-II	05	150
9	6P501	Computer Security & Cyber Laws(CSCL)	06	150
10	6S505	Software Testing (ST)	05	150
11	6S504	Advanced java Programming	05	150
12	6P502-504	Elective-III	05	150
		Total	**61**	**1700**

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Programme Curriculum Strucutre (6th Revision : Outcome Based Education - 2017-18)

Name of Programme : DIPLOMA IN COMPUTER ENGINEERING

First Semester Courses

sr. no.	semi ster	course code	course Name	Teaching Scheme/Credits				Examination Scheme (Maximum Marks)										
				Theory	Practical	Tu	Total Credit	PT	TH	PR	OR	PA (T W)	Total	Theory Exam Hours	5th curr equi	4th curr equi	1,2,3 rd equival	Compulsury /Optional
1	**I**	6G101	Basic Mathematics (BMT)	3	0	1	4	20	80	--	--	--	100	3	5G101	4G101	GE152	Compulsory
2	**I**	6G103	Engineering Physics (EPH)	3	2	--	5	20	80	25	25	--	150	3	5G103	4G103	IT152	Compulsory
3	**I**	6G203	Basics of computer System	--	2	--	2	--	--	25	25	--	50	--	5G107	4G107	GE158	Compulsory
4	**I**	6G304	Environmental Science (EVS)	--	2	--	2	--	--	--	50	--	50	--	5G304	4G304	--	Compulsory
5	**I**	6S201	Fundamental Computer and Internet Technology	1	4	--	5	--	--	50	50	--	100	--	5S206	4T206	IT153	Compulsory
6	**I**	6G301	English (ENG)	2	2	--	4	20	80	--	25	--	125	3	5G301	4G301		Compulsory
7	**I**	6G303	Development of Life skills (DLS)	--	2	--	2	--	--	--	25	25	50	--	--	--	--	Compulsory

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, PR- Practical Examination, OR – Oral Examination, TW - Term Work, # External, @ Internal examination ,

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Programme Curriculum Strucutre (6th Revision : Outcome Based Education - 2017-18)

Name of Programme : DIPLOMA IN COMPUTER ENGINEERING

Second Semester Courses

sr. no.	semi ster	course code	Course Name	Teaching Scheme/Credits				Examination Scheme (Maximum										
				Theory	Practical	Tutorial	Total Credit	PT	TH	PR	OR	PA (TW)	Total	Theory Exam Hours	5th curr equi	4th curr equi	1,2,3 rd equival	Compulsury /Optional
1	**II**	6G102	Engineering Mathematics (EMT)	3	--	1	4	20	80	--	--	--	100	3	5G102	4G102	GE153	Compulsory
2	**II**	6G104	Engg. Chem	3	2	--	5	20	80	25	25	--	150	3	5G104	4G104	--	Compulsory
3	**II**	6S205	Static Web Page Designing Lab (SWPDL)	--	2	--	2	--	--	50	50	--	100	--	5S208	4T208	--	Compulsory
4	**II**	6S204	C Programming	3	4	--	7	20	80	*25	25	--	150	3	5T201 & 5T202	4T201	IT256	Compulsory
5	**II**	6S202	Elements of Electronic & Electrical Engineering (EEE)	4	2	--	6	20	80	--	25	25	150	3	5S203 & 5S204	4T203 & 4T204	IT151 & IT253	Compulsory
6	**II**	6G302	Communication Skills (CMS)	1	2	--	3	--	--	--	50	25	75	--	5G302	4G302	GE151	Compulsory
7	**II**	6G202	Workshop Practice	--	3	--	3	--	--	--	50		50	--	5G105	4G105	GE156	Compulsory
8	**II**	6G311 on words	NON-EXAM	--	2	--	2	--	--	--	--	--	--	--	5G311 on words	4G311 ON words		Optional

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, PR- Practical Examination, OR – Oral Examination, TW - Term Work, # External, @ Internal examination ,

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DATE: 25/06/2018

Curriculum Strucutre of Third semester courses.

Name of Programme : Computer Engineering

Third Semester Courses

Sr. No.	Semester	Course code	Course Name	Teaching Scheme/Credits				Examination Scheme (Maximum Marks)							
				Theory (TH)	Practical (PR)	Tutorial (TU)	Total Credit (C)	PT	TH	PR	OR	PA (TW)	Total	Theory Exam Hours	Practical Exam Hours
1	III	6S203	Digital Electronics	03	02	0	05	20	80	@25	--	25	150	03	02
2	III	6S206	Multi Media Techniques (MMT)	01	04	--	05	--	--	#50		50	100	00	02
3	III	6S208	Object oriented programming using C++ (OOP)	03	04	0	07	20	80	#25	--	25	150	03	02
4	III	6P201	Computer Hadrware Maintenance and Troubleshooting (CHMT)	03	02	0	05	20	80		@25	25	150	03	02
5	III	6S401	Relational Database Management Systems (RDBMS)	03	04	0	07	20	80	#25	--	25	150	03	02
6	III	6S405	Software Engineering (SE)	03	--	01	04	20	80	--	--	25	100	03	00
7	III	6G311 - onwords	Non-Exam	00	02	00	02	--	--	--	--	--	--	NIL	NIL

Legends : TH-Lecture; TU-Tutorial/Teacher Guided Theory Practice ; PR- Practical; C- Credits; ESE- End Semester Examination;
PT – Progressive Test, PA- Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

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DATE: 26/12/2018

Curriculum Strucutre of Fourth Semester Courses.

Name of Programme : Computer Engineering

Fourth Semester Courses																		
				Teaching Scheme/Credits				Examination Scheme (Maximum Marks)										
sr. no.	Sem	Course code	course Name	Theory (TH)	Practical (PR)	Tutorial (TU)	Total Credit (C)	PT	TH	PR	OR	PA (TW)	Total	Theory Exam Hours	Practical Exam Hours	Remarks	Comp/ Opt	Degree Award Course	Equivalent course to 5th Curriculum
1	IV	6S207	Data Structures (DS)	3	4	-	7	20	80	@25	-	25	150	3	2	Common for CO & IT	Comp	No	Data Structures (DS) 5S401
2	IV	6P301	Microprocessor & Programming (MPP)	3	2	-	5	20	80	-	@25	25	150	3	2	-	Comp	No	Microprocessor & Prog (MPP) 5S301
3	IV	6S402	Software Development Tool(SDT)	0	4	-	4	--	--	#50		75	125	-	2	Common for CO & IT	Comp	No	Software Development Tool(SDT) 5S207
4	IV	6S403	JAVA Programming (JP)	3	4	-	7	20	80	#25		25	150	3	2	Common for CO & IT	Comp	No	JAVA Prog (JP)5P406
5	IV	6S404	Operating Systems (OS)	4	2	-	6	20	80	--	@25	25	150	3	2	Common for CO & IT	Comp	Yes	Operating Systems (OS) 5P407
Optional Courses (Any One from Group I)																			
6	IV	6S406	PHP prog (PHPP)	1	4	-	5	--	--	#50	-	75	125	-	2	Common for CO & IT	Opt	Yes	Newly Added Course
7	IV	6S407	Ruby prog (RP)	1	4	-	5	--	--	#50	-	75	125	-	2	Common for CO & IT	Opt	Yes	Newly Added Course
8	IV	6S408	Python Prog (PythonP)	1	4	-	5	--	--	#50	-	75	125	-	2	Common for CO & IT	Opt	Yes	Newly Added Course
9	IV	6S409	Android Prog (AP)	1	4	-	5	--	--	#50	-	75	125	-	2	Common for CO & IT	Opt	Yes	Newly Added Course
			TOTAL	**14**	**20**		**34**	**80**	**320**	**150**	**50**	**250**	**850**						

Legends : TH-Lecture; TU-Tutorial/Teacher Guided Theory Practice ; PR- Practical; C- Credits; ESE- End Semester Examination,Comp-compulsary,Opt-Optional;
PT – Progressive Test, PA- Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

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DATE: 24/6/2019

Curriculum Strucutre of FIFTH Semester Courses.

Name of Programme : Computer Engineering

Fifth Semester Courses

sr. no.	semister	Course code	course Name	Teaching Scheme/Credits				Examination Scheme (Maximum Marks)								Remarks	Compulsury/ Optional	Degree Award Course	Equivalent to 5th Curriculum
				Theory (TH)	Practical (PR)	Tutorial (TU)	Total Credit (C)	PT	TH	PR	OR	PA (TW)	Total	Theory Exam Hours	Practical Exam Hours				
1	V	6S305	Industrial Management (INM)	3	2		5	20	~80		--	25	125	3	2	Common for CO & IT	Compulsory	No	Industrial Management (INM) 5G305
2	V	6P401	Advanced Microprocessor & Micro-Controllers (AMM)	4	2		6	20	80		#25	50	175	3	2	-	Compulsory	Yes	Microprocessor & Programming (MPP) 5S301
3	V	6P402	Mobile Computing (MOC)	3	2		5	20	80	@25		25	150	3	2		Compulsory	No	(ES) 5P501 (MOC) 5P414
4	V	6P403	Computer Networks (CN)	4	2		6	20	80		#25	25	150	3	2		Compulsory	Yes	Computer Networks (CN) 5S403
5	V	6P404	Linux Prog Lab (LPL)	1	4		5		--	#50		75	125		2		Compulsory	Yes	Linux operating System (LOS) 5P508
6	V	6S501	Seminar (SMR)	--	2	--	2		--	--	#25	50	75	-	2	Common for CO & IT	Compulsory	Yes	Seminar (SMR) 5S401
Optional Courses (Any One from Group II)																			
7	V	6P405	Info. Storage Management System(ISMS)	3		2	5	20	80		@25	25	150	3	2		Optional	Yes	Newly Added Course
8	V	6T406/6P406	Data Warehousing & Mining(DWM)	3		2	5	20	80		@25	25	150	3	2	Common for CO & IT	Optional	Yes	Newly Added Course
9	V	6T407/6P407	Cloud Computing(CC)	3		2	5	20	80		@25	25	150	3	2	Common for CO & IT	Optional	Yes	Newly Added Course
			TOTAL	**18**	**14**	**2**	**34**	**100**	**400**	**75**	**100**	**225**	**900**	**15**	**18**				

Legends : TH-Lecture; TU-Tutorial/Teacher Guided Theory Practice ; PR- Practical; C- Credits; ESE- End Semester Examination;
PT – Progressive Test, PA- Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal, ~ Online Exam

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DATE: 24/6/2019

Curriculum Strucutre of SIX Semester Courses.

Name of Programme : Computer Engineering

Six Semester Courses

sr. no.	semister	Course code	course Name	Teaching Scheme/Credits				Examination Scheme (Maximum Marks)								Remarks	Compulsury/ Optional	Degree Award Course	Equivalent to 5th Curriculum
				Theory (TH)	Practical (PR)	Tutorial (TU)	Total Credit (C)	PT	TH	PR	OR	PA (TW)	Total	Theory Exam Hours	Practical Exam Hours				
1	V	6G306	Entrepreneurship Development (EDP)	2	2	--	4	--	--	--		50	50			Common for CO & IT	Compulsory	No	Entrepreneurship Development (EDP) 5G303
2	V	6P501	Computer Security & Cyber Laws(CSCL)	4	2	--	6	20	80	@25		25	150			-	Compulsory	Yes	CS 5P502 & PECSL 5P412
3	V	6S502	Project Work (PW)	--	4	--	4	--	--	--	#50	100	150			Common for CO & IT	Compulsory	Yes	Project Work (PW) 5S410
4	V	6S504	Advanced JAVA Programming(AJP)	3	4	--	7	20	80	#25		25	150			Common for CO & IT	Compulsory	Yes	Newly Added Course
5	V	6S505	Software Testing(ST)	3	2	--	5	20	80	#25		25	150			Common for CO & IT	Compulsory	Yes	Software Testing(ST) 5P408
6	V	6S503	Implant Training (IT)	--	4	--	4	--	--	--	@50	50	100			Common for CO & IT	Compulsory	No	Seminar (SMR) 5S401
Optional Courses (Any One from Group III)																			
7	V	6P502/ 6T502	Advanced Database Management Systems (ADBMS)	3	2	--	5	20	80	--	#25	25	150				Optional	Yes	Advanced Database Management Systems (ADBMS) 5P416
8	V	6P503/ 6T503	Geographical Information System(GIS)	3	2	--	5	20	80	--	#25	25	150				Optional	Yes	Newly Added Course
9	V	6P504	Object Technology & UML(OTU)	3	2	--	5	20	80	--	#25	25	150				Optional	Yes	Newly Added Course
				15	20		35	80	320	75	125	300	900						

Legends : TH-L(TOTAL

PT – Progressive Test, PA- Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal, ~ Online Exam

HOD ---------- Engineering

Govt. Polytechnic, Aurangabad.

COURSE TITLE **BASIC MATHEMATICS**

COURSE CODE **6G101**

Diploma Programme in which this course is offered	Semester in which offered
CE/ME/EE/ET/IT/CO/AE	First Semester

1 RATIONALE

This course is classified under foundation level courses and intends to teach students basic facts, concepts and principles of mathematics, as a tool to analise engineering problems. Diploma engineers have to solve the problems in engineering.
Basic mathematics is an attempt to initiate the multi-dimensional logical thinking and reasoning capabilities of the students.

2 COMPETENCY

At the end of studying this course students will be able to
"**Solve engineering problems by using analytical and systematic approach."**

3 COURSE OUTCOMES

Students will be able to apply rules of Logarithms in solving simple engineering

Problems

1. Solve simultaneous equations using concepts of Determinants and Matrices
2. Solve simple engineering problems using concepts of Partial Fractions
3. Solve simple engineering problems by applying formulae of trigonometry.
4. Solve simple engineering problem of function using the different definition of Function
5. Solve simple engineering problem of function using the rules of Limits.

4 TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PT	ESE	PA	
03	01	--	04	80	20	--	--	100
Exam Duration				03 Hrs.	01 Hr.			

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice(batch-wise);
P - Practical; **C** – Credit, **ESE** - End Semester Examination; **PT** - Progressive Test; OR-Oral examination

5 COURSE DETAILS:-

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit I Revision	1a.To recall/know the basic concept of Logarithms and Determinant of order 2and3	1.1 Logarithms 1.2 Definition natural and common logarithms. 1.3 Laws of logarithm . 1.4 Definition of Determinant, Order of Determinant. 1.5 Expansion of Determinant of order 2 and 3. 1.6 Properties of Determinant.
Unit II Determinant And Matrices	2a.Students will be able to Solve simultaneous equations using concepts of Determinants and Matrices	2.1 Cramer's Rule. (solution of simultaneous equations in two and three unknowns) 2.1 Definition of matrix: Type of matrix: viz.- null, row, column, Square, diagonal, scalar, unit, Triangular. 2.2 Algebra of matrices –addition, subtraction and multiplication . 2.3 Transpose of a matrix. 2.4 adjoint of a matrix Relation. 2.5 Inverse of matrix by adjoint method. 2.6 Solution of simultaneous equations in two and three Unknowns using Inverse of matrix method .
Unit III Partial Fractions	3a.Students will be able to solve simple problems Using concepts of Partial Fractions	3.1 Definition of Partial fraction, proper and improper fractions, rational fractions. 3.2 To resolve given rational fraction into partial fractions. 3.3 Denominator containing non repeated linear factors. 3.4 Denominator containing repeated linear factors. 3.5 Denominator containing irreducible non-repeated quadratic factors.

		3.6 Different types of examples.
Unit IV Trigonometry	4a.Students will be able to Solve simple problems by applying using concepts of trigonometry.	4.1 Trigonometric ratios of allied, compound and multiple angles. 4.2 Trigonometric Ratios of allied angles. 4.3 Trigonometric Ratios of compound angles. 4.4 Trigonometric Ratios of multiple angle Product, sum and difference formulae. 4.5 Sub-multiple angles. 4.6 Definition of inverse trigonometric, ratios. 4.7 Principal value of inverse trigonometric ratios. Relation between inverse trigonometric ratios. 4.8 Examples on inverse circular functions.
Unit V Function	5a.Students will be able to Solve the problem of function using the concept of Function	5.1 Cartesian products of sets. 5.2 Definition of relation, definition of function, real value. Function, domain, co-domain of a function. 5.3 Types of Functions. 5.4 Value of the function at given point . 5.5 Composite function. 5.6 Different types of examples on functions .
Unit VI Limits	6a. Students will be able to Solve the problem of function using the concept of Limit	6.1Definition and concept of limit, limits of algebraic functions. 6.2 Limits of trigonometric functions. 6.3 Limits of exponential functions. 6.4 Limits of logarithmic functions.

6. SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
1	Revision	02	0	0	0	0
2	Determinants and Matrices	12	04	08	12	24
3	Partial Fractions	06		04	04	08
4	Trigonometry	14	04	08	12	24
5	Function	04	02	02	04	08
6	Limits	10	04	04	08	16
	TOTAL	**48**	**14**	**26**	**40**	**80**

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

7 SUGGESTED EXERCISES/PRACTICAL/TUTORIAL

1) The tutorial/practical/exercises should be properly designed and implemented with an attempt to develop different types of cognitive and practical skills so that students are able to acquire the competencies.

2) Form a batch of 20 students and at least 10 problems should be given to get necessary exercise.

Sr. No.	**Title/Topic**	**Exercises/Tutorial**	Approx. hours
1	Determinants and Matrices	Solving problems on cramer's rule Examples on Matrix Addition/Subtraction and Product Co-factors, Ad joint and Inverse of Matrix Solution of Simultaneous Equation using 3X3 Matrix and its Applications	02 02 02

2	Partial Fractions	Examples related Definition and cases	02
3	Trigonometry	Practice Examples: Allied & Compound Angles. Examples related inverse trigonometric ratios	04
4	Function	Examples related Definition and Rules.	02
5	Limits	Examples related to different types of function.	02

8. SUGGESTED STUDENT ACTIVITIES

--------N.A.-----

9. SPECIAL INSTRUCTIONAL STRATEGIES (if any)

1 Chalk-board method.
2 Projector method.
3 Tutorial method.

10. SUGGESTED LEARNING RESOURCES

Sr. No.	**Title of Book**	**Author**	**Publication**
1	Mathematics for polytechnic students for first year	S.P.Deshpande	Pune vidhyarti gruh prakshan Pune
2	Mathematics for polytechnic students for first year	G.V.Kumbhojkar	Phadke prakashan Kholapur
3	Mathematics for polytechnics	TTTI Bhopal	TTTI Bhopal

11 Major Equipment/ Instrument with Broad Specifications

Sr.NO.	Name of the Equipment	Specification
	NA	

12. Software/Learning Websites

POs and PSOs assignment and its strength of assignment with each CO of the Course

CO. NO.	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PS01	PSO2	PSO3
CO1	To able the basic concept of Logarithms and Determinant of order 2 and 3	1	1	0	0	0	0	0	0	0	0	-	-	-
CO2	Students will be able to Solve simultaneous equations using concepts of Determinants and Matrices	3	1	1	-	-	-	-	-	-	-	-	-	-
CO3	Students will be able to solve simple problems Using concepts of Partial Fractions	1	1	1	-	-	-	-	-	-	-	-	-	-
CO4	Students will be able to Solve simple problems by applying using concepts of trigonometry.	3	2	1	-	-	-	-	-	-	-	-	-	-
CO5	Students will be able to Solve the problem of function using the concept of Function	1	1	-	-	-	-	-	-	-	-	-	-	-
CO6	Students will be able to Solve the problem of function using the concept of Limits	1	3	-	-	-	-	-	-	-	-	-	-	-

13. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Sr. No	Name of the faculty member	Designation and Institute
1	Mr. M.A. Ali	Lecturer in Mathematics, Government Polytechnic Aurangabad
2	Mr. R.B. Borulkar	Lecturer in Mathematics, Government Polytechnic Aurangabad
3	Mrs. H.H. Bhumkar	Lecturer in Mathematics, Government Polytechnic Aurangabad

Member Secretary PBOS Chairman PBOS Co-coordinator science and Humanities

COURSE TITLE **ENGINEERING PHYSICS**
COURSE CODE **6G103**

Diploma Programmes in which this course is offered	Semester in which offered
ME/CE/ET/EE/CO/IT/AE	First/Second Semester

1. RATIONALE

Engineering Physics represents foundation level of courses. It is considered as the mother of all engineering programmes. The principles, laws, hypothesis, concepts, ideas which are acquired by students through this course help in reinforcing the knowledge of technology and solving engineering problems.

2. COMPETENCIES

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competencies…

I. Apply facts, concepts and principles of Physics for solving various Engineering Problems
II. Observe, describe, interpret and interact with physical and engineering world through concepts and principles of physics.

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			**Total Credits (L+T+P)**	**Examination Scheme**				
				Theory Marks		**Practical Marks**		**Total Marks**
L	T	P	C	ESE	PT	ESE	PA	**150**
3	0	2	5	80~	20~	25@	25	
Exam Duration				2 Hrs.	1 Hr.	2 Hrs.		

Legends: **L**-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** - Practical;
C – credit; **ESE** - End Semester Examination; **PA** - Progressive Assessment;
PT- Progressive Test**; ~** - Multiple choice Online Examination
@ Internal Examination

4. COURSE OUTCOMES:

Students will able to

1. Determine relevant physical properties of a given material.
2. Analyze thermal, optical and acoustical system using properties of heat, light and sound.

3. Apply fundamentals electrical laws.
4. Select different type of semiconductors, x-ray and optical fibre application.

5. COURSE DETAILS:-

Unit	Major Learning Outcomes	Topics and Sub-topics
UNIT-I Genral Propertis of Matter	1a. Measure Strength parameter. 1b. Measure automization and lubricity of given liquid.	**Elasticity:** 1.1 Definitions of deforming force, restoring force, elasticity, plasticity, Factors affecting elasticity.· 1.2 Stress Tensile, Compressive, Volumetric and Shear stress, Strain: Tensile, Volumetric and Shear strain. 1.3 Elastic limit, Hooke's law. Elastic co-efficient- Young's modulus, bulk modulus, modulus of rigidity and relation between them **Viscosity** 1.4 Viscous force, definition of viscosity, velocity gradient, Newton's law of viscosity, coefficient of viscosity and its SI unit. 1.5 Streamline and turbulent flow with examples, critical velocity, Reynold's number and its significance. **Surface tension** 1.6 Cohesive and adhesive force, Laplace's molecular theory of surface tension, Surface Tension: definition and unit, 1.7 effect of temperature and impurity on surface tension. Angle of contact, Capillarity and examples of capillary action 1.8 derivation of expression for surface tension by capillary rise method, applications of surface tension.

UNIT-II Heat Light And Sound	2a. Analyze thermal system. 2b. Analyze optical system. 2c. Analyze acoustic system.	**Heat** : 2.1 Three modes of transistor of heat , conduction convection Radiation , law of thermal conductivity 2.2 Coefficient of thermal conductivity , , expansion of solid and coefficient of linear , aerial and cubical expansion & relation between them **LIGHT** : 2.3 Introduction to reflection and refraction of light, Snell's Law, 2.4 Dispersion. Total internal reflection of light. Critical angle, Simple problems. **Properties of sound** : 2.5 Wave motion transverse & longitudinal wave 2.6 Free & forced vibration , Resonance formula calculate velocity of sound by resonance tube method
UNIT-III Electrostatics And Current Electricity	3a.Analyze electrical system.	3.1 Electric charge, Coulomb's Law of Charges, Unit charge, field, intensity of electric field, electric lines of forces (Properties) Electric Flux, Flux Density. 3.2 Concept of resistance, Specific resistance, Whetstone's network, meter bridge, balancing condition of meter bridge, measurement of unknown resistance using meter bridge. Problems. 3.3 Potential , Potential drop along the length of wire, Principle of Potentiometer, Potential gradient, E.M.F. Unit, Comparison of EMF using potentiometer

UNIT-IV Modern Physics	4a. Use modern materials 4b. Use X-ray	Semiconductor – 4.1 Classification of solids on the basis of band theory: forbidden energy gap, conductor, insulator semiconductor 4.2 intrinsic, extrinsic, semiconductor doping , P and n type semiconductor electrical conduction through p and n semiconductor .P-N junction diode semiconductor metal and insulator. 4.3 Optical fibre: principle, structure of optical fibre, propagation of light wave through optical fibre, derivation of numerical aperture and acceptance angle **X-rays:** 4.4 Origin of X-rays, production of X-rays using Coolidge's X-ray tube 4.5. Minimum wavelength of X-ray derivation, properties of X-rays, applications of X- rays: engineering, medical and scientific

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total
1	GENERAL PROPERTIES OF MATTER	12	6	7	7	20
2	HEAT LIGHT AND SOUND	12	6	7	7	20
3	ELECTRICITY	12	6	7	7	20
4	MODERN PHYSICS	12	6	7	7	20
	TOTAL	48	24	28	28	80

Legends:
R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's taxonomy)

7. SUGGESTED LIST OF EXERCISES/PRACTICAL/EXPERIMENTS

The exercises/practical/experiments should be properly designed and implemented with an attempt to develop different types of skills leading to the achievement of the competency. Following is the list of exercises/practical/experiments for guidance.

Sr. No.	Unit No.	Experiment /Practical Exercises	Approximate Hours
1	1	Know your Physics Laboratory and use of scientific calculator & interpretation of graph.	2
2	2	Measure the dimensions of given objects using vernier caliper.	2

3	3	. Determine Young's modulus of elasticity of metal wire by using Searle's apparatus	2
4	4	Measurement of unknown temperature using platinum resistance thermometer.	2
5	5	To determine critical angle using glass block	2
6	6	. Determine coefficient of viscosity of given liquid using Stoke's Method	2
7	7	To determine specific resistance of given wire using Ohm's Law	2
8	8	To verify the Law of Resistance in series by Meter bridge.	2
9	9	To study the forward characteristics of P-N junction diode	2
10	10	To understand the concept of resonance and determine the velocity of sound in air.	2
11	11	Comparison of EMF of two cells using Potentiometer	2
Micro Project (Any one of following will be opted by a group of 5-6 students)			
1	Survey of different diodes, resistances and capacitance		
2	Prepare current and voltage rating of home appliances		
3	To make the telescope using lenses		
4	Analyse the different toys and watch on the basis of property of Elasticity		
5	Analyse the different liquidator on the basis of property of surface tension		
6	To collect the information from internet regarding distribution of sound at Gowalkonda fort		
7	To collect the information from internet regarding distribution of sound at Golghumut at Vaijapur		

8. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

Following is the list of proposed student activities

a. Calculate acoustics of given class room.
b. Prepare a chart of applications of optical fibre in different fields.
c. Demonstrate different types of capacitors.
d. Seminar by student on any relevant topic.

9. SPECIAL INSTRUCTIONAL STRATEGIES

a. Search various sites to teach various topics/sub topics.
b. Instead of the traditional lecture method, use different types of teaching methods such as improved lecture method, question answer method, laboratory method to attained specific outcome.
c. Some topics are relatively simpler in nature is to be given to the students for self-learning by seminar or by classroom presentations
d. Teachers provide theme to create multiple choice questions.
e. Provide super visionary assistance for completion of micro-projects.

10. Hours distribution for Physics Experiments :

Sr. No.	Description	Hours
1	An introduction to Physics laboratory and its experiments (for the set of first four experiments)	02
2	Set of first four experiments	08
3	An introduction to experiments (for the set of next four experiments)	02
4	Set of next four experiments	08
5	An introduction to experiments (for the set of next three experiments)	02
6	Set of next three experiments	06

11. SUGGESTED LEARNING RESOURCES LIST OF BOOKS

Sr No.	**Title of Books**	**Author**	**Publication**
1	Basic Science Physics	Pawar and Sutar	Nirali Publication
2	Applied Physics	B.G. Bhandarkar	Vrunda Publication
3	Engineering Physics	R.K. Gupta and S.L Gupta	Dhanpat Rai Publication
4	Applied Physics	Pawar, Umrani and Joshi	Nirali Publication
5	Basic Physics	B.G. Bhandarkar, S.N. Jumde	Vrunda Publication
6	Physics Text Book Part -1 for Class - 12	NCERT	NCERT; 2014 edition **ISBN-13:** 978-8174506313
7	Physics Text Book Part -2 for Class - 12	NCERT	NCERT; 2014 edition **ISBN-13:** 978-8174506719
8	A text book of applied physics		S Chand Publication

12. List of Major Equipment/ Instrument

1. Platinum resistance thermometer
2. Thermocouple
3. Meter bridge
4. Potentiometer

13. E-learning resources

1. www.physicsclassroom.com for unit II and unit III
2. www.fearofphysics.com for unit III
3. www.sciencejoywagon.com/physicszone for unit III and IV
4. www.science.howstuffworks.com
5. https://phet.colorado.edu/en/simulations/category/physics for unit I, II, III and IV

POs and PSOs assignment and its strength of assignment with each CO of the Course

CO. NO.	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	**Student will able to calculate young's modulus ,surface tension and viscosity of different material**	3	3	3	2	-	1	-	-	-	2	-	-	-
CO2	**Student will able to demonstrate different properties of heat ,light and sound**	3	3	2	2	-	2	-	-	-	1	-	-	-
CO3	**Student will able to demonstrate different laws of electric field, charge resistance and capacitance**	3	3	3	3	-	2	1	-	-	1	-	-	-
CO4	**Student will able to demonstrate different type of semiconductors, x-ray and optical fiber knowledge and application**	3	3	3	3	-	3	-	-	-	-	-	-	-

14. Name and Designation of Course Designer

Sr. No	Name of the faculty member	Designation and Institute
1	Mr. V.S Deshmukh	Lecturer in Physics, Government Polytechnic Aurangabad
2	Mrs. S.B.Kale	Lecturer in Physics, Government Polytechnic Aurangabad
3	Mrs. Z.F.Siddiqui	Lecturer in Physics, Government Polytechnic Aurangabad

Member Secretary PBOS Chairman PBOS Co-coordinator science and Humanities

COURSE TITLE- **BASICS OF COMPUTER SYSTEM**

COURSE CODE **6G203**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Common to all branches (CE/ME/EE/ET/CO/IT/AE/DDGM)	FIRST SEMESTER

1. RATIONALE

This course pertains to basic technology level. It aims to developing fundamentals of Computer and its Applications in students of various programs. This will enable students in using application software's such as word processor, spreadsheets, and power point presentations in their professional fields. Further it will enable students to be lifelong learner.

2. COMPETENCY

"Use of computer and software application proficiently".

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (PR)	PA (TW)	50
-	-	2	2	--	--	25@	25	
Duration of the Examination (Hrs)				--	--	--	--	

Legends : L-Lecture**; T**-Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

On successful completion of the course, the students will be able to:

1. Connect and operationalize computer system with its peripheral devices.
2. Create and Format documents in Microsoft Word.
3. Create spreadsheets in Microsoft Excel by using formulae.

4. Create and edit basic power point presentations in Microsoft PowerPoint.
5. Use internet for creating email-id, receive and send email with attachment & search information on internet.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit- 1 Basics of Computer System	1a.Describe computer hardware and software 1b.Identify & use of I/O devices 1c. Describe functioning of CU ALU and memory unit 1d Differentiate various types of printers 1e. Explain use of OS 1f. Demonstrate various file handling operations	1.1 Concept of Hardware and Software 1.2 Computer block diagram and its component like CPU, Control Unit, Arithmetic logic Unit (ALU) & Memory Unit 1.3 Input Output Devices: Keyboard, Mouse, Scanner, Monitor, Printers: Dot matrix, Laser, Inkjet, Plotters. 1.4 System software and Application Software 1.5 Operating system concepts, purpose and functions 1.6 Operations of Windows OS. 1.7 Creating and naming of file and folders 1.8 Copying file, renaming and deleting of files and folders, 1.9 Searching files and folders, installation application, creating shortcut of application on the desktop 1.10 Overview of control Panel, Taskbar.
Unit-2 Word Processor	2a. Create, edit and save word document using basic text formatting features, page setup options & print options. 2b.Apply spell check & grammatical check in the created document. 2c. Insert graphics/clipart/ smart art/shapes/charts in the document. 2d. Create tables, insert, delete rows and columns and apply different table properties.	2.1 Overview of Word processor 2.2 Basics of Font type, size, colour 2.3 Effects like Bold, italic , underline, Subscript and superscript, 2.4 Case changing options, 2.5 Inserting, deleting, undo and redo, Copy and Moving (cutting) text within a document, 2.6 Formatting Paragraphs and Lists 2.7 Setting line spacing; single, multiple 2.8 Page settings and margins including header and footer 2.9 Spelling and Grammatical checks 2.10 Table and its options, Inserting rows or columns, merging and splitting cells. 2.11 Insert Picture, Clipart, shapes, smart art & charts.

		2.12 Working with pictures, Inserting Pictures from Files, Wrapping it with image. 2.13 Finding & replacing text. 2.14 Using Drawings and WordArt; Lines and Shapes, Modifying Drawn Objects. 2.15 Printing: print preview, select printer & appropriate print options.
Unit- 3 Excel (Spreadsheets)	3a. Create, open, save and print worksheet with page setup and print options. 3b. Enter data and insert, delete and format cells, rows and columns. Use formula and functions 3c. Insert formulas, functions and named ranges in worksheet. 3d. Create chart of different types.	3.1 Introduction to Excel, 3.2 Introduction to data, Cell address, Excel Data Types, Concept of hyperlink 3.3 Introduction to formatting number, text and date. 3.4 Concept of worksheet and workbook. 3.5 Understanding formulas, Operators in Excel, Operators Precedence, Understanding Functions, Common Excel Functions such as sum, average, min, max, date, sqrt, power, upper, lower, count, countif, roundup, sin, cos. 3.6 Introduction to charts, overview of different types of charts available with Excel. 3.7 Hide, unhide rows and columns. 3.8 Concept of print area, margins, header, footer and other page setup options.
Unit- 4 Power Point Presentation	4a. Create a simple text slide using formatting, selecting a slide layout and insert pictures & backgrounds. 4b.Use different design templates for creating slides. 4c. Apply slide transitions and slide timings and animation effect for slide show. 4d. Insert hyperlink in the created slides.	4.1 Outline of an effective presentations 4.2 Starting a New Presentation Files, Saving work, 4.3 Creating new Slides, Working with textboxes. 4.4 Changing a slides Layout, Applying a theme, Changing Colours, fonts and effects, Creating and managing custom Colour & font theme, Changing the background. 4.5 Use of design template and auto content wizard. 4.6 Apply animation and transition to slides with timing effect. 4.7 Slideshow: from beginning slideshow, from current slideshow, custom slideshow. 4.8 Creating hyperlinks**,** Using action buttons
Unit- 5 Introduction to Internet	5a. Know different terms related to internet and browsers. 5b. Understand need & duty of ISP & List out different ISP in	5.1 What is the Internet? 5.2 Web pages, Home Pages. 5.3 Use of web sites 5.4 ISP: need & duties of ISP, different ISP

	city. 5c. Use internet for searching information and create, receive & send email with attachment.	in city 5.5 Browsers 5.6 Universal resource locators (URL) 5.7 Browsing or surfing the web 5.8 Search engines 5.9 E-mail and Creation of E-mail ID. Sending & Receiving email with attachment. 5.10 Chatting & Video Conferencing tools: Skype and GTalk 5.11 Applications of the Internet

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Practical Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
1	Basics of Computer System	08				NA
2	Word Processing	08				NA
3	Spreadsheet	06				NA
4	Presentation	06				NA
5	Introduction to Internet	04				NA
6						NA

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	1	Connect the peripherals to a computer system. Get the information about the manufacturers and prices of various components of a PC and laptop.	2
2	1	Start and shutdown of windows, starting different applications. Use of accessories like calculator, paint, notepad	4

		& WordPad, Use of system tools like Disk Cleaner, Disk defragmenter, System Information, System Restore & Control panel.	
3	1	Perform file management operations such as copying, deleting, renaming, creating folders, renaming folders using My computer, Windows Explorer, searching files and folders.	2
4	1	Change windows format such as wall paper, date &time, installing printer, installing and removing programs by using add/remove programs.	2
5	2	Prepare a sample doc files such as resume, application, time table etc. using all word processor tools from menu bar.	6
6	3	Prepare sample spreadsheets such as sample result sheet, salary sheet of employees using all MS-Excel tools from menu bar. (applying excel formulae/functions)	6
7	4	Prepare sample power point presentation by applying MS-Power Point tools such as design template, background, transition and animation effect to slides.	6
8	5	Search information on internet .Use Internet to create email account, send email with attachment, receive email and management of email account.	2
9	5	Use of E-commerce sites, Mobile apps for various online transactions.	2
			32

8. SUGGESTED STUDENTS ACTIVITIES

Following is the list of proposed student activities like: assignments based on MS-Office, teacher guided self-learning activities and lab based mini-projects on MS-Word, MS-Excel and MS-PowerPoint. These could be individual or group-based.

a. Visit institute website.
b. Manage files and folder using Windows.
c. Prepare letter and project report using word processor
d. Create result sheet by inserting student marks and show it in chart form on the same worksheet using Excel spreadsheet.
e. Develop effective presentation of project report using PowerPoint Presentation.
f. Use open source software like openoffice.org (latest version).

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Group based.
b. Q & A technique.
c. Individual based.
d. Activity based learning
e. Self Line learning.

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Fundamentals of computers	P.K.Sinha	BPB Publication
2.	Computer course	R.Taxali	TMGH Publication
3.	MS-Office for Dummies	Wallace Wang	Wiley India, New Delhi
4.	Basic Computer Engineering	Dr. Shailendra Singh, Pawan Thakur, Anurag Jain	Satya Prakashan, New Delhi, India.
5.	Microsoft Office	Ron Mansfield	BPB Publication
6.	Fundamentals of computers	P.K.Sinha	BPB Publication

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment	Brief specification
1.	Computer System with latest configuration along with Windows Operating System and latest MS-Office.	Desktop Computer/Personal Computer (Windows OS Prof. Edition/Academic edition) with preloaded operating systems windows 7/windows 8 (academic Lic)
2.	PROJECTOR	Multimedia Projector with wireless connectivity between PC and Projector
3.	PRINTER	HP 1022n laser printer
4.	SCANNER	HP scanner ,Color Scan Method: Color, Flatbed, Mirror Moving Scanner Optical Resolution: 800 x 1600 dpi Maximum Scanning Area 304.8 x 431.8 mm (12x17 inch)
5.	Computer System with latest configuration along with Windows Operating System and latest MS-Office.	Desktop Computer/Personal Computer (Windows OS Prof. Edition/Academic edition) with preloaded operating systems windows 7/windows 8 (academic Lic)
6.	PROJECTOR	Multimedia Projector with wireless connectivity between PC and Projector

12. LEARNING WEBSITE & SOFTWARE

(Please mention complete URL of the E- resource CO wise)

a. https://www.youtube.com/watch?v=cXBVMyKQ3ZY
b. http://www.gcflearnfree.org/computerbasics/
c. http://www.homeandlearn.co.uk/word2007_2010/Word-2007-2010.html
d. http://www.homeandlearn.co.uk/excel2007/Excel2007.html
e. https://support.office.com/

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Connect and operationalize computer system with its peripheral devices.	2	2	2	-	-	-	-	-	-	2	-	-
2	Create and Format documents in Microsoft Word.	3	-	3	3	-	-	-	-	-	3	-	-
3	Create spreadsheets in Microsoft Excel by using formulae.	3	-	3	3	-	-	-	-	-	3	-	-
4	Create and edit basic power point presentations in Microsoft PowerPoint.	3	-	3	3	-	-	-	-	-	3	-	-
5	Use internet for creating email-id, receive and send email with attachment & search information on internet.	1	1	1	1	-	-	-	-	-	1	-	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	R.T.Aghao	Sr.Lecturer in APM Dept. , Govt. Polytechnic, Aurangabad
2	O.R.Varma	Lecturer in IT Dept., Govt. Polytechnic,Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **FUNDAMENTALS OF COMPUTER & INTERNET TECHNOLOGY**

COURSE CODE **6S201**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engg and Information Technology	First

1. RATIONALE

This is a basic technology level course. Computers are very useful in day to day life. This Course intends to develop basic hardware skills of computer system and internet in students, being laboratory course.

2. COMPETENCY

"Configure Computing device and peripherals on network."
"Use Internet for its application."

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE @ (PR)	PA (TW)	100
1	-	4	05	--	--	@50	50	
Duration of the Examination (Hrs)				--	--	2	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, PR- Practical Examination, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Select computer system as per requirements.

2. Select the application softwares and operating systems as per requirements.
3. Select the network topologies.
4. Change the network protocols as per requirements.
5. Use Information technology

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
UNIT I Anatomy of Computer System	1a. Identify various parts and devices of computer system.	1.1 Anatomy of computers: 1.2 Motherboard, CPU,SMPS, Expansion slots, Drives, Storage devices. Input devices: Keyboard, Mouse, Pen, Touch 1.3 Screen, Scanners Output devices: Monitors, LCD, LED, 1.4 Printers, tablets. Memory**:** RAM, ROM, Cache, Auxiliary Memory, HDD, CD, DVD, Blue ray and USB Drives 1.5 IT Infrastructure Components: Computer Hardware, Operating System, Software, 1.6 Network components
UNIT II Types of Software	2a. Select appropriate operating system and software.	2.1 Types of software: Overview of System software and application software, Operating system, Utility software, drivers, compilers and interpreters. 2.2 Operating system: Windows :Desktop, 2.3 Control Panel, Driver installation, 2.4 create users, rename computer, manipulate 2.5 taskbar, power management, screensaver, 2.6 Install new peripheral
UNIT III Basics of Computer Networking	3a. Identify suitable network with various devices.	3.1 Network advantages like resource sharing, file sharing, common Storage. 3.2 LAN, MAN, WAN, Internet, 3.3 Networking infrastructure: Repeater, Bridge, 3.4 Hub, Switch, Router, Firewall, Gateway, NIC, Cables, MODEM

UNIT IV **Basics of Internet, Its Applications & Security**	4a. select appropriate web connections and browsers.	4.1 Internet basics: Dial up Connection, DSL, Leased line connectivity, Wi-Fi Connection, 4.2 Browsers: IE, Firefox, Chrome. 4.3 Protocols : http, https, www, IP, setting up 4.4 Internet connection on DSL, setting up 4.5 Internet on local network. 4.6 DNS: types with examples 4.7 Search engines : Google, yahoo, bing: search 4.8 images, maps, news, search content using 4.9 Different criteria. 4.10 Applications of Internet : www, mail, news, 4.11 Chat, social networking. 4.12 Threats to IT infrastructure : Physical, 4.13 Access level : password breaks, hacking, web based threats like weak passwords, 4.14 social engineering, pirated software, 4.15 unethical websites, Malicious programs, 4.16 infrequent updates, protecting and mitigating 4.17 threats : Use of Anti Virus software, 4.18 scanning computer regularly, updating antiV
UNIT V **Introduction to Information Technology**	5a. use of ethics in Information technology	5.1 Information Technology: Understanding the need of Information, Data, Knowledge, Difference between Data, Information and Knowledge. 5.2 Benefits of IT infrastructure, Ethical issues : Plagiarism, Use of License Software, copyright infringement, Intellectual property 5.3Rights, its impact on IT. Downloading and installation of skype.

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
I	**Anatomy of Computer System**	**2**	Not Applicable			
II	**Types of Software**	**2**				
III	**Basics of Computer Networking**	**3**				
IV	**Basics of Internet, Its Applications & Security**	**3**				
V	**Introduction to Information Technology**	**6**				
	Total	16				

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1.	I	Install new application software using control panel.	02
2.	I	Shrink the hard disk partition for more partitions	04
3.	I	Create users with full control, limited control.	02
4.	I	Set screen savers and energy management in Windows.	04
5.	II	Set window resolution	02
6.	II	Perform configuration using CMOS setup.	04
7.	II	Dissemble and Identify Motherboard, CPU, SMPS, Expansion slots, Drives, storage devices.	04
8.	III	Identify IP address, Network mask, Computer Name in local Network.	04

9.	III	Study of different ports such as PS/2,NIC,Serial & parallel.	02
10.	III	Burn/Copy data on CD.	02
11.	IV	Perform Printer Installation and self test.	02
12	IV	Perform connection of speakers and microphones.	02
13	IV	Maintain keyboard and mouse.	02
14	IV	Perform scanner Installation and scanning procedure of scanning a document.	02
15	IV	Select network devices for given application.	04
16	V	Use E-mail.	04
17	V	Perform Download and install on skype.	04
18	V	Create a group mail, add class mates to group mail and send them 'Welcome e-mail'.	04
19	V	Use Google maps and find out location of your institute.	04
20	V	Apply passwords of your computer system.	02
21	V	Change the size of scanned images.	02
TOTAL			64

8. SUGGESTED STUDENTS ACTIVITIES

Other than class room and laboratory activities following are the suggested guided co-curricular students activities which need to be undertaken to facilitate the attainment of various course outcomes of this course. The students are required to maintain portfolio of their experiences which he/ she will submit at the end of the term.

Following is the list of proposed student activities like:

1. Students will prepare file for the above mentioned Practicals.
2. Students will prepare the tutorial book for tutorial sessions.The questions and assignments will be solved in that and progressive assessment will be done by the teacher.
3. Tutorials are to be conducted batchwise for better understanding of subject.
4. Study of different ports such as PS/2,NIC,Serial & parallel

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

1. Guide students in preparing charts and display boards.
2. Guide students in searching information regarding datasheets and electronic components.
3. Demonstrate practical thoroughly before the students perform.
4. Show Flash/Video/Animation clippings for functioning of instruments.
5. Observe continuously and monitor the performance of students in lab.
6. Assign different types of Mini-projects
7. Guide students in preparing Micro-projects.

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Mr.David strone and Alfred Poor	Troubleshooting your PC.	Prentice Hall
2.	David Groth	A+ complete	PBP Publication
3.	Dennis P. Curtin, Kim Foley	Information Technology	Tata Mcgraw Hill

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment	Brief specification
1.	Computer System with latest configuration and memory	As per Computer industry specification
2.	Network devices and cables.	As per Computer industry specification

12. LEARNING WEBSITE & SOFTWARE

1 www.nptel.com
2.Weleys computing Resources
3.Fundamentals of computer: http://www.w3schools.in

Software's:

1. **Any antivirus software .**

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Select computer system as per requirements.	-	3	-	-	-	-	-	-	-	-	-	-
2	Select the application softwares and operating systems as per requirements.	-	3	3	-	-	-	-	-	-	-	-	-
3	Select the network topologies.	-	3	-	-	-	-	-	-	-	-	-	-
4	Change the network protocols as per requirements.	-	3	3	3	-	-	-	-	-	-	-	-
5	Use Information technology	-	3	-	-	-	-	-	-	-	3	-	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Nilophar Masuldar	Lecturer in Computer Engineering, Govt Polytechnic, Aurangabad
2	Prajakta Sadafule	Lecturer in Computer Engineering, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE ENGLISH
COURSE CODE 6G301

Diploma Programme in which this course is offered	Semester in which offered
Common to all programmes	First

1. RATIONALE

English language has become a supreme necessity to pick up a solid core of knowledge. It has a power of linking us with the outside world. Competency in English is also important in business matters like transactions including e-mails, memos, reports and contracts in writingnot only for Indian industry, but also worldwide. Students having proficiency in reading, writing and speaking English has become a prospect of employment in the industry. Hence, this course is designed to help the students to communicate in English effectively.

2. COMPETENCY

At the end of studying this course students will be able to

"Communicate in English language in spoken and written form."

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PT	ESE	PA	
2	-	2	4	80	20	-	25@	125
Exam Duration				3 Hrs	1 Hr	-	-	-

(*): *Out of 25 marks, 05 marks -micro-project assessment; 20 marks-progressive assessment.*

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; **C** – Credit, **ESE** -End Semester Examination; **PT**- Progressive Test; OR-Oral Examination; **PA**- Progressive Assessment

4. COURSE OUTCOMES

1. Interpret the meaning of new words from the text.
2. Formulate grammatically correct sentences using new words.
3. Prepare resume in proper format.
4. Use relevant vocabulary to construct sentences.

5. COURSE DETAILS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
UNIT-I Comprehension	1a. Understanding meaning of new words from the text. 1b.Write summary of the text 1c. Responding to the questions from the text 1d. Express ideas and views on learned topics	**Text from the book & Vocabulary Building** 1.1.Man Versus Machine—M..K..Gandhi 1.2. Say No to Plastic Bags 1.3. Interview of Dr.A.P.J.AbdulKalam 1.4. Dare to Dream- N.R.Narayan Murthy 1.5. The History Maker—MaltiHola
UNIT-II Functional Grammar	2a. Apply correct verbs in given sentences 2b. Use of correct structures in writing 2c. Identify different types of sentences 2d. Apply correct auxiliaries 2e. Use appropriate connectors in the given sentences 2f. Use appropriate prepositions in the given sentences 2g. Apply correct and exact rules and structures to transform the sentences 2h. Use of correct punctuations in writing	**Functional Grammar** 2.1.Tenses & Time 2.2. Sentence Patterns 2.3. Types of Sentences 2.4. Modal Auxiliaries 2.5. Connectors 2. 6. Prepositions 2.7. Voice, Degree and Reported Speech 2.8. Punctuation Marks
UNIT-III Craft of writing	3a. Writing a paragraph effectively 3b. Writing e-mail in proper formats 3c. Prepare resume in suitable format	3.1.Paragraph Writing 3.2.E-mail writing 3.3. Resume Writing
UNIT-IV Listening & Speaking Skills	4a. Formulate sentences using new words	4.1. Importance of effective listening 4.2.Barriers in listening and how

	4b. Enrich vocabulary through reading and listening 4c. Follow correct pronunciations, intonations & accents in communication	to overcome them 4.3Problems in speaking English faced by Indian Students

6. SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Text from the book & Vocabulary Building	12	08	12	10	30
II	Functional Grammar	12	05	08	13	26
III	Craft of Writing	06	04	04	08	16
IV	Listening & Speaking Skills	02	02	02	04	08
	Total	**32**	**19**	**26**	**35**	**80**

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from the above table.

7. SUGGESTED EXERCISES/PRACTICALS

The tutorial/practical/exercises should be properly designed and implemented with an attempt to develop different types of cognitive and practical skills **(Outcomes in cognitive, psychomotor and affective domain)** so that students are able to acquire the competencies.

Sr. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
1.	I	Make Sentences Using Correct Collocations	04
2.	II	Frame Sentences Using Appropriate Preposition/Conjunction	04
3.	III	Make Sentences Using Correct Tenses	04
4.	IV	Make Sentences Using Seven Basic Sentence Patterns	04
5.	V	Transform Sentences in Reported Speech	04
6.	VI	Prepare an Effective Resume in a Proper Format	04
7.	VII	Draft Formal E-mails	04
8.	VIII	Listen a Paragraph/Speech/Story and Make a	04

		Summary	
Total			**32**

8. SUGGESTED STUDENT ACTIVITIES

Following is the list of proposed student activities like:

a. Read newspapers daily.
b. Solve exercises on lexical items.
c. Use apps for practice.
d. Use pocket dictionary to increase vocabulary.
e. Listen the news bulletin on radio.
f. Play different word games to improve vocabulary.
g. Write different articles & posts.
h. Practice role-playing.
i. Write a story of own experiences.
j. Practice listening comprehension.
k. Collect articles from newspapers & make a collection.
l. Practice paragraph writing.
m. Collect different business letters.

9. SPECIAL INSTRUCTIONAL STRATEGIES (if any)

a. Arrange different competitions to solve various grammatical items.
b. Motivate students to listen, speak, read and write English in their day-to-day life.
c. Student centered methods and techniques of teaching and learning e.g. group discussion, role-play, individual and group assignments should be used so as to make the students actively participate in the teaching-learning process.

10. SUGGESTED TITLES FOR MICRO-PROJECTS

A micro-project is planned to be undertaken by a student. He/she ought to submit it by the end of the semester to develop the industry oriented COs. The micro-project could be industry application-based, internet-based, workshop-based, laboratory-based or field-based. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. A suggestive list is given here. Similar micro-projects could be added by the concerned faculty**:**

a. The use of English language in the user manual of electronic appliances used at home.
b. Prepare an advertisement for five daily used products using contextual vocabulary.
c. Observe environmental problems in your locality and frame at least ten slogans to createan awareness.

d. Take an interview of any successful person in your locality in context with his life journey, inspiration, social contribution, role model and keys to success.
e. Prepare a leaflet giving information about your institute.
f. Write a review of your favourite movie/drama/novel.
g. Find out the difficulties in speaking English faced by the students from rural areas.

11. SUGGESTED LEARNING RESOURCES

Sr. No.	Title of Book	Author	Publication
1	English Grammar & Composition	R. C. Jain	Macmillan
2	Business Letters & E-mails	JyotiNandedkar	Saket Pub.
3	Business Correspondence and Report writing	R. C. Sharma & Krishna Mohan	Tata McGraw Hill
4	Contemporary English Grammar	David Green	Macmillan
5	A Communicative Grammar of English	Geofray Leech &Jansvartvik	Pearson Education
6	*Spectrum- A Text Book on English	-	MSBTE
7	* A Text Book on English	-	MSBTE

12. Major Equipments/ Instruments with Broad Specifications

Sr.No.	Name of the Equipment	Specification
1	Digital English Language Laboratory	
2	Computers and Headphones	
3	Magazines,Articles,Journals in Lab.	

13. E-learning resourses

(Please mention complete URL of the E- resourses CO wise)

1	https://www.nptel.ac.in/courses
2	https://www.k12reader.com
3	https://www.eduaction.com
4	https://www.k5learning.com
5	https://www.english4u.com

POs and PSOs assignment and its strength of assignment with each CO of the Course

CO. NO.	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Interpret the meaning of new words from the text.	3	1	1	1	1	1	1	1	3	1	-	-	-
CO2	Formulate grammatically correct sentences using new words.	3	1	1	1	1	1	1	1	3	1	-	-	-
CO3	Prepare resume in proper format.	1	1	2	1	3	3	2	3	3	3	-	-	-
CO4	Use relevant vocabulary to construct sentences.	1	1	1	1	1	1	1	1	2	1	-	-	-

Sr. No	Name of the faculty member	Designation and Institute
1	Mrs. P.Y. Kamble	Lecturer in English, Government Polytechnic, Aurangabad
2	Mrs. M.S. Ban	Lecturer in English, Government Polytechnic, Aurangabad
3	Mr. P.V. Deshmukh	Lecturer in English, Government Polytechnic, Aurangabad
4	Mr. R.L. Korde	Lecturer in English, Government Polytechnic, Aurangabad
5	Mr. D.D. Gangthade	Lecturer in English, Government Polytechnic, Aurangabad
6	Mr. A.P. Jagtap	Lecturer in English, Government Polytechnic, Osmanabad

Member Secretary PBOS Chairman PBOS Co-coordinator science and Humanities

COURSE TITLE: DEVELOPMENT OF LIFE SKILLS

COURSE CODE: 6G303

Diploma Programme in which this course is offered	Semester in which course is offered
CE/ME/ETX/EE/AE/DDGM/CO/IT	FIRST / SECOND

1 RATIONALE

The generic skills are lifelong skills which need to be developed continuously. These skills are necessary for diploma engineers for their professional career.

This course aims to develop interpersonal skills, problem solving, decision making, Professionalism with etiquettes, ethics and value system.

This course also aims at developing an engineer as a team leader, effective member of the team and to become sound personality. It will develop the abilities and skills to perform at highest degree of quality as an individual.

2 COMPETENCY

"Develop life skills to enhance personal effectiveness, professionalism and optimal use of resources."

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			**Total Credits (L+T+P)**	**Examination Scheme**				
				Theory Marks		**Practical Marks**		**Total Marks**
L	**T**	**P**	**C**	**ESE**	**PT**	**ESE (OR)**	**PA**	
--	--	2	2	--	--	25@	25	50

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; **C** – Credit, **ESE** -End Semester Examination; **PA** - Progressive Assessment

4. COURSE OUTCOMES (COs)

1. Develop interpersonal skills.
2. Exhibit corporate etiquettes and professionalism.
3. Enhance personal effectiveness and body language
4. Practice time management and goal setting technique
5. Develop presentation skills.
6. Manage Stress at workplaces

5 COURSE DETAILS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit –I Self Analysis	1a. Identify Strengths and weaknesses of an individual 1b.Identify opportunities, threats in different situations. 1c. Describe principle of Need Base Theory	**Self-Analysis** 1.1 Strength, weaknesses, opportunities and threats 1.2 Techniques of self-control 1.3 Understanding Need base Theory — Attitude, aptitude, assertiveness, self-esteem, Confidence 1.4 Understanding Self
Unit– II Communication Skills& Presentation Skills	2a. Identify techniques of communications. 2b. Describe Body language techniques 2c. Understand the principle Eye contact and facial expression. 2d. Develop appropriate presentation Skills. 2e. Use multimedia tools and technology for effective presentation. 2f. Conduct Group discussion and Interviews.	**Communication Skills& Presentation Skills** 2.1 Techniques of communication skills, 2.2 Body language, Dress like the audience, Posture, Gestures, Eye contact and facial expression. 2.3 Presentation Skill –Stage fright, Voice and language – Volume, Pitch, Inflection, Speed, Pause Pronunciation, Articulation, Language, Practice of speech. 2.4 Group discussion and Interview technique, Use of aids –OHP, LCD projector, white board
Unit III Interpersonal communication and Corporate and Etiquettes	3a. exhibit/apply inter personal skills in different situations. 3b. Practice manners and Etiquettes.	**Interpersonal communication and Corporate and Etiquettes** 3.1 Interpersonal communication. Through Self Development and

		change. 3.2 Polished personal habits 3.3 Ethics & Etiquettes: a way of life, what are ethics, how ethics help to ensure positive interpersonal relations, 3.4 Personal value system, Personal Attire & Grooming 3.5 Cell phone manners
Unit IV **Time Management and goal setting.**	4a. Understand importance of time management. 4b. Apply time management skills. 4c. Set the goals for career growth.	**Time management and Goal Setting** 4.1 Time management skills in groups for completion of project 4.2 Factors that lead to time loss and how they can be avoided 4.3 Time matrix & urgent versus, Important jobs 4.4 Importance of goal setting 4.5 How to set SMART goals.
Unit V **Health and Stress Management**	4a. Manage health for personal efficiency. 4b. Describe Stress Management, 4c. Use strategies to overcome stress 4d Understand emotions	**Health and Stress Management** 5.1 Importance of health management, 5.2 Relevance of it, 5.3 Tips to maintain good health 5.4 Strategies to overcome stress, understanding importance of good health to avoid stress. 5.5 Stresses in groups,

		understand and identify emotions, how to control emotions, emotional intelligence.
Unit VI **Problem Solving Techniques and Creativity**	6a. participate in technical Quizzes and puzzles. 6b.Use problem solving techniques 6c. Describe factors enhancing creativity	**Problem Solving Techniques and Creativity** 6.1 definition of problem, types 6.2 solving Puzzles and technical quizzes. 6.3 Reducing conflict by preventing problems in the classroom. 6.4 Creativity concept, Tips and ways to increase creativity, importance of creativity.

6 SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Self-Analysis	4	NA	NA	NA	NA
II	Communication Skills & Presentation Skills	6	NA	NA	NA	NA
III	Interpersonal communication and Corporate and Etiquettes	6	NA	NA	NA	NA
IV	Time management and Goal Setting	6	NA	NA	NA	NA
V	Health and Stress Management	6	NA	NA	NA	NA
VI	Problem Solving Techniques and	4	NA	NA	NA	NA

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
	Creativity					

Legends: R = Remembrance; U= Understanding; A= Application and above levels (Revised Bloom's taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

7. SUGGESTED EXERCISES/PRACTICALS

The tutorial/practical/exercises should be properly designed and implemented with an attempt to develop different types of cognitive and practical skills **(Outcomes in cognitive, psychomotor and affective domain)** so that students are able to acquire the competencies.

Note*: Here only outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of* ***Programme Outcomes/Course Outcomes in affective domain*** *as given in a common list at the beginning of curriculum document for this programme. Faculty should refer to that common list and should ensure that students also acquire those Programme Outcomes/Course Outcomes related to affective domain.*

S. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
1	I	1) Analyze self with SWOT techniques.	04
2	II	2) Present a topic (related to technical advancement should be given to a group of five to six students. Group should search the necessary information from various sources and prepare a systematic power point presentation. All such presentations should be delivered in front of class by groups. Presentations are to be evaluated by teacher).	04
3	II	3) Deliver extempore (Topic will be given to the individual for a speech of 5 to 8 minutes. Here the individual speeches of students will be conducted and evaluated by group of students.)	04

S. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
4	II	4) Participate in Group Discussion (Teacher should form group of six to eight students and give topics for group discussion. Group discussions should be carried out and evaluated by teacher)	04
5	III	5) Exhibit Etiquettes in different situations (Visit to any one place like office/firm/development sites etc. and observe the communication and etiquettes.)	04
6	IV	6) Prepare your individual time table for a week - a) List down your daily activities. b) Decide priorities to be given according to the urgency and importance of the activities. c) Find out your time wasters and mention the corrective measures. d) Set short term and long term goal for PT/TEE/Gymkhana -sport/gathering event etc.	04
7	V	7) Demonstrate simple Yoga postures and other stress relieving techniques by professional persons and narrate his/her experiences.	04
8	VI	8) Participate in Quizzes, puzzle- solving and educational games and narrate his/her experiences.	04
Total			**32**

8. SUGGESTED STUDENT ACTIVITIES

Following is the list of proposed student activities like:

- Following activities will be undertaken as per their convenience. students are advice to submit their report about participation in activities.
- 1. Case studies to be discussed in a group and presentation of the same by group /group leader.
- Carry out Field exercises and prepare reports. (e.g. interact with supplier/trader and discuss about techno commercial specifications of product)
- Role play by individual/group leader.
- Sharing of self -experiences in a group.
- Brain storming sessions in a group
- Questionnaire -filling & discussing results of the same in a group.

9. SPECIAL INSTRUCTIONAL STRATEGIES (if any)

i. Motivate students to use internet and collect information about various generic skills

ii. Arrange expert lecture on various topics on (two/three) SWOT analysis/Time management/Etiquettes / stress management/health management.etc.

10. SUGGESTED LEARNING RESOURCES

A) Books

S. No.	Title of Book	Author	Publication
1	Pearson Education Asia	Organizational Behavior	Tata McGraw Hill
2	Marshall Cooks	Adams Time management	Viva Books
3	Bishop , Sue	Develop Your Assertiveness	Kogan Page India
4	Allen Pease	Body Language	Sudha Publications Pvt. Ltd.
5	Lowe and Phil	Creativity and problem solving	Kogan Page (I) P Ltd
6	You can win	Mr. Shiv Khera	Macmillan ,India Ltd.
7	Wings of Fire	Mr .Abdul Kalam	Universities Press
8	Prabhavi Vyaktimatwa	SEEMA GUPTA	SAKET PUBLICATION
9	Yoga Dipika	Mr. Iyyengar	Rohan prakashan
10	Tan Tanavache Niyojan (Marathi)	Dr. Anand Nadkarni	Majestic Publishing House
11	Tandrust Raha ,Mast Jaga.(Marathi)	Dr. Rajiv Sharangpani	Continental Prakashan

B) Software/Learning Websites:
Websites related to soft skills.

POs and PSOs assignment and its strength of assignment with each CO of the Course

CO. NO.	Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
CO1	Develop interpersonal communication	-	-	-	2	-	-	-	2	3	-	-	-
CO2	Display corporate etiquettes and professionalism	-	2	-	-	2	-	-	2	-	-	-	-
CO3	Improve personality and body language	-	-	2	-	-	-	-	-	-	2	-	-
CO4	Practice time management and goal setting technique	2	-	2	-	-	-	-	2	2	-	-	-
CO5	Develop presentation and group discussion technique	-	2	-	2	-	-	2	-	-	-	-	-
CO6	Acquire Stress removing and Problem solving technique	-	2	-	-	2	-	-	-	-	2	-	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Dr.Uday V. Pise	Head of Department , Mechanical Engg. Govt. Polytechnic, Aurangabad
2	Prof. R. T. Aghao	Lecturer in Applied Mechanics., Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE: ENVIRONMENTAL SCIENCE

COURSE CODE: 6G304

DIPLOMA PROGRAMME IN WHICH THIS COURSE IS OFFERED	SEMESTER
ME, CE, EE, E&TC, CO, IT, AE	FIRST

1 RATIONALE:-

The present plight of the world as a victim to a number of environmental setbacks ranging from global warming, ozone layer depletion, acid rains led to alarmingly increase in world pollution levels. This has led to the dangerous situation threatening existence of biosphere on the earth. Diploma engineers also get confronted with this issue in their professional life.. Diploma engineers need to be aware of environment and associated issues so that he can help in protection and preservation of environment.

2 COMPETENCY: -

"Contribute in overall preservation of eco system of organization."

3 TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PT	ESE (PR)	PA	50
0	--	2	2	--	--		50@	
Exam duration			--	--	--	--	--	

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; **C** – Credit, **ESE** -End Semester Examination; **PA** - Progressive Test; OR-Oral examination

4 COURSE OUTCOMES:-

At the end of this course, students would be able to -

1. Identify elements of biodiversity.
2. Assess the impact of biodiversity
3. Apply provisions of various environmental protection acts in practice.
4. Undertake survey on environmental concerns and remedial measures

5 COURSE DETAILS:-

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit –I **Environment and studies**	1a. Write genesis of environmental concerns 1b. Identify the various types of environmental issues.	1.1 Definition , Scope and importance of Environmental studies 1.2 Meaning of environment, , Environment and its components, Segments of environment, scientific aspects 1.3 Global environment crisis and factors affecting it. Deforestation. aquatic life and tsunami effects ,Population, Carbon dioxide emissions, pollution, Extinction of species etc. Ecological Foot print
Unit– II **Environmental** **Natural Resources**	2a. Classify different resources 2b. Outline issues associated with different resources. 2c. Develop strategies to conserve of natural resources.	2.1. Renewable and Nonrenewable natural resources and associated issues as under, a. Forest resources b. Water resources c. Energy resources d. Land resources e. Food resources f. Energy resources 2.2. Role of individual in conservation of natural resources
Unit– III **Ecosystems**	3a. Outline ecosystem. 3b. Categorize various ecosystems .	3.1 Concept of Ecosystem 3.2 Structure and function of ecosystem 3.3 Structure and functions of following ecosystems, a. Forest Ecosystem b. Grassland Ecosystem

		c. Desert Ecosystem d. Aquatic ecosystem
Unit– IV **Biodiversity and Conservation**	4a. Outline Biographical classification of India 4b. Assess Biodiversity loss and its impact.	4.1 Introduction, Values of the Biodiversity, Biographical classification of India 4.2 Biodiversity loss and its impact 4.3 Conservation of Biodiversity, Efforts made in India.
Unit - V **Environmental Pollution**	5a. Describe pollution and its typs 5b. Describe cause, effect relationship. 5c. Conduct Survey on Environmental Pollution	5.1 Definition of pollution and its types 5.2 Causes, effects and control measures of following types of pollutions a. Air Pollution b. Water Pollution c. Soil Pollution d. Marine Pollution e. Thermal Pollution f. Nuclear hazards and pollution 5.3 Pollution norms, rules and bye laws 5.4 Solid waste management: Causes, Effects and control measures of urban and industrial waste.
Unit – VI **Social Issues and Environment**	6a. Identify social issues related to environment 6b. Suggest control measures to counter the issues, .	6.1 Urban problems related to Energy, Measures of water conservation including Rain water harvesting, Watershed Management 6.2 Climatic changes, Global Warming, Acid rain, Ozone layer depletion issue, Nuclear accidents and holocaust. Kyoto Protocol, Climate justice 6.3 Introduction to Environment (protection) act(prevention and control of pollution),Wildlife protection act, Forest protection act Air (Prevention and control of pollution) Act, Water related Environment laws ,issues in

		enforcement of environmental legislation, public awareness.
Unit – VII **Human population and environment**	7a. Use of ICT in environment and human health areas.	7.1Concepts of Population Growth, Environment and human health, Role of information technology in environment and human health

6. SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (THEORY)

Unit	Unit Title	Teaching Hours	Distribution of practical examination marks			
			R Level	U Level	A Level	Total Marks
I	Environment and studies	6	NA	NA	NA	NA
II	Environmental Natural resources	6	NA	NA	NA	NA
III	Ecosystems	6	NA	NA	NA	NA
IV	Biodiversity and conservation	6	NA	NA	NA	NA
V	Environmental Pollution	12	NA	NA	NA	NA
VI	Social issues and environment	6	NA	NA	NA	NA
VII	Human population and environment	6	NA	NA	NA	NA
Total		48	NA	NA	NA	NA

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

7. SUGGESTED EXERCISES/PRACTICALS

The tutorial/practical/exercises should be properly designed and implemented with an attempt to develop different types of cognitive and practical skills **(Outcomes in cognitive, psychomotor and affective domain)** so that students are able to acquire the competencies.

Here all the practical exercises are to be completed by students in a group. The group size should be 10 to 12. The groups should be formed by concerned teacher in consultation with students Every group should be assigned a group leader. All groups will complete the practical assignments in spare time and during Sundays and holidays. No separate time slots will be allotted to these practical exercises. Teacher will guide and give necessary inputs for modus operand of exercises.

S. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
1	I	Prepare report on environmental issues of your institute / Selected Premises	04
2	II	Collect information related to natural resources of India and methods adopted for conservation of these resources	02
3	I, II	Prepare "Energy Audit Report" of a small home. And give suggestions for conservation of energy.	02
4	III, IV	Examine water usage of a small community/locality in city/Apartment /Your Institute and prepare a Report on actions that could be taken to conserve the water fron following point of view: How much water is consumed How much wastage of water occurs How can demand of water be reduced How can ecological footprint of water they get can be reduced What other environment friendly ways of getting water can one implement What is the quality of water and how can it be improved How reuse and recycling of water can be done How users can be educated for proper use of water	02
5	I,II,III, VI	Visit, "Roof water harvesting" system installed in nearby area and prepare a detailed report. Include local bodies legislation as regards roof water harvesting	02
6	I,II,III	Undertake "Tree plantation project" and plant at least 03 trees per student in your Institute. Prepare detailed report on tree plantation.	02
7	I,II,III	Visit ,study and analyze a "Solar systems" installed in nearby area and prepare a detailed report. Include following types of systems, a.Household Solar water heating systems b. Solar P-V Systems c.Solar roof top Net metering systems	02
8	IV	Preparation of Biodiversity Report: Select a small park or garden in your area.Prepare a Biodiversity register: list all the species found in place ,find their scientific names with the help of a botanist. Interview long term users of the place and find out about loss of	03

		biodiversity. Write a report describing your observations and your recommendations for conservation of biodiversity.	
9	V	Prepare a report on water pollution scenario in your institute and make a detailed report. Following activities can be undertaken with permission, Locating and studying water consumption locations in institute like Water coolers , R.O units, Filters, taps. Taking and checking drinking water samples periodically from testing authorities and keeping records. Preparing and executing schedule for cleaning water tanks, water filters, RO units etc.	06
10	V	Prepare report Vehicular pollution checking in your institute: Here sample check the two wheelers, four wheeler vehicles of employees, students with the help of Exhaust gas analyzer / Smokemeter periodically and check the levels of pollution.	02
11	V	Prepare report of Noise and Air pollution levels at a crowded square of city using Deciblemeter and Air sampling device	02
12	VI	Collect information on Global Warming,Acid rain, Ozone layer depletion issue,Nuclear accidents and holocaust. Kyoto Protocol, Climate justice, Environment protection laws and regulations.	02
Total			32

8. SUGGESTED STUDENT ACTIVITIES

Following is the list of proposed student activities like:

1 Search different journals on Environment
2 Collect info of Environmental laws and regulations from websites.
3 Collect various news paper cuttings on the issues of environment
4 Observe and celebrate following important days on environment,
- 22 April- Earth Day
- 1 – 7 July – Vanamahotsava Week
- 11 International Mountain day
- 2 February –Worlds wetland day
- 5 April – National Maritime day
- 8 June – World Oceans day
- 22 May – international Day of Biological diversity
- 22 March – World Water day.
- 21 March – World Forestry Day
- 16 October –Worlds food day
- 22 September –Car free day
- 29 October-National disaster reduction day
- 21 July – Worlds Population day
- 8 March – Womans day

5 Prepare charts, banners, posters on environment and its protection and display in class, notice boards.
6 Participate in social campaigns concerning environment and its preservation.
7

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATEGIES

1. Q & A Techniques.
2. Field Visits
3. Expert Lectures.

10. SUGGESTED LEARNING RESOURCES

S. No.	Title of Book	Author	Publication
1	Environmental Studies	R.Rajgopalan	OXFORD university press
2	Environmental Studies	Anindata Basak	Pearson education
3	Air Pollution	M.N. Rao	Tata Macgrawhill
4	Elements of Environmental Science and Engineering	P. Meenakshi	Prentice Hall
5	Introduction to Environmental Engineering	P.AarneVesilind and Susan Morgan	Thomson

11. Major Equipment/ Instrument with Broad Specifications

Sr. No.	Major equipment/ Instrument with Broad Specification	Quantity
1	Biological Microscope	01
2	Air sample testing setup	01
3	Water sample testing setup	01
4	Exhaust gas Analyzer	01
5	Smoke meter	01
6	PC with Net connectivity	01
7	LCD Projector	01 et

12.. E-learning resources

(Please mention complete URL of the E- recourse CO wise)

1. www.unep.org
2. www.ipcc.ch
3. www.grida.no
4. www.wildlifeinindia.com
5. www.fsi.nic.in/sfr_2009.htm

6. www.unesco.org
7. www.chilika.com
8. www.foodfirst.org/media/opeds/2000/4-greenrev.html
9. www.cites.org
10. http://projecttiger.nic.in/
11. www.iwmi.cgiar.org/
12. www.worldwater.org
13. www.indiaenergyportal.org
14. http://www.lifeaftertheoilcrash.net/
15. www.mmpindia.org/
16. www.pcri.com
17. http://www.unwater.org/statistics_pollu.html

List of Films

1. The 11th hour
2. The many faces of madness
3. Planet Earth-BBC documentary
4. The childrens of Amazon
5. The Blue Planet-BBC documentary
6. End of Line
7. The State of planet – BBC Documentary
8. The truth about Tigers
9. Bringing home rain- A film by SushamaVeerappa.
10. Drinking the sky – BBC documentary
11. A Crude Awakening :The OIL Crash – A documentary by Basil Gelpke
12. Poison on a platter – Documentary by Mahesh Bhatt
13. The story of bottled water – A documentary by Annie Leonard on packaged water industry.(Download from www.storyofstuff.org)

13. POs and PSOs assignment and its strength of assignment with each CO of the Course

CO. NO.	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
CO1	Analyze and assess the impact of biodiversity and its loss on environment.	2	-	-	-	2	2	-	-	-	-	-	-
CO2	Identify causes of pollution in working system and apply control measures for prevention.	-	-	-	-	2	2	-	-	-	-	-	-

CO3	Apply provisions of various environmental protection acts in practice.	2	-	-	-	3	3	-	-	3	-	-	-
CO4	Appreciate correlation between Human population and its effect on environment.	2	-	-	-	2	2	-	-	3	-	-	-
CO5	Read, analyze and apply various laws and regulations concerning environmental issues.	2	-	-	-	3	3	-	-	-	-	-	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Prof.S.P.Shiralkar	Lecturer in Mechanical Engineering Department
2	Prof. A.B. Deshpande	Lecturer in Mechanical Engineering Department

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE **ENGINEERING MATHEMATICS**

COURSE CODE **6G102**

Diploma program in which course is offered	Semester in which course is offered
CE/ME/EE/ET/IT/CO/AE	Second Semester

1. RATIONALE:

Engineering Mathematics forms foundation to understand basic principles of Engineering Mathematics to solve engineering problems. This subject is an extension of Basic Mathematics which deals with calculus, differentiation, integration, differential equations etc. which have applications in several engineering courses of various programmes. This course aims at multi-dimensional logical thinking and reasoning capabilities of the students.

2.COMPETENCY STATEMENT:

At the end of studying this course students will be able to

"Solve engineering problems using the principles of applied mathematics."

3. COURSE OUTCOMES

Students will be able to

1. Differentiate the various function using different rules
2. Apply rules of derivatives to solve engineering problems.
3. Apply rules of integration to solve engineering problems.
4. Solve the various types of differential equations.
5. Apply principles of central tendencies for quality assurance in engineering field

4. TEACHING AND EXAMINATION SCHEME

Teaching scheme (In hours)			Total credits (L+T+P)	Examination scheme				
				Theory Marks		Practical marks		Total Marks
L	T	P	C	ESE	PT	ESE	PA	
03	01	00	04	80	20	--	--	100
Exam Duration				3 Hrs	1 Hr.			

Legends:

L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice(batch-wise); **P** Practical;

C – Credit; **ESE** -End Semester Examination; **PT** - Progressive Test.

5. CORSE DETAIL.

Unit	Major Learning Outcomes	Topics and Sub-topics
UNIT I Derivatives	1a.Differentiate various engineering functions	1.1 Definition of derivative, notation. 1.2 Derivative of standard functions. 1.3 Rules of Differentiation (without proof) such as sum, difference, product and quotient. 1.4 Derivative of composite functions. 1.5 Derivative of inverse trigonometric functions. 1.6 Derivative of implicit functions. 1.7 Derivative of parametric functions. 1.8 Logarithmic differentiation. 1.9 Second order derivatives.
UNIT II Applications of derivative	2a.Apply derivatives to find Velocity, Acceleration and Maxima & Minima	2.1 Tangent & normal. 2.2 Maxima & minima. 2.3 Radius of curvature.
UNIT III Integration	3a.Integrate various Functions using appropriate methods.	3.1 Definition of integration. 3.2 Integration of standard function. 3.3 Rules of Integration: sum, difference & multiplication. 3.4 Methods of Integration 3.4.1 Integration by substitution. 3.4.2 Integration by partial fraction. 3.4.3 Integration by parts. 3.5 Definition of Definite integral. 3.6 Simple problems on definite integral
UNIT IV Differential Equations	4a.Solve various types of differential equations.	4.1 Definition of differential equation, order &degree. 4.2 Formation of differential equation. 4.3 Solution of Diff. equation. 4.4.1 variable separable. 4.4.2 Homogeneous equation. 4.4.3 Exact diff. equation. 4.4.4 Linear diff. equation.
UNIT V Statistics	5a.Measure Central Tendencies 5b. Measure Dispersion for given data.	5.1 Graphical representation: Histogram & o-give curve to find Mode and median. 5.2 Measures of dispersion : Range, mean deviation and Standard deviation.

6. SUGGESTED SPRCIFICATION TABLE WITH HOURS AND MARKS (THEORY)

Sr,no	Title/Topic	Teaching Hours	Distribution of Theory Marks			
			Remembrance levels	Understanding levels	Application levels	Total
1	Derivative	12	2	08	08	18
2	Applications of derivative	04	00	04	08	12
3	Integration	16	06	08	12	26
4	Differential Equations	10	04	04	08	16
5	Statistics	06	02	02	04	08
TOTAL		48	14	26	36	80

7. SUGGESTED LIST OF TUTORIAL

1) The exercises should be properly designed and implemented with an attempt to develop different types of skills leading to the achievement of the competency
2) Form a batch of 20 students and at least **ten** problems should be given to get necessary exercise.
3) Course faculty will provide programme related problems.

Sr. No.	**Title/Topic**	**Exercises/Tutorial**	**Approx. hours**
1	Derivative	Solve problems related to various methods/techniques of differentiations	03
2	Applications of derivative	Calculate Engineering Applications of Tangent, normal, maxima, minima and Radius of curvature from respective programmes.	03
3	Integration	Solve problems Related to Various Methods/Techniques of integration	04
4	Differential Equations	Solve problems Related to Various Methods/Techniques of Differential equation.	04
5	Statistics	Solve examples of Comparative data. Plot different types of graph.	02

8. SUGGESTED STUDENT ACTIVITIES

Following is the list of proposed student activities like:

Other than the classroom learning, following are the suggested student-related ***co-curricular*** activities which can be undertaken to accelerate the attainment of the various outcomes in this course:

a. Collect the mathematical derivation based on curriculum from respective programme.

b. Identify mathematical problems related to respective programme and get them solved.

c. Find graphical software using internet and list them.

d. Identify problems based on applications of differential equations and solve these problems.
e. Prepare a seminar on any relevant topic based on curriculum.

9. SPECIAL INSTRUCTIONAL STRATEGIES (if any)

These are sample strategies, which the teacher can use to accelerate the attainment of the various outcomes in this course

a. Use open resources available on internet to teach Engineering Mathematics.
b. Apply the mathematical concepts learnt in this course to branch specific problems.
c. Use different instructional strategies in classroom teaching.

10. SUGGESTED LEARNING RESOURCES

Sr. No.	Title	Author	Publication
1.	Mathematics for polytechnic students for second Year	S. P. Deshpande	Pune vidhyarti gruh prakshan Pune
2.	Applied Mathematics	By Patel & Rawal	Nirali prakashan Mumbai
3	Mathematics for polytechnic students for second year	G.V.Kumbhojkar	Phadke prakashan Kholapur

11. Major Equipment/ Instrument with Broad Specifications

Sr. No.	Name of the Equipment	Specification
1	NA	

12. Software/Learning Websites

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13. POs and PSOs assignment and its strength of assignment with each CO of the Course

CO. No.	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Students will be able to differentiate the various function using different rules	2	3	1	-	-	-	-	-	-	-	-	-	-
CO2	Students will be able to apply the differentiation to Velocity, Acceleration and Maxima & Minima	-	-	1	-	1	-	-	-	-	-	-	-	-
CO3	Students will be able to so Integrate the various Function using different methods	3	3	-	-	-	-	-	-	-	-	-	-	-
CO4	Students will be able to solve the various types of differential equation using different methods.	1	1	3	-	-	-	-	-	-	-	-	-	-
CO5	Students will be able to Measure Central tendency and Measure Dispersion in given data	-	1	1	-	1	-	-	-	-	-	-	-	-

13. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Sr. No.	Name of the faculty member	Designation and Institute
1	Mr. M.A. Ali	Lecturer in Mathematics, Government Polytechnic, Aurangabad
2	Mr. R.B. Borulkar	Lecturer in Mathematics, Government Polytechnic, Aurangabad
3	Mrs. H.H. Bhumkar	Lecturer in Mathematics, Government Polytechnic, Aurangabad

Member Secretary PBOS	Chairman PBOS	Co-ordinator science and Humanities

COURSE TITLE ENGINEERING CHEMISTRY

COURSE CODE 6G104

Diploma Programme in which this course is offered	**Semester in which offered**
ME/CE/EE//ET/CO/IT/AE	First/ Second Semester

1 RATIONALE:

Chemistry is a basic science subject which is essential to all engineering courses. It gives knowledge of engineering materials, their properties, related applications and selection of materials for specific engineering applications/work/job.

Due to technological progress, there are hazardous effects of chemicals, waste water and sewage water on environment & human life. The core knowledge of environmental effects will bring awareness; generate curiosity in students about the precautions & preventions to be taken to carry out further development resultantly to reduce the ill effects.

2. COMPETENCY:

At the end of studying this course students will be able to

"**Apply basic knowledge and principles of chemistry to solve different industrial problems."**

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme					
				Theory Marks		Practical Marks		Term work	Total Marks
L	T	P	C	ESE	PT	ESE	PA	ESE	TOTAL MARKS
3	0	2	5	80~	20~	25@	00	25	150
Examination Duration				2Hrs	1/2Hr.	2Hrs.	--	--	--

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** - Practical; **C** – Credit, **ESE** - End Semester Examination; **PT** - Progressive Test; OR-Oral examination; **PA** - Progressive Assessment(PR); ~Online Multiple choice examination. @ Internal Examination

3. COURSE OUTCOMES:

After providing classroom teaching and laboratory experiences related to this course, students will be able to

1. Draw the orbital configuration of different elements.
2. Represent the formation of molecules schematically.
3. Compare and use different types of cells.
4. Identify the properties of metals & alloys related to engineering applications.
5. Identify the properties of nonmetallic materials, related to engineering applications.

6. Select a proper material for specific purpose.
7. Select and use the lubricants at proper/ specific conditions of machines.

4. COURSE DETAILS:

Unit	Major Learning Outcomes	Topics and Sub-topics
UNIT-I Electronic Theory Of Valency & Molecule Formation	1a.Identification of structure and nature of atom, element and molecule.	1.1 Atomic no, atomic mass no. numerical problems on it , orbit & orbitals. 1.2 Electronic configuration, electronic configuration of first 30 elements. 1.3 Molecule formation: Valency, types of valency, electrovalency and covalency with suitable examples. Study of Formation of Electrovalent compounds e.g. NaCl, $CaCl_2$ & $MgCl_2$ and formation of Covalent Compounds examples H_2O, Cl_2, CO_2, N_2
UNIT-II Electrochemistry	2a.Verify Principle, construction, working and applications of different cells.	2.1 Arrhenius Theory of Ionization, Degree of ionization. 2.2 Basic concepts of Conductors, Insulators, Dielectrics, Electrolyte, Non Electrolyte 2.3 Electrolysis, Electrolytic Cell, Electrodes. 2.4 Electrolysis of $CuSO_4$ Solution by using Cu Electrode & Platinum Electrode 2.5 Faraday's first law of Electrolysis & numerical problems on it Application of Electrolysis such as Electroplating. 2.6 Electrochemical Cells & Batteries Types of cell Primary & secondary cell construction And Working of Dry cell & Lead – Acid Storage.

UNIT III Metals and Alloys	3a.Identify different mechanical properties and extraction methods of pure metal, Correlate properties, composition and applications of alloys with metal.	3.1 Definition of Metallurgy, Mineral, Ore, Gangue, Flux & Slag, Occurrence of Metals. 3.2 Mechanical Properties of metals such as hardness, Toughness, ductility, malleability, tensile strength. 3.3 Stages of Extraction of Metals from its Ores in detail i.e. its flow sheet Crushing, Concentration, methods of concentration (physical and chemical). 3.4 Reduction of iron in blast furnace with chemical reactions, Reactions in zone of reduction. **Alloys** 3.5 Definition of Alloy, Purposes of Making alloy. 3.6 Methods of Preparation of alloy such as fusion method & compression method 3.7 Classification of Alloys, Ferrous alloys & Non Ferrous alloys, their examples. 3.8 Composition, Properties & Applications of some common alloys such as Alnico, Duralumin, Wood's Metal
UNIT-IV Corrosion of Metals And its Application	4a. Classify corrosion from action of surrounding environment and its protection methods.	4.1 Definition of corrosion 4.2 Atmospheric corrosion or dry Corrosion, corrosion due to oxygen , different types of film formation. 4.3 Electrochemical Corrosion Hydrogen evolution mechanism. 4.4 Appling protective Coatings like metal coating by galvanising, tinning
UNIT-V Water	5a. Recognize ill effect of hard water and methods for purification of water.	5.1 Hard water & soft water, types of hardness, causes of hardness 5.2 Effects of hard water in different industries (such as paper , sugar , dying and textile industries) and domestic purposes. 5.3 Softening of hard water by Permutit process and ion exchange process,. 5.4 Potable water & its condition for pot-ability. Different methods of purification of water for drinking purposes chlorination and ozonation 5.5 pH – value of water its applications Numericals on pH values.

UNIT-VI Non Metallic Materials	6a. Identification of types , preparation, properties and applications of plastic, rubber and thermal insulating material.	6.1 Plastics Definition of Plastic, Formation of Plastic by Addition Polymerisation with examples Polyethylene & PVC. 6.2 Formation of Plastic by Condensation Polymerisation with suitable example as Nylon 6, 6; Bakelite plastic. 6.3 Types of Plastics, Thermo softening & Thermosetting Plastic & difference between them. 6.4. Engineering properties of plastic and its related uses. **RUBBER** 6.5 Natural rubber its extraction from latex, drawbacks of natural rubber. Synthetic Rubber its examples 6.6 Vulcanisation of rubber with chemical reaction. 6.7 Properties of rubber such as elasticity, tack, resistant to abrasion, rebound capacity. 6.8 Engineering Applications of rubber based on its properties. 6.9 Thermal insulating materials Definition & characteristics of ideal thermal insulator. **Glass wool** preparation, properties & applications. **Thermocole** properties and its applications.
Unit-VII Lubricants	7a. Select proper lubricant for different types of machineries.	7.1 Definition of lubricant and Lubrication. 7.2 Functions of lubricants. 7.3 Classification of lubricants with examples, 7.4 Mechanism of Lubrication by Fluid Film, Boundary & Extreme Pressure, 7.5 Physical Characteristics of Lubricants Such as Viscosity, Viscosity Index, Oiliness, Volatility, Flash & Fire Point, Cloud & Pour Point. 7.6 Selection of proper Lubricants for Various types of machines.

5. SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Electronic Theory of Valency and Molecular Formatin	8	2	6	4	12
II	Electrochemistry	6	2	8	2	12
III	Metals and Alloys	8	2	8	4	14
IV	Corrosion of Metals and it's Applications	6	2	4	2	8
V	Water	7	2	2	6	10
VI	Non Metallic Materials	7	4	8	4	16
VII	Lubricants	6	2	4	2	8
Total		**48**	**16**	**40**	**24**	**80**

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

6. SUGGESTED EXERCISES/PRACTICALS

The tutorial/practical/exercises should be properly designed and implemented with an attempt to develop different types of cognitive and psychomotor skills **(Outcomes in cognitive, psychomotor and affective domain)** so that students are able to acquire the competencies.

(Any TEN from following)

Sr. No.	Unit No.	Practical Exercises	Approx. Hrs. required
1	1	Write Orbital electronic configuration of different elements (First 30 elements)	2
2	2	Verify Faraday's first Law of electrolysis.	2
3	7	Find the normality & strength in grams per liter of the given solution (NaOH) with the help of standard hydrochloric acid.	2
4	5	Determine pH value of given solutions, water samples, by using, universal indicator and pH meter.	2
5	7	Determine the normality & strength of given hydrochloric acid solution by titrating it against standard potassium hydroxide solution.	2
6	3	Determine percentage of iron from steel by titration method.	2
7	5	Determine the hardness of potable water and boiler feeding water.	2
8	5	Determine the chloride content potable water and boiler feeding water.	2
9	6	Prepare phenol formaldehyde resin.	2
10	7	Determine the acid value of oil sample by neutralization method.	2

11	2	Qualitative analysis of given salt solutions, i.e. to determine one acidic and one basic radical from given salt solution. (At least 05 salt solutions.)	For each salt solution 2
Micro Project (Any one of following will be opted by a group of 5-6 students)			
Sr. No.	**Unit No.**	**Practical Exercises**	
1	1	Prepare power point presentation to show/demonstrate covalent bond, ionic bond.	
2	4	Effect of acid or alkali on rate of corrosion for different metals.	
3	5	Study of hard and soft water of different samples of water	
4	2	Study of mechanism and working of different batteries.	
5	2	Preparation of small scale batteries/ Galvanic cells. Collect chemicals and material from lab and household and prepare working model of cell.	
6	6	Collect different polymers and prepare the chart on the basis of its type, properties and uses.	

7. SUGGESTED STUDENT ACTIVITIES

a. Verify the properties of different types of compounds used in day to day life.
b. Differentiate properties and uses of different metals.
c. Differentiate composition, properties and application of different alloys.
d. Co-relate the effect of acidic environment with neutral environment.
e. Library survey regarding engineering chemistry topics regarding curriculum.
f. Animated Power point presentation containing current research development related to topics mentioned in curriculum.

8. SPECIAL INSTRUCTIONAL STRATEGIES

a. Search various sites to teach various topics/sub topics.
b. Instead of the traditional lecture method, use different types of teaching methods such as improved lecture method, question answer method, laboratory method to attained specific outcome.
c. Some topics are relatively simpler in nature is to be given to the students for self-learning by seminar or by classroom presentations
d. Teachers provide theme to create multiple choice questions.
e. Provide super visionary assistance for completion of micro-projects.

9. SUGGESTED LEARNING RESOURCES

Sr.No.	Title of Book	Author	Publication
1	Engineering Chemistry	Jain & Jain	Dhanpat Rai and Sons Co. **ISBN 9789352160006**
2	Engineering Chemistry	S. S. Dara	S. Chand Publication **ISBN 8121903599**
3	Chemistry of Engineering Materials	S.N. Narkhede	Nirali Prakashan

10. MAJOR EQUIPMENTS/ INSTRUMENTS WITH BROAD SPECIFICATIONS

Sr. No.	Name of the Equipment	Specification
1	pH meter	Digital ,Range 0 to 14 with Sensitive Glass electrode
2	Distilled water plant	S.S. plant with 15 lit capacity with 2Kv heating coil
3	Kipps's Apparatus	Airtight three section apparatus
4	Electrolytic cell for verification of Faraday's first law	Battery 24V and 5 Ampere , Rheostat 1000 Ohm, Wire, Ammeter 0 to 5 Ampere, Copper plate 3" x 6 " inch

11. E-LEARNING RESOURCES

(Please mention complete URL of the E- resourse CO wise)

Sr. No.	Web Address
1	http://www.webelements.com
2	http://www.chemtutor.com
3	http://www.chem1.com
4	https://phet.colorado.edu
5	www.visionlearning.com
6	www.onlinelibrary.wiley.com
7	www.rsc.org
8	www.chemcollective.org

12. POs and PSOs assignment and its strength of assignment with each CO of the Course

CO. No.	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Draw the orbital configuration of different elements.	3	3	-	-	-	-	-	-	-	-	-	-	-
CO2	Represent the formation of molecules schematically.	3	2	2	1	-	-	-	-	-	-	-	-	-
CO3	Compare and use different types of cells.	3	3	-	1	-	-	-	-	-	-	-	-	-
CO4	Identify the properties of metals & alloys related to engineering applications.	3	3	2	1	-	-	-	-	-	-	-	-	-
CO5	Identify the properties of nonmetallic materials, related to engineering applications.	3	3	1	2	-	2	-	-	-	-	-	-	-
CO6	Select a proper material for specific purpose.	2	2	2	1	1	1	-	-	-	-	-	-	-

CO7	Select and use the lubricants at proper/ specific conditions of machines.	2	2	2	1	1	1	-	-	-	-	-	-	-

13. Name and Designation of Course Designer:

Sr. No	Name of the faculty member	Designation and Institute
1	Dr. H.R. Shaikh	Lecturer in Chemistry, Government Polytechnic, Aurangabad
2	Dr. Devdatta V. Saraf	Lecturer in Chemistry, Government Polytechnic, Aurangabad
3	Mrs. R.A. Nemade	Lecturer in Chemistry, Government Polytechnic, Aurangabad
4	Mr. P.K. Shewalkar	Lecturer in Chemistry, Government Polytechnic, Jalna

Member Secretary PBOS | Chairman PBOS | Co-coordinator science and Humanities

COURSE TITLE- WORKSHOP PRACTICE

COURSE CODE:-6G202

Diploma Programme in which this course is offered	Semester in which offered
CE/ME/AE/EE/ET/IT/CO	First/Second

1. RATIONALE

Workshop Practice is a basic engineering course. Diploma Engineers while working at worksites / in industries, supervises various skilled man power during industrial / site related process. He is required to be conversant with various skills. These basic skills are imparted in basic shops like wood working, fitting, welding, plumbing and sheet metal shop is essential for technician to perform his/her duties in industries. Students are able to perform various operations using hand tool equipment and machineries in various shops. Working in workshop develops the attitude of group working and safety awareness. This course provides industrial environment in the educational institute.

2. COMPETENCY

"Prepare simple jobs on the shop floor of the engineering workshop."

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (In Hours)			**Total Credits (L+T+P)**	**Examination Scheme**				
				Theory Marks		**Practical Marks**		**Total Marks**
	T	**P**	**C**	**ESE**	**PT**	**ESE (OR)**	**PA**	
	--	03	03	--	--	--	50@	50

Legends : L-Lecture**; T**-Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C**- Credits**; ESE**- End Semester Examination**; PT – Progressive Test, PA**- Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES-

At the end of this course, students would be able to –

1. Select tools and machinery according to job.
2. Use hand tools in different shops for performing different operation.
3. Operate equipment and machinery in different shops.
4. Prepare job according to drawing.
5. Maintain workshop related tools, equipment and machineries

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit – I General Workshop Practice	1a. Follow safety practices 1b. Explain the procedure for extinguishing fire 1c. Use firefighting equipment 1d. Locate various machines and equipment in workshop 1e. Follow good housekeeping.	1.1 Safety Practices, Causes of accidents, General safety rules, Safety signs and symbols. 1.2 First Aid 1.3 Fire, Causes of Fire, Basic ways of extinguishing the fire Classification of fire, Class A, B,C, D, Firefighting equipment, fire extinguishers, and their types Workshop Layout 1.4 Issue and return system of tools, equipment and consumables
Unit– II Fitting	2a. Identify fitting tools. 2b. Explain operation of fitting shop machines 2c. Use hand tools 2d. Operate machineries. 2e. Perform fitting operations 2f. Maintain tools, equipment and machineries.	2.1 Fitting hand tools bench vice, hammers, chisels, files, hacksaw, surface plate, punch, v block, angle plate, try square, marking block , steel rule, twist drills, reamers, tap set, die set and their Specifications 2.2 Operation of fitting shops machineries - Drilling machine, Power saw, grinder their specifications and maintenance. 2.3 Basic process chipping, filling, scraping, grinding, marking, sawing, drilling, tapping, dieing, reaming etc.
Unit– III Plumbing	3a. Identify plumbing tools. 3b. Explain operation of fitting shop machines 3c. Use hand tools 3d. Operate machineries.	3.1 Plumbing hand tools pipe vice, pipe bending equipment, pipe wrenches, dies and their Specifications 3.2 Pipe fittings- bends, elbows, tees,

	3e. Perform plumbing operations 3f. Maintain tools, equipment and machineries.	cross, coupler, socket, reducer, cap, plug, nipple and their Specifications 3.3 Operation of Machineries in plumbing shops- pipe bending machine their specifications and maintenance. 3.4 Basic process cutting, threading.
Unit– IV **Metal Joining**	4a. Identify metal joining tools. 4b. Explain gas and arc welding procedure 4c. Use hand tools. 4d. Perform welding, soldering, brazing operations 4e. Maintain tools, equipment and machineries.	4.1 Gas welding hand tools- welding torch, welding tip, pressure regulator, oxygen and acetylene cylinders, spark lighter and their Specifications 4.2 Arc welding hand tools- electrode holder, cable connector, cable lugs, chipping hammer, earthling clamp, wire brush and their Specifications 4.3 Operation of machineries in welding shops- arc welding transformer their specifications and maintenance. 4.4 Welding Electrode, filler rod, fluxes, and solders. 4.5 Basic process welding, brazing and soldering.
Unit– V **Furniture Making**	5a. Select wood working tools as per job/ requirement. 5b. Explain operation of wood working machines 5c. Use hand tools 5d. Operate machineries. 5e. Perform wood working operations 5f. Maintain tools, equipment and machineries.	5.1 Types of artificial woods such as plywood, block board, hardboard, laminated boards, Veneer, fiber Boards and their applications. 5.2 Wood working hand tools carpentry vice, marking and measuring tools, saws, claw hammer, mallet, chisels, plans, squares, and their specifications 5.3 Operation of wood working machineries - Wood turning lathe, circular saw, their specifications and maintenance. 5.4 Basic process- marking, sawing, planning, chiseling, turning, grooving, boring.
Unit–VI **Sheet Metal**	6a. Identify sheet metal tools. 6b. Explain operation of sheet metal machineries. 6c. Use hand tools 6d. Operate sheet metal	6.1 Sheet metal hand tools snip, shears sheet gauge, straight edge, L square, scriber, divider, trammel, punches, pliers, stakes, groovers, limit set and their

	machineries. 6e. Perform bending operations 6f. Maintain tools, equipment and machineries.	Specifications 6.2 Operation of machineries in sheet metal shops- sheet cutting and bending machine their specifications and maintenance. 6.3 Basic process-marking, bending, folding, edging, seaming, staking, riveting.

6. **SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (Practical)**

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	General Workshop Practice	03	01	01	03	05
II	Fitting	12	-	03	06	09
III	Plumbing	06	-	02	07	09
IV	Metal Joining	09	01	02	06	09
V	Furniture Making	09	-	02	07	09
VI	Sheet Metal	09	-	02	07	09
	Total	48	02	12	36	50

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

7. **SUGGESTED EXERCISES/PRACTICALS**

The tutorial/practical/exercises should be properly designed and implemented with an attempt to develop different types of cognitive and practical skills **(Outcomes in cognitive, psychomotor and affective domain)** so that students are able to acquire the competencies.

S. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
1	I	Perform mock drill session in group of minimum 10 students for extinguishing fire.	03

2	II	Prepare job involving marking, punching, sawing, chamfering, drilling, tapping operations as per given drawing. (simple job individually)	09
3	III	Prepare plumbing job as per given drawing (individually)	06
4	III	Prepare black smithy job involving cutting, bending, drawing/ upsetting operations as per drawing (individually)	06
5	IV	Prepare lap joint/butt joint using arc welding as per given drawing (individually)	06
6	IV & V	Prepare utility job/ different working joints involving wood work as per given drawing (in group of 4 to 5 students)	12
7	VI	Prepare sheet cutting, bending, edging, end curling, lancing, soldering and riveting operations. (in group of 4 to 5 students)	06
Total			48

8. SUGGESTED STUDENT ACTIVITIES

Following is the list of proposed student activities like:

1. Prepare work diary based on practical performed in workshop. Work diary consist of job drawing, operations to be perform, required raw materials, tools, equipments, date of performance with teacher signature.
2. Prepare journals consist of free hand sketches of tools and equipments in each shop, detail specification and precautions to be observed while using tools and equipment.
3. Prepare/Download a specifications of followings:
    a) Various tools and equipment in various shops.
    b) Precision equipment in workshop
    c) Various machineries in workshop
4. Undertake a market survey of local dealers for procurement of workshop tools, equipment machineries and raw material.
5. Visit any fabrication/wood working/sheet metal workshop and prepare a report.

9. **SPECIAL INSTRUCTIONAL STRATEGIES (if any)**

1. Demonstration

10. **SUGGESTED LEARNING RESOURCES**

S. No.	**Title of Book**	**Author**	**Publication**
1.	Workshop Practice	Bawa, H.S.	McGraw Hill Education,Noida; ISBN-10: 0070671192 ISBN-13: 978-0070671195
2.	A Textbook of Manufacturing Process (Workshop Tech.)	Gupta, J.K.;Khurmi,R.S.	S.Chandand Co. New DelhiISBN:81-219-3092-8
3.	Workshop Practice Manual For Engineering Diploma & ITI Students	Hegde, R.K.	Sapna Book House, 2012, ISBN:13: 9798128005830
4.	Introduction to Basic Manufacturing Process & Workshop Technology	Singh, Rajender	New Age International, New Delhi; 2014, ISBN: 978-81-224-3070-7

11. **Major Equipment/ Instrument with Broad Specifications**

S. No.	**Equipment Name with Broad Specifications**	**Experiment S.No.**
1	Fire buckets with stand of medium size	I, II, III, IV,V, VI
2	Fire extinguisher A,B and C types	I, II, III, IV,V, VI
3	Wood Turning Lathe Machine, Height of Centre: 200mm, Distance between Centers: 1200mm, Spindle Bore: 20mm with Taper, Range of Speeds: 425 to 2800 with suitable Motor Drive. with all accessories	II
4	Circular Saw Machine, Diameter of saw blade 200 mm, Maximum Depth of Cut 50 mm, Table Size -350 x 450 mm, Table Tilting - 45^0	II
5	Wood working tools- marking and measuring tools, saws, claw hammer, mallet, chisels, plans, squares,	II
6	Carpentry Vice 200 mm	II

7	Work Benches- size:1800 x 900 x 750 mm	III
8	Bench Drilling machine (up to 13 mm drill cap.) with ½ H.P. Motor 1000 mm. Height.	III
9	Power Saw machine 350 mm mechanical with 1 HP Motor & all Accessories.	III
10	Bench Grinder 200 mm Grinding Disc diameter 200 mm. with 25 mm. bore 32 mm. with ½ HP/1HP Motor.	III
11	Vernier height Gauge 450 mm	III
12	Surface Plate 600 x 900 mm Grade I	III
13	Angle Plate 450 x 450 mm	III
14	Welding machine 20 KVA 400A welding current 300A at 50, 100, 200, 250, 300 with std. Accessories and Welding Cable 400 amp. ISI with holder	IV
15	Oxygen and acetylene gas welding and cutting kit with cylinders and regulators.	IV
16	Pipe Bending Machine	IV
17	Pipe Vice – 100 mm	IV
18	Pipe Cutter- 50 mm	IV
19	Bench Vice 100 mm	II,III,IV,V,VI
20	Portable Hammer Drill Machine 0-13 mm A.C. 230 V, 2.5Amp, Pistol type, having different types of bits	II, III, IV,V, VI
21	Sheet Bending Machine	VI
22	Sheet Cutting Machine	VI
23	Brazing Equipment	VI
24	Fitting tools - hammers, chisels, files, hacksaw, surface plate, punch, v block, angle plate, try square, marking block, steel rule, twist drills, reamers, tap set, die set.	III
25	Plumbing tools-pipe vice, pipe bending equipment, pipe wrenches dies.	IV
26	Gas welding hand tools- welding torch, welding tip, pressure regulator, oxygen and acetylene cylinders, spark lighter	V
27	Arc welding hand tools- electrode holder, cable connector, cable lugs, chipping hammer, earthing clamp, wire brush.	V
28	Sheet metal hand tools-snip, shears sheet gauge, straight edge, L square, scriber, divider, trammel, punches, pliers, stakes, groovers, limit set	VI

12. E-learning recourses

(Please mention complete URL of the E- recourse CO wise)

1. http://www.asnu.com.au
2. http://www.abmtools.com/downloads/Woodworking%20Carpentry%20Tools.pdf
3. http://www.weldingtechnology.org

4. http://www.newagepublishers.com/samplechapter/001469.pdf
5. http://www.youtube.com/watch?v=TeBX6cKKHWY
6. http://www.youtube.com/watch?v=QHF0sNHnttw&feature=related
7. http://www.youtube.com/watch?v=Kv1zo9CAxt4&feature=relmfu
8. http://www.piehtoolco.com
9. http://sourcing.indiamart.com/engineering/articles/materials-used-hand-tools/
10. https://www.youtube.com/watch?v=9_cnkaAbtCM

13. POs and PSOs assignment and its strength of assignment with each CO of the Course

CO. NO.	Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
CO 1	Prepare simple jobs on the shop floor of the engineering workshop	1	2	3	3	1	-	1	2	2	2		3
CO 2	Select tools and machinery according to job	1	2	3	3	1	-	1	2	2	2	2	
CO 3	Use hand tools in different shop for performing different operation.	1	2	3	3	1	-	1	2	2	2		3
CO 4	Operate equipment and machinery in different shops	1	2	3	3	1	-	1	2	2	2	3	3
CO 5	Prepare job according to drawing	1	2	3	3	1	-	1	2	2	2		
CO 6	Maintain workshop related tools, equipment and machineries	1	2	3	3	1	-	1	2	2	2	3	

Sr No	Name of the faculty members	Designation and Institute
1	D.V.Tammewar	Workshop Superitendent
2	Dr.U.V.Pise	Head of Mechanical Engineering

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **ELEMENTS OF ELECTRONICS & ELECTRICAL ENGINEERING**

COURSE CODE **6S202**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engg and Information Technology	Second

1. RATIONALE

It is necessary for the students of Computer Engineering and Information Technology to study and apply the basic principles, analyze and troubleshoot simple subsystems. To acquire this level of understanding, the basic knowledge of electronic devices and circuits is essential. Electrical engineering involves the conception, design, development, & production of the electrical or electronic products & systems needed by our technological society. This Course is one of the core subjects which is deals with construction, working principle of electronic devices, Electric circuits, different electrical machines with application of active components.

2. COMPETENCY

Apply the basic electronic testing and fault finding of electronic and electrical components and circuits.

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE @ (OR)	PA (TW)	150
4	-	2	06	80	20	25@	25	
Duration of the Examination (Hrs)				3	1	--	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Identify electronic components in given electronic circuit.
2. Select particular diode for different rectifier application, Filters and Regulator Circuits.
3. Distinguish the functioning of Uni-polar devices & Bi-polar Junction Transistor.
4. Use of electric machines & instruments for computer application
5. Select the need and application of protective devices

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit – I **Electronic Components and Signals**	1a. Differentiate between active and passive electronic components 1b. Differentiate between voltage and current source. 1c. Explain the different types of signal Parameters with sketches. 1d. Differentiate various types of ICs.	1.1 Active and passive components, Voltage and Current Source, Symbols of various Semiconductor Components. 1.2 Amplitude, Frequency, Phase, Wavelength, Signal, waveform, Time and frequency domain representation, Types of Signals: sinusoidal, triangular and square 1.3 Integrated Circuits – Analog and digital
Unit– II **Diodes and Applications**	2a.Describe V-I characteristics of PN junction diode with sketches 2b.Describe the application of PN Junction diode. 2c. Describe the working and applications of Zener diode. 2d. Describe V-I characteristics of Zener diode. 2e. Describe the applications of	2.1 Symbol , construction and working principle of P-N junction diode 2.2 Need of rectifiers,Half wave, Full wave and Bridge Rectifier, Working and block diagram of regulated power supply,Need of filters,'L', 'C' and 'π'' Filter working. 2.3 Zener diode, Zener diode as voltage Regulator, Symbol , construction and working principle and V-I characteristics of Light Emitting Diode

	LED. 2f.Compare -1.Types of Rectifiers 2.Types of Filters	
Unit– III **Bipolar junction** **Transistor** **& Field Effect Transistors(BJT & FET)**	3a. Differentiate unipolar and bipolar devices. 3b.Describe the applications of transistor. 3c. Determine the effect of Current gain on the performance of the transistor. 3d. List specifications and ratings of BJT 3e. Describe the applications of JFET and MOSFET. 3.f Differentiate BJT and JFET.	3.1 Introduction to Unipolar and Bipolar devices 3.2 symbol, construction and working principle of NPN transistor, Transistor as switch and amplifier,Input and Output characteristics of CE,CB and CC configurations, Regions – Cut-off, saturation and Active region,Transistor parameters-alpha, beta, input and output resistance and relation between alpha and beta 3.3FET-Types(JFET and MOSFET),Classification of JFET,Symbol, construction and working principle of N-channel and P-channel JFET
Unit – IV Electric Circuit Fundamentals & Machines	4a. State and explain Ohm's law. 4b. Explain different Circuit condition. 4c. Apply Kirchoff's law in different circuit. 4d. Give characteristics of Inductance & Capacitance. 4e. Analyze Series and Parallel combination of circuits Practical examples of these circuits. 4f. Describe the working principle of DC generator and alternator 4g. Classify induction motors 4h Describe the working Principle of given induction motor	4.1 Current, Voltage- EMF and Resistance, Ohm's Law, Equivalent resistance of resistors connected in series and parallel.,Circuit conditions – open, close and short circuit, Kirchhoff's voltage and current laws,Power and Energy, Meters used to measure Current. 4.2 Voltage, Resistance,inductance and capacitance Power and Energy, Simple problems on ohm's and kirchoff's law. 4.3DC generator and alternator, Classification of induction motors,Construction, working principle,Squirrel cage and wound rotor induction motor
Unit– V Transformer and protective devices	6a.Describe the construction of a simple transformer. 6b. Describe the types and uses of transformers 6c.List the types of transformers used in various devices 6d.State the differences of MCB and ELCB	6.1 General construction and principle of Transformers., Emf equation and transformation ratio of transformers,Applications of Transformers, Construction and uses of auto transformers. 6.2 Different protective devices such as fuse, M.C.B. and ELCB. HRC fuses,Uninterruptible Power Supplies

	6e.State the need of HRC fuses. 6f.Explain how to protecting computer against power transient. 6g. Describe how earthing is done for a domestic building	(UPS),Protecting computer system against power transients,Earthing principles and pipe earthing

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
I	**Electronic Components and Signals**	08	04	04	02	10
II	**Diodes and Applications**	16	04	06	10	20
III	**Bipolar junction Transistor & Field Effect Transistors(BJT & FET)**	16	02	08	10	20
IV	**Electric Circuit Fundamentals & Machines**	14	04	06	08	18
V	**Transformer and protective devices**	10	02	04	06	12
	Total	64	16	28	34	80

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	I	Measure parameters like amplitude, time period, frequency of sine wave and square wave using CRO and Function Generator	02
2	I	Measure the value of the resistance by using (i) Analog and Digital Multi-meters and (ii) by Colour coding.	02

3	II	Test the working of PN junction diode.	02
4	II	Test the working of Zener diode.	02
5	II	Use rectifiers to convert AC signal into DC signal using Half wave and Full wave rectifier. Use of filters to get regulated DC.	04
6	II	Use rectifiers to convert AC signal into DC signal using Bridge rectifier. Use of filters to get regulated DC.	04
7	II	Test the working of Zener regulator.	02
8	III	Check input and output characteristics of NPN Transistor in CE Mode.	04
9	III	Measure voltage between terminals of AC/DC.	02
10	IV	Apply ohm's law experimentally in a given circuit.	02
11	IV	Apply Kirchhoff's current& voltage law in a given circuit.	02
12	VI	Measure input & output quantities of single phase transformer.	02
13	VI	Measure ratings of various Protective devices.	02
TOTAL			32

8. SUGGESTED STUDENTS ACTIVITIES

Other than class room and laboratory activities following are the suggested guided co-curricular students activities which need to be undertaken to facilitate the attainment of various course outcomes of this course. The students are required to maintain portfolio of their experiences which he/ she will submit at the end of the term.

Following is the list of proposed student activities like:

1. Prepare journals based on practical performed in laboratory.
2. Study of datasheet of electronic components.
3. Prepare charts of symbols of Electronic components.
4. Search information about Ratings and specifications of Regulator, diode transistors, CRO, function generator.
5. List analog and digital ICs and prepare charts of the same.
6. Students may be asked to make a list of following items used in electric and electronics circuits. Comparetheir properties, usage, cost and availability. Collections can be made for small inexpensive items. Each of thesecan be offered as a project.
   a. Conductors - Copper, Aluminum, Graphite, Carbon, Nichrome, Tin
   b. Commonly used insulators
   c. Transistors
   d. Capacitors

e. Resistors
f. Diodes and Rectifiers
g. Transformers
h. SCRs, TRIACs, DIACs
i. LEDs, LCDs
j. Devices for industrial and residential illumination
k. Heaters and furnaces
l. Motors and Alternators
m. Switches, micro-switches and relays
n. Soldering, desoldering, welding devices and equipment.
o. Fans, Blowers and pumps
p. Smoke detectors, fire alarms used in electrical/electronics installations.
q.High voltage devices and equipment used and their safety features.

r. To study three phase induction motor parts & their identification & Study the UPS used in the electrical/electronics laboratory.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

1. Guide students in preparing charts and display boards.
2. Guide students in searching information regarding datasheets and electronic components.
3. Demonstrate practical thoroughly before the students perform.
4. Show Flash/Video/Animation clippings for functioning of instruments.
5. Observe continuously and monitor the performance of students in lab.
6. Assign different types of Mini-projects
7. Guide students in preparing Micro-projects.

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	A text book of Applied Electronics	R.S.Sedha	S.Chand & Co., latest edition
2.	Electronics Principles	Albert Paul Malvino	McGraw Hill, latest edition
3.	Principles Of Electronics	V.K.Mehta Rohit Mehata	S.Chand & Co., latest edition

4.	B.L Theraja	Electrical Technology Vol. I & II	S. Chand & Co.
5.	Prasad P.V and Sivanagaraju S.	Electrical Engineering:Concepts and Applications	Cengage Learning India, New Delhi, 2012
6.	V. N. Mittle	Basic Electrical Engineering	Tata McGraw Hill, New

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment	Brief specification
1.	Single/Dual regulated Power supply.	As per Electronics and Electrical industry specification
2.	Digital multimeter and ammeter, micro-ammeter.	As per Electronics and Electrical industry specification
3.	Dual trace CRO/DSO.	As per Electronics and Electrical industry specification
4.	Function generator.	As per Electronics and Electrical industry specification
5.	Trainer kits / breadboard for Rectifiers, regulator, Transistors, JFET and RC coupled single / two stage amplifiers.	As per Electronics and Electrical industry specification

12. LEARNING WEBSITE & SOFTWARE

a. http://nptel.ac.in/courses/122104013/
b. http://www.electronics-tutorials
c. https://learn.sparkfun.com/tutorials/transistors
d. http://www.pitt.edu/~qiw4/Academic/ME2082/Transistor%20Basics.pdf
e. http://faculty.cord.edu/luther/physics225/Handouts/transistors_handout.pdf
f. http://www.technologystudent.com/elec1/transis1.htm
g. http://www.learningaboutelectronics.com/Articles/N-channel-JFET
h. http://www.electrical4u.com/jfet-or-junction-field-effect-transistor
i. http://www.electrical-technologies.com/
j. http://electrical4u.com/
k. http://www.electronics-tutorials
l. http://www.animations.physics.unsw.edu.au//jw/AC.html

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Identify electronic components.	1	-	1	-	-	-	-	-	-	-	-	-
2	Use diodes in different applications	1	-	1	-	-	-	-	-	-	1	-	-
3	Test the functioning of of uni-polar devices & Bi-polar Junction Transistor.	1	-	2	-	-	-	-	-	-	-	-	-
4	Measure the electric circuits fundamentals & Use the electric machines for computer application	3	-	-	-	-	-	-	-	-	-	-	-
5	Identify the need and use of protective devices	-	-	-	-	1	1	-	-	-	-	-	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Prajakta Sadafule	Lecturer in Computer Engineering, Govt. Polytechnic, Aurangabad
2	Pawan Lahoti	Lecturer in Computer Engineering, Govt. Polytechnic,Aurangabad
3	Nilophar Masuldar	Lecturer in Computer Engineering, Govt Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- 'C' PROGRAMMING (CP)

COURSE CODE 6S204

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
COMPUTER ENGINEERING INFORMATION TECHNOLOGY	**SECOND SEMESTER**

1. RATIONALE

This Course intends to develop programming skills in the students, using a popular structured programming language `C'. The students will learn step by step procedure (i.e. flowcharting &Algorithm) of any program development process. The programming skills thus acquired can be used for developing programs with advance level programming features which in turn will be helping in developing practical applications for the scientific, research and business purposes.

2. LIST OF COMPETENCIES

At the end learning this course student will be able to:

"Develop structured, modular and memory efficient programs in 'C' using arrays, functions, pointers."

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (PR)	PA (TW)	150
3	-	4	7	80	20	#25	25	
Duration of the Examination (Hrs)				3	1	2	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of learning this course students will be able to: -

1. Develop algorithm and Draw the flowchart for 'C' Programming.
2. Develop a program using decision and loop statement.
3. Implement program using array.
4. Use functions and pointer in given problem statement.
5. Create structure for different data type in one head.

5. DETAILED COURSE CONTENTS

Unit	**Major Learning Outcomes** (Cognitive Domain Only)	**Topics and Sub-topics**
UNIT-I **Basics of c programming**	1a. Draw flow chart to solve given problem logically. 1b. Develop Algorithm to solve given program. 1c. Comprehend general structure of 'C' program 1d. Declare and define variables 1e. Write and execute simple program in 'C' 1f. Use arithmetic, relational and logical operators for forming expressions. 1g. Format input and output using 'C' statements.	1.1 Introduction to C and General structure of 'C' program 1.2 Features and Advantages of C language. 1.3 Character set, 'C' tokens Keywords and Identifiers 1.4 Constants and Variables Data Types 1.5 Modifiers and type conversion 1.6 Input and Output statements in 'C' 1.7 Types of Operators and Expression: Arithmetic, Relational ,Assignment, Logical, conditional operators and expressions, Write, compile, execute a simple 'C' program
UNIT-II **Control and loop statements**	2a. Develop programs using decision making statements in 'C' language. 2b. Develop programs using structured loop control statements in 'C' language	2.1 Decision Statements 2.2 Unconditional branching: goto statement 2.3 Conditional branching statements: If statement, If-else statement, Nested If else statement

		2.4 If-else-if Ladder statement 2.5 Break, continue and goto statements, switch statements 2.6 Loop Control Statements: for loop, While loop, Do-while loop
UNIT-III **Introduction to Array**	3a. Declare and define array. 3b. Develop programs using array in 'C' language 3c. Develop, debug and execute programs which use reading, writing and manipulating Arrays. 3d. Describe string function	3.1 Array definition and Declaration 3.2 Concept of one dimensional and two dimensional array 3.3 Accessing and initialization an array 3.4 Characteristics of an array 3.5 Introduction of String 3.6 Declaration and Initialization of String 3.7 gets(), puts() functions in <String.h>: such as strlen(), strcmp(), strcpy(). Strrev(), strcat() and all.
UNIT-IV **Pointer and Function**	4a. Develop, debug and execute modular programs by writing and using Functions 4b. Develop, debug and execute programs using Pointers 4c. Declare and initialize pointer	4.1 Introduction and Features of Pointers 4.2 Declaration of Pointer, Pointer initialization, pointer arithmetic operation 4.3 Array using pointer and array of pointers. 4.4 Basics of Functions, Built-in and user defined functions 4.5 Advantages of using Functions 4.6 Working of a Function 4.7 Declaring, Defining and calling user defined Functions 4.8 Types of functions: i) no return type no argument list ii) no return type with

		argument list iii) return type no argument list iv) return type with argument list. 4.9 Call by Value and call by Reference and recursive function
UNIT-V **Structure and Union**	5a. Implement program for different Data types under a single structure 5b. Describe array of structure and pointer to structure. 5c. Describe union with its use 5d. Utilize memory effectively using Union	5.1 Introduction and Features of Structures 5.2 Definition and Declaration of Structures 5.3 Memory allocation of structure 5.4 Array of Structures and Pointers to Structure 5.5 Nested structure. 5.6 Declaration of Union, its use and how to access it 5.7 Create dynamic memory using <malloc.h> for structure variable.

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	**Unit Title**	**Teaching Hours**	**Distribution of Theory Marks**			
			R	**U**	**A**	**Total**
I	Basics of c programming	**08**	**3**	**5**	**6**	**14**
II	Control and loop statements	**10**	**3**	**5**	**8**	**16**
III	Introduction to Array	**08**	**4**	**4**	**6**	**14**
IV	Pointer and Function	**12**	**4**	**6**	**10**	**20**
V	Structure and Union	**10**	**4**	**6**	**6**	**16**
Total		**48**	**18**	**26**	**36**	**80**

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's Taxonomy)

7. SUGGESTED LIST OF EXERCISES/PRACTICAL/EXPERIMENTS

The exercises/practical/experiments should be properly designed and implemented with an attempt to develop different types of skills leading to the achievement of the competency. Following is the list of exercises/practical/experiments for guidance.

S. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
1.	1	Draw Flow Chart and write algorithm for at least four problems.	2
2.	1	i. Write programs using Constants, Variables & arithmetic expression. ii. Write program to calculate average of numbers using arithmetic operators	2
3.	1	Execute programs to create variable with different data types, Type modifiers and Type conversion.	2
4.	1	Execute programs providing insight to formatted and unformatted input and output in c	2
5.	1	Execute programs providing understanding of Relational operators.	2
6.	1	Execute programs using logical and bitwise operators.	2
7.	2	Make programs using If, If-else, If-else-if and Nested If statements.	4
8.	2	Make programs using break, continue, goto and switch statements.	4
9.	2	Execute programs to understand simple For loop and nested loops.	4
10.	2	Execute programs using While Loop and nested while loop.	2
11.		Execute programs using Do-while Loop and nested Do-while loop.	2

S. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
12	3	i. Execute program to display 1-D and 2-D array. ii. Execute programs on arrays. (Sorting, finding particular value etc.)	4
	3	Execute a program for matrix addition.	2
13		Execute a program for matrix multiplication	2
14	3	Execute programs using String functions strlen(), strcpy, strcmp(), strlwr(),strupr(), strchr(), strcat()	2
15	4	Execute a program for math and other functions like sqrt(), pow(), ceil(),round(), sin(), cos(), tan(), div(), abs() etc	2
16	4	Execute programs using functions and passing function arguments.	4
17	4	Execute programs for pointer.	2
18	4	Execute programs using recursive Functions.	2
19	4	Execute program for call by reference	2
20	5	Execute and execute programs with various features of Structures	2
21	5	Execute program for structure using pointer	4
22	5	Execute program for array of structure.	2
23	5	Execute program for structure within structure	2
24	5	Execute and execute programs using Union	2
25	5	Execute and execute programs for creating memory for structure variable using <malloc.h>	2
Total			64

8. SUGGESTED STUDENT ACTIVITIES

LIST OF PROPOSED ACTIVITY:

1. Students will prepare file for the above mentioned Practical
2. Prepare presentation and deliver seminar on various topics covered like String functions, Pointers, Arrays, File Functions, Structures and Unions,
3. Students are expected to develop minimum one program of particular topic as an example to exhibit real life application.

9. SPECIAL INSTRUCTIONAL STRATEGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-

b. Q & A technique.

c. Demonstration

d. Seminars

e. Activity based learning

10. SUGGESTED LEARNING RESOURCES

List of Books

Sr.No	Author	Title of Books	Publication
1	Kamthane,A.N.	Programming in 'C	Pearson,2012
2	Balaguruswami,E.	Programming in ANSI C	TMH,2012
3	Kanetkar, Yashavant	Let us 'C'	BPB publications,2010

11. List of Major Equipment/ Software

S. No.	Name of equipment	Brief specification
1	Desktop Computer	i5 processor or higher,4gb RAM
2	C compiler	TurboC3 or latest version

12. List of Software/Learning Websites

1. 'C' Programming Language: http://www.w3schools.in/cprogramming- language/intro/
2. Learn C Online: http://www.learnconline.com/
3. 'C' Frequently Asked Questions: http://www.c-faq.com
4. 'C' Programming: http://www.cprogramming.com
5. Sams Teach Yourself C in 24 Hours: http://aelinik.free.fr/c/

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

CO. NO.	Course Outcome	POs										PSOS	
		1	2	3	4	5	6	7	8	9	10	1	2
1	Develop algorithm and flowchart for 'C' Programming	1	-	2	3	-	-	-	-	-	-	1	1
2	Develop a program using decision and loop statement	-	-	3	3	-	-	-	-	-	-	2	2
3	Implement program using array.	-	1	2	1	-	-	-	-	-	-	2	2
4	Comprehend and use the concept of functions and pointer.	-	1	3	3	-	-	-	-	-	-	2	2
5	Create structure for different data type in one head	-	2	1	1	-	-	-	-	-	-	2	2
6	Open a file using 'C' Program.	-	1	1	1	-	-	-	-	-	-	2	2

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Ms. R.S.Sindge	LIT, P.L.Govt. Polytechnic, Latur
2	Ms. V.B. Kundlikar	LIT, Govt. Polytechnic,Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- STATIC WEB PAGE DESIGING LANGUAGE
COURSE CODE 6S205

PROGRAM & SEMESTER

Diploma Programmes in which this course is offered	Semester in which offered
Computer Engineering / Information Tech.	2nd Semester

1. RATIONALE:

this is basic level course aims at static web page desinging. World Wide Web is the basic technology for e-commerce and HTML is the medium for creating web pages. This language required for developing online educational applications such as organizational websites, educational website, virtual learning environments etc. and business applications in various fields such as products sale, banking, railways reservation, services etc.

2. COMPETENCY STATEMENT:

At the end learning this course student will be able to:

"Develop and host a static website using Hyper Text Markup Language with web technology features like Cascading Style Sheets etc."

3. TEACHING SCHEME

Teaching Scheme (Hours/Credits)			Total Credits	Examination Scheme (Marks)				
				Theory Mark		Practical Mark		Total Marks
L	T	P	C	ESE	PT	ESE (PR)	PA (TW)	100
0	0	2	2	0	0	@50	50	
Duration of the Examination (Hrs)				--	--	--	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. LEARNING OUTCOME

At the end learning this course student will be able to:

१. Select Static and Dynamic Web Pages.
2. Design web pages using basic HTML tags.

3. Design web pages containing hyperlink and different images.
4. Design web pages having frame consisting of table.
5. Design any kind of registration form.
6. Design and develop web pages using CSS styles, internal and/or external style sheets

5. DETAILED COURSE CONTENT

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit – I Website Development Essentials	1a.Identify website development essentials.	1.1 Information about web site, web page, Web Browsers and their types. 1.2 Working of different types of Web Pages, General structure of a Web Page, Scripting languages, URL, Popular Search Engines, WWW. 1.3 Static Web Pages, Dynamic Web Pages
Unit -II Introduction to HTML	2a.Use basic HTML tags	2.1 Introduce Web page structure and basic structure tags: !DOCTYPE, HTML, HEAD, TITLE, BODY with attributes. 2.2 Block Level Tags: Headings, aragraphs, Breaks, Divisions, Centered Text, Block Quotes, Preformatted text, HR tag. 2.3 Text Level Tags: Bold, Italic, Teletype, Underline, Strikethrough, Superscript, Subscript DIV Tag, Font Tag. 2.4 Lists: Ordered Lists, unordered Lists, Definition Lists, and Nested Lists.
Unit III: Linking Documents & Including Images	3a.linking of documents and images for given required link.	3.1 URL: Types of URLs, Absolute URLs, Relative URLs. 3.2 Anchor Tag: Linking various documents for internal and external links, Marquee Tag. 3.3 Image Formats: GIF,JPEG, BMP & PNG 3.4 Adding Image using Image tag, setting an image as background
Unit IV: Developing Table & Creating Frame	4a.use tables with given formatting.	4.1 TABLE tag with attributes. TABLE, TR, TH, TD tags, border, cell spacing, cell padding, width, align, bgcolor attributes. 4.2 Types of Frames with their attributes Creating frames: FRAMESET tag – rows, cols attributes. 4.3 FRAME tag –name, frame border, margin height, margin width, src, resize,

		scrolling attributes. Use of NOFRAMES tag, Frame targeting.
Unit V: Developing HTML Forms	5a.design forms for given systems	5.1 Creating basic form: FORM tag, action and method attributes. 5.2 Form fields: Single line text field, password field, multiple line text area, radio buttons, and check boxes. 5.3 Pull down menus: SELECT and OPTION tags. 5.4 Buttons: submit, reset and generalized buttons.
Unit VI: Introduction to Style sheets.	6a.make use of style sheets	6.1 Introduce Style Sheets with different types. 6.2 Adding style to the document: Linking to style sheets, Embedding style sheets, Using inline style. 6.3 Selectors: CLASS rules, ID rules. 6.4 Style sheet properties: font, text, box, color and background properties.

6. SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (THEORY)

Unit No.	Unit Title	Teaching / Practical Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Website Development Essentials	**06**	**NOT APPLICABLE**			
II	Introduction to HTML	**12**				
III	Linking Documents & Including Images	**12**				
IV	Developing Table & Creating Frame	**10**				
V	Developing HTML Forms	**14**				
VI	Introduction to Style sheets.	**10**				

Legends: R = Remembrance; U= Understanding; A= Application and above levels (Revised Bloom's taxonomy)

7. SUGGESTED EXERCISES/PRACTICALS

<table>
<tr><th>S. No.</th><th>Unit No.</th><th>Practical Exercises
(Outcomes in Psychomotor Domain)</th><th>Approx. Hrs. required</th></tr>
<tr><td>1</td><td>1</td><td>Study different static web site & dynamic web site.</td><td>02</td></tr>
<tr><td>2</td><td>2</td><td>Design a basic web pages using structure tag for displaying “My First Web Page” message.</td><td>02</td></tr>
<tr><td>3</td><td>2</td><td>Create a HTML document giving details of your [Name, Age], [Address, Phone] and [Register Number, Class] aligned in proper order using alignment attributes of Paragraph tag and different heading style</td><td>02</td></tr>
<tr><td>4</td><td>2</td><td>Create a page to show different character formatting (B, I, U, SUB, SUP) tags.
viz : $\log_b m^p = p \log_b m$</td><td>02</td></tr>
<tr><td>5</td><td>2</td><td>Create a web page, showing an ordered list and unordered list of all second semester courses (Subjects).</td><td>02</td></tr>
<tr><td>6</td><td>3</td><td>Create a web page to link web page in the same directory, different
Directory, in a subdirectory of a parent directory, any other directory, and link to Email ID.</td><td>02</td></tr>
<tr><td>7</td><td>3</td><td>Write a HTML code to create a web page with pink colour background and display moving message in red colour.</td><td>02</td></tr>
<tr><td>8</td><td>3</td><td>Write HTML code to create a WebPage that contains an Image at its centre.</td><td>02</td></tr>
<tr><td>9</td><td>3</td><td>Create a web page with an appropriate image towards the left hand side of the page, when user clicks on the image another web page should open.</td><td>02</td></tr>
<tr><td>10</td><td>4</td><td>Create a web page implementing all formatting and table tags.
<table>
<tr><th>Reg. Number</th><th>Student Name</th><th>Year/Semester</th><th>Date of Admission</th></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
</table></td><td>02</td></tr>
<tr><td>11</td><td>4</td><td>Create a web page implements no. of frame in a single web page
<table>
<tr><td>FRAME-1</td><td>FRAME-2</td></tr>
<tr><td colspan="2">FRAME-3</td></tr>
</table></td><td>02</td></tr>
<tr><td>12</td><td>5</td><td>Create a web page for students Registration form using FORM tags.</td><td>04</td></tr>
</table>

S. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
13	5	Write a program to demonstrate the use of GET, POST, developing a Feedback form with the use of <form> and <button> HTML tags.	02
14	6	Create a web page for demonstration of CSS applying Internal/External/Inline style.	02
15	6	develop a CSS program to set an image as the background	02
Total			**32**

8. SUGGESTED LIST OF STUDENT ACTIVITIES

Following is the list of proposed student activities like:

- Analyze any 5 different website.
- Create our own website using online available templates.
- Develop a static website consisting of minimum five web pages usingDreamweaver

9. SUGGESTED LEARNING RESOURCES

Sr. No.	Author	Title of Book	Publication
1	Duckett Jon	Beginning Web Programming with HTML,XHTML & CSS	Wrox, 2008
2	Thomas Powell	HTML and XHTML –The complete reference	Tata McGraw Hill, New
3	Robbins Design	Learning Web	O'Reilly
4	Dick Oliver	SAMS Teach Yourself HTML & CSS in 24 Hours	Pearson Education Publication

10. LIST OF MAJOR EQUIPMENTS

Computer System with latest configuration & Dreamweaver software

11. SOFTWARE/LEARNING WEBSITES

1. http://www.w3schools.com/html
2. https://www.tutorialspoint.com/html/
3. http://www.html.net/
4. http://www.2createawebsite.com
5. http://webdesign.about.com
6. https://www.codecademy.com/learn/web

12. POs and PSOs assignment and its strength of assignment with each CO of the Course

CO. NO.	Course Outcome	POS										PSOs	
		1	2	3	4	5	6	7	8	9	10	1	2
1	Explain the Difference between Static and Dynamic Web Pages.	-	2	2	-	-	-	-	-	-	-	-	-
2	Design web pages using basic HTML tags.	-	3	3	-	-	-	-	-	-	3	-	-
3	Design web pages containing hyperlink and different images.	-	3	3	-	-	-	-	-	-	3	-	-
4	Design web pages having frame consisting of table.	-	3	3	-	-	-	-	-	-	3	-	-
5	Design any kind of registration form.	-	3	3	-	-	-	-	-	-	3	-	-
6	Design and develop web pages using CSS styles, internal and/or external style sheets.	-	3	3	-	-	-	-	-	-	3	-	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Mr. P.B.Lahoti	LCO, Govt. Polytechnic, Aurangabad
2	Ms. P.S. Sadafule	LCO, Govt. Polytechnic, Aurangabad
2	Ms. V.B. Kundlikar	LIT, Govt. Polytechnic,Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE : COMMUNICATION SKILLS
COURSE CODE : 6G302

Diploma Programme in which this course is offered	Semester in which offered
All Branches of Diploma in Engineering and Technology	Second Semester

1. RATIONALE

Proficiency in communication skills is one of the prime needs of diploma engineer/ technician who has to communicate all the time with peers, superiors, sub-ordinates and clients in his professional life. The need of acquiring effective communication skills is more essential. As the world is shrinking into a global village with the new technologies, technically sound diploma holders may be a quality human resource, if their communicative abilities are shaped properly. Therefore, this course is designed to develop the ability of students to stand as a skilled and effective communicator with employability skills.

2. COMPETENCY

At the end of studying this course students will be able to

"Communicate effectively at workplaces."

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	**T**	**P**	**C**	**ESE**	**PT**	**ESE(OR)**	PA	TOTAL MARKS
1	0	2	3	-	-	@25	50	75
Exam Duration				-	-	-	-	

(*): *Out of 50 marks, 10 marks -micro-project assessment; 40 marks-progressive assessments*

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; **C** – Credit, **ESE** -End Semester Examination; **PA** - Progressive Test; OR-Oral examination

4. COURSE OUTCOMES

1. Express new ideas effectively.
2. Select suitable type of communication in different situations.
3. Avoid communication barriers for effective communication.
4. Use appropriate body language to communicate effectively.
5. Formulate various ways to face interview effectively.
6. Draft different types of business letters, notices, memoranda and E-mails using correct formats.

5. COURSE DETAILS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
UNIT-I Introduction to communication	1a. Describe significance of Communication. 1b. Describe the elements of communication. 1c. Explain the cycle & process of communication. 1d. Identify the various communication situations.	1.1. Definition, importance 1.2. Communication cycle / process 1.3. Elements of Communication
UNIT-II Types of communication	2a.Identify the types of communication. 2b.Explain the types of communication.	2.1. Verbal-nonverbal , formal-informal, upward-downward, horizontal-diagonal communication
UNIT -III Principles of effective communication	3a.Explain the principles of communication. 3b.Illustrate principles of effective communication. 3c. Describe communication barriers. 3d. Identify the types of communication barriers. 3e. Select ways to overcome communication barriers.	3.1.Effective Communication 3.2.Barriers to communication & ways to overcome them
UNIT-IV Non -Verbal Communication	4a. Understanding non-verbal communication. 4b. Know the uses of body language. 4c. Uses of pictorial representations.	4.1.Non-verbal codes 4.2.Aspects of body language 4.3. Pictorial representation
UNIT –V Interview Techniques	5a. Listening& comprehending the passage. 5b. Having presence of mind. 5c. Managing stress. 5d. Facing viva.	5.1.Listening skills 5.2.Stress management 5.3.facing oral communication
UNIT-VI Formal Written Skills	6a. Correct format with correct language. 6b. Identify the types of letters. 6c.Applying different techniques of drafting letters.	6.1.Business Letters: Enquiry, Order, Complaint, Adjustment, Seeking Permission etc.

6. SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Introduction to Communication	03	NA	NA	NA	NA
II	Types of communication	02	NA	NA	NA	NA
III	Principles of Effective Communication	03	NA	NA	NA	NA
IV	Non-verbal communication	03	NA	NA	NA	NA
V	Interview Techniques	02	NA	NA	NA	NA
VI	Formal written skills	03	NA	NA	NA	NA
	Total	16	NA	NA	NA	NA

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

7. SUGGESTED EXERCISES/PRACTICALS

The tutorial/practical/exercises should be properly designed and implemented with an attempt to develop different types of cognitive and practical skills **(Outcomes in cognitive, psycho-motor and affective domain)** so that students are able to acquire the competencies.

S. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
1	I & II	Identify the elements of communication cycle with three Suitable examples.	04
2	II	Deliver two short and long prepared speeches.	04
3	III	Present a role-play.	04
4	III	Form a group of four students and make a group discussion on current issues and summarize it.	04
5	II&IV	Prepare a power point presentation on any one technical topic.	04
6	III	Demonstrate any assigned activity using appropriate body language.	04
7	III	Face a mock-interview.	04
8	IV	Write two formal letters in correct format.	04
Total			**32**

8. SUGGESTED STUDENT ACTIVITIES

Following is the list of proposed student activities:

a. List the different communication situations.
b. Use audio visual aids to learn different skills in communication.
c. Conversations –formal/informal.
d. Read newspaper.
e. Collect different audio clips.
f. SWOT analysis.
g. Deliver welcome/farewell speeches in various programmes.
h. Use of graphics in technical writings.
i. Interviewing common people.
j. Debating practices.
k. Summarizing discussions.
l. Practicing interviews

9. SPECIAL INSTRUCTIONAL STRATEGIES (if any)

a. Arrange various debate/elocution competitions to develop spoken communication skills.
b. Show audio/video clips to develop listening skills.
c. Collect various pictures/charts to demonstrate body language.
d. Prepare and give oral presentations.
e. Guide micro-projects in groups as well as individually.

10. SUGGESTED TITLES OF MICRO PROJECTS

A micro-project is planned to be undertaken by a student. He/she ought to submit it by the end of the semester to develop the industry oriented COs. The micro-project could be industry application-based, internet-based, workshop-based, laboratory-based or field-based. Each student will have to maintain dated work diary consisting of individual contribution in the project work and give a seminar presentation of it before submission. A suggestive list is given here. Similar micro-projects could be added by the concerned faculty**:**

a. Find out five communication events from day to day life and explain them in the form of communication process.
b. Find out various reasons of communication gap in certain official situations.
c. Identify various types of communication situations in student's life.
d. Study various barriers occurring in communication among diploma students.
e. Find out the remedies to overcome psychological barriers in communication.
f. Collect different types of letters and analyze the language and format used in it.
g. Prepare a review on the listened story/news/discussion/meeting.

11. SUGGESTED LEARNING RESOURCES

Sr.No.	Title of Book	Author	Publication
1.	Business Communication	R.C.Bhatiya	Ane Books India, New Delhi.
2.	Developing Communication Skills	Krishna Mohan& Meera Banerjee	Macmillan
3.	Power Point Presentation	Adam B Cooper	Macmillan
4.	Group Discussions & Interviews	Dr.B.R.Kishor& D. S.Paul	Vee Kumar
5.	Body Language	Allan Pease	Sheldon Press, London.

12. Major Equipment/ Instrument with Broad Specifications

Sr.No.	Name of the Equipment	Specification
1	Digital English Language Laboratory	
2	Computers and Headphones	
3	Magazines,Articles,Journals in Lab.	

13. E-learning resources

(Please mention complete URL of the E- resourses CO wise)

1	https://www.nptel.ac.in/courses
2	https://www.k12reader.com
3.	https://www.eduaction.com
4.	https://www.k5learning.com
5.	https://www.english4u.com

POs and PSOs assignment and its strength of assignment with each CO of the Course -

CO. NO.	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	Develop the habit to express new ideas properly.	1	1	3	-	1	-	-	-	1	1	-	-	-
CO2	Select correct type of communication in different situations.	-	-	1	-	1	-	1	1	1	1	-	-	-
CO3	Avoid communication barriers for effective communication.	-	-	2	-	2	2	2	2	2	2	-	-	-
CO4	Use appropriate body language to communicate effectively	-	-	1	-	2	2	2	3	3	3	-	-	-

CO5	Formulate various ways to face interview effectively.	-	-	2	-	3	2	2	3	3	3	-	-	-
CO6	Draft different types of business letters, notices, memoranda and E-mails using correct formats.	-	-	1	-	1	-	-	1	1	1	-	-	-

Sr. No	Name of the faculty member	Designation and Institute
1	Mrs. P.Y. Kamble	Lecturer in English, Government Polytechnic, Aurangabad
2	Mrs. M.S. Ban	Lecturer in English, Government Polytechnic, Aurangabad
3	Mr. P.V. Deshmukh	Lecturer in English, Government Polytechnic, Aurangabad
4	Mr. R.L. Korde	Lecturer in English, Government Polytechnic, Aurangabad
5	Mr. D.D. Gangthade	Lecturer in English, Government Polytechnic, Aurangabad
6	Mr. A.P. Jagtap	Lecturer in English, Government Polytechnic, Osmanabad

Member Secretary PBOS Chairman PBOS Co-coordinator
science and Humanities

COURSE TITLE- **COMPUTER HARDWARE MAINTENANCE AND TROUBLE SHOOTING**

COURSE CODE **6P201**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering	Third

1. RATIONALE

Computer Hardware Maintenance and Trouble Shooting is a basic level course to keep computer systems maintain. This course helps the students to configure computer hardware as per the specification and perform periodic maintenance of it. This course is skill oriented and will develop the troubleshooting skills in the students.

2. COMPETENCY

At the end of studying this course students will be able to
"**Install, configure and identify faults for maintaining and troubleshooting computer systems and peripherals."**

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (OR)	PA (TW)	150
3	-	2	05	80	20	@25	25	
Duration of the Examination (Hrs)				3	1	2	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, PR- Practical Examination, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

1. Identify components of computer system.
2. Dissect Secondary Storage Devices and Drive
3. Examine input devices based on their working principle.
4. Examine output devices based on their working principle.
5. Apply PC's troubleshooting and maintenance using different tools.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit-I **Components of Computer system**	1a. Explain functionality and features of CPU. 1b. Differentiate types of motherboards pre-processors 1c. Describe bus slots and cards 1d. Define System Controller 1e. Explain BIOS features 1f. List advantages of Chipsets 1g. List features of different types memory modules	1.1 Central Processing Unit (CPU): CPU Speeds, Word Size, Data Path, Internal Cache memory, Slots and sockets, CISC vs. RISC processor, CPU chips pre-processors motherboard Types/Form Factors (AT, Baby AT, ATX, LPX, NLX, BTX). 1.2 PCI, Combination of Bus Systems, AGP – Accelerated Graphics Port, Universal Serial Bus (USB), IEEE 1394 Fire Wire- A Bus Standard. 1.3 Basic Input Output System: Services, Bios Interaction, CMOS-RAM. 1.4 Chipsets: Definition, Advantage, North and South Bridge. 1.5 System Memory: definition, memory sizes, speeds and shapes (DIP, ZIP, SIPP, SIMM, DIMM, RIMM), Memory modules (Dynamic RAM, SDRAM, DDR SDRAM, SLDRAM, DRDRAM, Fast Page Mode (FPM) DRAM, Extended Data Out (EDO) DRAM.

Unit-II **Secondary Storage Devices and Drives.**	2a. Define: Heads, Tracks, Sectors, Cylinders, Cluster, Landing zone, MBR, Zone bit recording 2b. Describe functioning of hard disk. 2c. Explain the working of hard disk controller 2d. Explain types of DVD, recording and constructions 2e. List blue-ray disk specification	2.1 Hard Disk Interfaces: EIDE, Serial ATA, SCSI, USB and IEEE 1394 (Firmware), RAID, Solid State Drive (laptop). Recording Techniques: FM, MFM , RLL, perpendicular recording 2.2 Disk Geometry: Heads, Tracks, Sectors, Cylinders, Cluster, Landing zone, MBR, Zone bit recording. 2.3 Hard Disk Controller: Functional Blocks, HDC Functions,Formatting 2.4 DVD Drives: Types, Recording, Construction, Interfacing. 2.5 Blue-ray disk specification
Unit-III **Input Devices and power supplies**	3a. Explain operations of keyboard. 3b. Explain operation of mouse. 3c. Explain working of scanner.	3.1 Keyboard Types, Types of Key switches (Membrane, mechanical, rubber dome, capacitive), Keyboard interfaces. 3.3 Mouse: Types, Operation, Interfaces. 3.4 Scanner: Scanner Types, Image quality measurement. 3.5 Block diagram and working of SMPS 3.6 Power supply characteristics: Rated wattage, Efficiency, Regulation, Ripple, Load regulation, Line regulation 3.7 Uninterrupted Power Supply
Unit- IV **Output Devices and Display Adapters**	4a. Describe the working of LaserJet and Ink-jet Printer. 4b. Define video basics (CRT parameters) and VGA monitors	4.1 Types of printer, Printer Interfaces, Ink-jet Printer: Parts, working principle, LaserJet Printer: Parts, working principle. 4.2 Video Basics (CRT parameters), VGA monitors. 4.3 Digital Display Technology- Thin Displays, Liquid Crystal Displays, Plasma

		Displays, Light Emitting Display. 4.4 Graphics Cards : Components of a card, Accelerated Video cards, CGA, EGA, VGA
Unit V: **Trouble Shooting and Preventive Maintenance**	5a. Explain POST sequence 5b. Explain troubleshooting procedures of listed peripherals and motherboard 5c. List the Preventive maintenance tools	5.1 POST : Functions, IPL Hardware, Test Sequence, Error messages. 5.2 Troubleshooting : possible problems and diagnosis , Motherboard , Keyboard , Hard Disk Drive, Printer 5.3 Preventive maintenance tools. 5.4 Power problems: Blackout, Brownout, surges and spikes, Symptoms of power problems. 5.5Diagnostic software for trouble shooting PC.

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
I	Components of computer system	12	08	10	06	24
II	Hard Disk Drive and Controller, DVD Drives	10	06	06	04	16
III	Input Devices	10	06	06	04	16
IV	Output Devices and Display Adapters	8	04	04	04	12
V	Trouble Shooting and Preventive Maintenance	8	02	06	04	12
	Total	**48**	**26**	**32**	**22**	**80**

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	I	Identify basic components of a personal computer. Demonstrate a list of various computer peripherals. (E.g. CPU, Monitor, Keyboard, Mouse, Speaker, Web cam, Printer, Scanner, microphone, speakers, modem, projector etc).	02
2	I	Identify common ports, associated cables, and their connectors. Observe various connectors, ports back and front side of the computer. Write their purpose and specifications. (e.g. Power, PS/2 keyboard and mouse, Serial and parallel, USB, VGA, LAN, Audio & microphone, Firewire, HDMI, games, SATA etc.)	04
3	II	Observe various secondary storage devices- Hard Disk, Flash drives, CD/ DVD drive. Open drives and dissect the internal structure of them. (If available Also open the various FDD/HDD disks to observe the magnetic disk inside.)	04
4	III	Open at least 2 to 3 different types of keyboard and mouse and observe the internal circuits. Observe and write steps to troubleshoot, maintain and clean the diskette drives, keyboard, mouse, etc.	04
5	IV	Observe different types of printers (dot matrix, inkjet & laser, multifunction). Install and configure device driver of printers with PC/Laptop on any operating system.	04
6	IV	Boot the computer system using different booting priority and/or sequence.	02
7	IV	Install Video Graphics Array (VGA) or Super Video Graphics Array (SVGA) display cards.	02
8	V	Identify the fault in the given PC, using the given troubleshooting sequence, fix the issue, record the given problem, and produce proper documentation of your work	02

9	V	a. Perform physical cleaning (internal and external) of personal computer. b. Demonstrate how to adjust basic performance settings. c. Perform hard drive file system maintenance. d. Identify anti-virus software and applications. e. Identify diagnostic software such as anti-virus utilities.	04
10	V	Use diagnostic software to identify installed computer peripherals and test their working condition.	02
Total			**32**

8. SUGGESTED STUDENTS ACTIVITIES

i. Survey of computer system, laptops, servers and peripherals available in the market to get awareness of the technology being used and their specifications.
ii. Prepare comparative charts as outcome of survey done.
iii. Prepare charts for various types of CPU and input/output devices available in market.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

i. Use online tutorials to guide students for desk top computer system, laptops, servers with latest configuration.
ii. Demonstrate practical thoroughly Preventive maintenance kit
iii. Show Flash/Video/Animation All peripheral maintenance kits (motherboard, keyboard, DVD, mouse, HDD etc)

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	The complete PC Upgrade & Maintenance Guide	Mark Minasi	BPB Publications

2.	IBM PC and clones	Govind Rajalu	Tata McGraw Hill Education Private Limited
3.	PC Upgrading and Maintenance	Biagloo	Tata McGraw Hill

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment	Brief specification
1.	Desk top computer system, laptops	with latest configuration.
2.	All peripheral maintenance kits (motherboard, keyboard, DVD, mouse, HDD etc)	Motherboard,keyboard ,mouse
3.	Preventive maintenance kit/ Disk cleaning kit	Print head cleaner
4.	Diagnostic software/tools, preferably open source based	

12. LEARNING WEBSITE & SOFTWARE

i. http://www.gcflearnfree.org/computerbasics/15/print
ii. http://www.more.net/sites/default/files/training/BTTmain.pdf
iii. Software: Microsoft windows operating system from XP/vista/7/8 to latest version available in market, Windows server, linux/ubuntu/centos, server operating system

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

Sr. No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Summarize and recall various component of computer system.	-	3	3	-	-	-	-	-	-	-	1	-
2	Disassemble and locate HDD and Disk Drive and recall the functionality.	-	3	3	1	-	-	-	-	-	-	1	-
3	Examine and select exact input devices and printer based on their working and functionality.	-	3	3	-	-	-	-	-	-	-	1	-
4	Select proper output devices based on their parameter and their requirement.	-	3	2	-	-	-	-	-	-	-	-	-
5	Apply and test of PCs troubleshooting and maintenance using different tools.	-	2	3	3	-	-	-	-	-	-	1	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	P B Lahoti	Lecturer in Computer Engineering, Govt. Polytechnic,Aurangabad
2	N.M. Masuldar	Lecturer in Computer Engineering, Govt. Polytechnic,Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **DIGITAL ELECTRONICS**

COURSE CODE **6S203**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engg and Information Technology	Third

1. RATIONALE

This is basic technology level course. It aims to enable the students to understand functioning of digital circuit using core structure of digital logic. This Course will enable student to solve various Boolean expressions, to design, develop and implement logic circuits.

2. COMPETENCY

At the end of studying this course students will be able to
"Use Digital Systems and Logic Families to design Simple and combinational circuits of any electronic device."

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE @ (PR)	PA (TW)	150
3	-	2	05	80	20	@25	25	
Duration of the Examination (Hrs)				3	1	2	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, PR- Practical Examination,OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Convert numbers from one form to another.
2. Select appropriate gates for a given logic.
3. Simplify circuits using K-map.
4. Design digital combinational circuit using arithmetic circuit (half adder, full adder)
5. Design digital combinational circuit using multiplexer and demultiplexer.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit – I **Introduction to Digital Principles**	1a. Use number system and codes for conversion 1b. Use a proper digital system to develop logic.	1.1 Number Systems : Binary Number System, Signed Binary Numbers, Octal Number System, Hexadecimal Number System , Binary Arithmetic. 1.2 1's Complement & 2's Complement. 1.3 Codes: BCD, EBCDIC, ASCII Code, Gray codes, Excess 3 code 1.4 Digital signal, Digital systems- Positive and Negative Logic, Advantages, Disadvantages and Applications of Digital Systems.
Unit -II **Logic Gate & Boolean Algebra**	2a. Explain working of Logic Gates 2b. Construct logical circuit using gates. 2c. Optimize logical circuit.	2.1. Working principles and Truth of AND, OR, NOT, NOR, NAND, EX-OR, EX-NOR Gates 2.2. Boolean Algebra : Basic Boolean 2.3. Operations, Basic Laws of Boolean 2.4. Algebra, De-Morgan's Theorems 2.5. Boolean Forms-Canonical & Standard
Unit III: **Boolean Expression**	3.a. Design and simplify expression using K-map for 2 variables. 3.b. Design and simplify	3.1 Standard Representation For Logic Functions. 3.2 K-map representation of logical functions minimization using 2, 3,

Implementation	expression using K-map for 3 variables. 3.c. Explain Boolean function 3.d. Implementation and simplification. 3.e. Define Don't Care Condition.	Variables. 3.3 Minimization of Logic Functions Specified and not specified in Minterms /Maxterms or Truth Table, Don't Care Condition.
Unit IV: **Combinational Logic**	4.a. Explain Basic Combinational Logic 4.b. Design half adder, fulladder, Half Subtractor &full Subtractor 4.c. Convert BCD code to Excess 3 Code.	4.1 Realization of system using Combinational Logic. 4.2 Realization of Half Adder & Full Adder. 4.3 Realization of Half Subtractor& Full Subtractor 4.4 Code Conversion-BCD to Excess 3 Code Conversion
Unit V: **Combinational Logic using LSI & MSI Circuit**	5.a. Implement Decimal-to-BCD encoder and Decimal-to-BCD decoder. 5.b. Design 4:1 Multiplexer with its logical expression and block diagram.. 5.c. Design 1:8 Demultiplexer with its truth table and block diagram.	5.1 Encoder, Decimal-to-BCD encoder. 5.2 Decoder, Decimal-to-BCD decoder 5.3 Multiplexer – Block diagram, Truth table, Logical expression and logic diagram of Multiplexers (2:1, 4:1, 8:1and 16:1), Multiplexer Tree. 5.4 Demultiplexer – Block diagram, Truth table, Logical expression and logic diagram of Demultiplexer (1:2, 1:4, 1:8and 1:16), Demultiplexer Tree
Unit VI: **Introduction to Sequential Logic Circuit**	6.a. Differentiate Sequential & Combinational Logic Circuit. 6.b. Define 1-bit memory cell. 6.c. Define Flip flop.	1.1 Introduction to Sequential Logic Circuit – Difference between combinational and sequential circuit. 1.2 Introduction to 1-bit memory cell and flip flop.

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
I	Introduction to Digital Principles	10	04	06	06	16
II	Logic Gate & Boolean Algebra	08	04	04	04	12
III	Boolean Expression Implementation	10	04	08	04	16
IV	Combinational Logic	06	04	04	02	10
V	Combinational Logic using LSI & MSI Circuit	10	06	08	04	18
VI	Introduction to Sequential Logic Circuit	04	04	04	00	08
	Total	**48**	**26**	**34**	**20**	**80**

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	1	Convert given Number system to another (HEX, OCTAL, DECIMAL, BINARY)	01
2	1	Calculate 2's and 1's Complements	01
3	2	Verify truth table of basic logic gates.	02
4	2	Use universal gate to form basic gates.	04
5	2	Verify Demorgan's theorem.	02
6	3	Implement given Boolean expression.	02
7	3	Implement given Boolean expression using Universal gates	02
8	3	Simplify the Boolean expression using Boolean algebra.	04

9	4	Construct and verify Decoder and Encoder circuit	02
10	4	Convert Decimal to BCD encoder &decoder.	02
11	4	Design and implement Half Adder and full adder circuit.	02
12	4	Design and implement Half Subtractor and full Subtractor circuit	02
13	4	Construct and verify BCD to Excess 3 conversion.	04
14	5	Design and Verify TT of 4:1 mux & 1:4 demux	02
Total			**32**

8. SUGGESTED STUDENTS ACTIVITIES

Other than class room and laboratory activities following are the suggested guided co-curricular students activities which need to be undertaken to facilitate the attainment of various course outcomes of this course. The students are required to maintain portfolio of their experiences which he/ she will submit at the end of the term.

Following is the list of proposed student activities like:

1. Prepare charts of symbols of given Digital Circuit.
2. List and observe ICs for given Digital Circuit.
3. Visit digital portals.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

1. Use online tutorials to guide students in searching information regarding Digital Electronics.
2. Demonstrate practical thoroughly before the students perform.
3. Show Flash/Video/Animation clippings for given Logic Circuits.
4. Observe continuously and monitor the performance of students in lab.
5. Assign different types of Mini-projects
6. Show simulation to analyze working of given Logic Circuits

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Mano M. Morris	Digital logic and Computer Design	Pearson publication, Latest Edition ISBN**:** 81-203-0417-9
2.	Malvino& Leach	Digital Principles and Applications	Tata McGraw Hill, New
3.	R P Jain	Modern Digital Electronics	Tata McGraw Hill, New
4.	Thomas L. Floyd	Digital Fundamentals	Pearson Education, ISBN:9788131734483

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment	Brief specification
1.	Binary to Decimal Converter & Decimal to Binary Converter	As per Electronics industry specification
2.	Binary to Gray code Converter & Gray to Binary code Converter	As per Electronics industry specification
3.	BCD to Seven Segment Decoder (Common Cathode Display)	As per Electronics industry specification
4.	Basic Logic Gates using Diode & Transistor	As per Electronics industry specification
5.	AND, OR, NOT Gate Characteristics kit	As per Electronics industry specification
6.	OR,NOR,EX-OR Gate Characteristics kit	As per Electronics industry specification
7.	De-Morgan's Theorem kit	As per Electronics industry specification
8.	NAND & NOR as Universal Gate	As per Electronics industry

		specification
9.	Multiplexer / De-multiplexer using Gates	As per Electronics industry specification
10.	Half & Full Adder & Half & Full Sub tractor	As per Electronics industry specification

12. LEARNING WEBSITE & SOFTWARE

a. http://www.asic-world.com/digital/tutorial.html
b. http://electrical4u.com/
c. http://www.electronics-tutorials.ws
d. http://www.vlab.co.in/http://www.electrical4u.com/jfet-or-junction-field-effect-transistor

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Identification and conversion of number system.	3	3	1	1	-	-	-	-	-	-	-	-
2	Select appropriate gates and theorem to solve Boolean algebra.	3	1	2	1	-	-	-	-	-	-	-	-
3	Apply K-map to simplify Boolean expression.	3	-	-	-	-	-	-	-	-	-	-	-
4	Design digital combinational circuit including arithmetic circuit (half adder, full adder)	3	2	2	-	-	-	-	-	-	-	-	-
5	Design digital combinational circuit using multiplexer & demultiplexer.	3	3	3	3	-	-	-	-	-	-	-	-
6	Compare and contrast combinational & sequential circuit.	-	1	1	1	-	-	-	-	-	-	-	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Pawan Lahoti	Lecturer in Computer Engineering, Govt. Polytechnic, Aurangabad
2	Prajakta Sadafule	Lecturer in Computer Engineering, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **MULTIMEDIA TECHNIQUES**

COURSE CODE- **6S206**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering/Information Technology	Third

1. RATIONALE

Multimedia Techniques is basic level course where student are going to develop multimedia application using recent tools. Animation plays a huge role in entertainment (providing action and realism) in advertising, films and gaming industry and also be extremely effective in education (providing visualization and demonstrations of abstract ideas and concepts). This course includes tools and techniques for designing graphics oriented multimedia and animated application based on audio, video and different file formats.

2. COMPETENCY

At the end of studying this course students will be able to
"Create and simulate multimedia and animated application using tools and technique."

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme 0(Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (PR)	PA (TW)	100
1	-	4	5	00	00	#50	50	
Duration of the Examination (Hrs)				00	00	02	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Identify various approaches, methods and techniques of Animation Technology.
2. Apply compression technique on appropriate multimedia file formats.
3. Develop effective animation for given application.
4. Create customized application using Photoshop.
5. Create animated movie using flash.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
UNIT-I Introduction to Multimedia	1a. Illustrate Multimedia system. 1b. Compare application of multimedia system.	1.1. I/O Devices 1.2. Evaluation of Multimedia System 1.3. Multimedia Application 1.4. Storage Media.
UNIT-II Compressions Technique & File Formats	2a. Distinguish between different file formats. 2b. Apply compression and decompression on different file format.	2.1. Principles of Compression 2.2. Methods of Text and Image Compression 2.3. Methods of Audio and Video Compression Working with sound and embedding videos 2.4. Study of various File Formats 2.5. MPEG vs. JPEG
UNIT-III Introduction to Animation	3a. Identify the animation its technique. 3.b. Apply the animation techniques in different applications.	3.1. Animation basics, Timeline, Frames and Key Frames 3.2. Creating a basic text animation 3.3. Creating and manipulating animations 3.4. Creating a basic frame-by-frame animation, Using Onion Skin to modify an animation 3.5. Using shape twining and hinting, Using motion twining 3.6. Using motion twinning with a guide, Mask Animations
UNIT-IV Photoshop Tools	4a. Apply the Photoshop tool on different applications.	4.1. Parts of the Toolbox , Toolbox shortcuts , Tools options 4.2. Marquees , Magic wand , Lassos , Move tool , Crop tool, Slice tools, Pencil , Paintbrush ,Eraser tools ,History brushes, Gradient , Paint bucket , Burn-dodge-sponge, Blur-

		sharpen- smudge, Shapes-line-rectangle-polygon , Path selection tool , Pen tool , Type tools , Notes tool-audio annotation 4.3. Eyedropper-color sampler- measure too, Hand-zoom, Quick mask-Screen modes, Jump to Image Ready, Back ground and foreground.
UNIT-V Introduction to Flash	5a.Use the flash environment 5b. Apply different flash tools.	5.1. Overview of Flash 5.2. Flash Environment 5.3. Creating New FLASH documents, User interface of Flash, FLASH Workspace, Menu bar, Timeline 5.4. Different shapes, text tools and pen tool 5.5. Selecting shapes using lasso tool and performing basic editing tools 5.6. Modifying created objects

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
1	Introduction to Multimedia	2	NOT APPLICABLE			
2	Compressions Technique & File Formats	4				
3	Introduction to Animation	2				
4	Photoshop Tools	6				
5	Introduction to Flash	2				
	Total	16				

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	01	Identify multimedia devices.	02
2	02	Install 3D Max Software and identify its various tools.	02
3	05	Install latest version of Photoshop and navigate its tools.	04
4	04&06	Install latest version of open source Flash.	02
5	03	Perform image enhancement operation like - setting resolution of images, sizes, pixel depth, color modes – RGB, CMYK, grey Scale and comparison of images based on storage size & image quality, save file in different file formats - .bmp, jpeg, jpg, tga, tiff, gif, pic, pdf, png etc	04
6	04	Create an application using 1.Text Animation 2. Multimedia Animation.	04
7	04	Create an application using onion skinning.	04
8	04	Create an application using motion tween	02
9	05	Create an application using Menu bar tool in Photoshop.	04
10	05	Create an application in Photoshop using 1.Retouching Tool; 2.Painting and Drawing Tools; 3. Navigation Tool.	04
11	04	Create an application in Photoshop using 1.Selection Tools; 2.Crop and Slice Tools; 3. Measuring Tools.	04
12	06	Create an application in academics using flash for 1. graphics-lines and shapes, 2. Texture, filling colors using color palates, texturing.	02
13	06	Draw a car with appropriate tools in flash. Label each part of the car using different style and format and animate text	02

14	06	To create a forest of tree with flowers fruits from small plant using different layers and frame transition time.	02
15	06	Create a forest of trees using the object created earlier. Also add lighting and rain effect.	02
16	06	Edit images captured by Digital web cam using Web-cam software.	02
17	06	Import and Export the following using flash 1.Image 1.Sound 2. Video.	02
18	06	Create a multimedia database for student ID Card preparation i.e. store image in database.	04
19	06	Design a game application in Flash.	04
20	06	Design an Advertisement in Flash	04
	ALL	Mini Project: Student should create a movie of minimum 2 minutes playtime using either Flash/3D-MAX/MAYA or Photoshop.	04
Total			64

8. SUGGESTED STUDENTS ACTIVITIES

1. Following is the list of proposed student activities like:
2. Survey of various animated websites and latest tools available to create animated website
3. Seminar on various readymade examples of Photoshop/flash
4. Make small animation using flash and Photoshop in the group
5. Demonstration of individual assigned project

9. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Lesa Snider	Photoshop CC: The missing manual	O'Reilly Media

2.	Deke McClelland	Adobe Photoshop CS5 - one-to-one	O'Reilly Media
3	Robertt Reinhardt, snow dowd	Adobe flash CS4Professional Bible	Wiley
4	Katherine Ulrich	Macromedia Flash For Windows and Macintosh	Pearson Education

10. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED:

S. No.	Name of equipment	Brief specification
1.	Computer System with latest configuration and memory, laptops, servers	Latest version
2.	Open source Free software for animations /editors for html5/css3	Latest version
4	Photoshop	Latest version
5	Micro-Media flash	Latest version
6	3D MAX	Latest version
7	Multimedia projector	Latest version
8.	Internet Access	Latest version

11. LEARNING WEBSITE & SOFTWARE

1. http://www.codecademy.com/learn
2. www.photoshopessentials.com
3. www.adobeknowhow.com
4. http://www.webdevelopersnotes.com/tutorials/flash/
5. http://www.adobe.com/devnet/flash.html
6. http://www.adobe.com/support/flash/tutorial_index.html
7. http://www.thefreecountry.com/webmaster/flash.shtml

12. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

S.No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	To familiarize the students with various approaches, methods and techniques of Animation Technology.	2	2	-	1	1	-	-	-	-	1	-	-
2	To develop competencies and skills needed for becoming an effective Animator.	1	3	-	-	1	-	-	1	-	-	-	-
3	Mastering traditional & digital tools to produce stills and moving images.	1	3	3	3	-	-	-	-	-	3	-	-
4	Exploring different approaches in computer animation	1	3	3	1	-	-	-	-	-	-	1	1
5	To enable students to manage Animation Projects from its Conceptual Stage to the final product creation.	-	2	2	-	-	-	-	-	-	-	1	1
6	To apply Audio and Video Production Techniques to an Animation Project	1	3	3	-	-	-	-	-	-	-	-	-

Course Curriculum Design Committee

1. Prof.R.P.Tiwari Lect in Computer Engineering,Govt.Polytechnic,Aurangabad

2. Prof.Dipali P.Sapkal Lect.in InformationTechnology,Govt.Polytechnic,Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **OBJECT ORIENTED PROGRAMMING USING C++**

COURSE CODE **6S208**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engg and Information Technology	Third

1. RATIONALE

Object-oriented programming using C++ is a basic level course intends to teach students the basic concepts of object-oriented programming (OOP). Large programs are probably the most complicated entities ever created by humans. Because of this complexity, programs are prone to errors so that software errors can be expensive and even life-threatening. Object-Oriented Programming offers a new and powerful way to cope with this complexity.

2. COMPETENCY

"Develop C++ programs by using object oriented programming."

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (PR)	PA (TW)	150
3	-	4	07	80	20	# 25	25	
Duration of the Examination (Hrs)				3	1	02	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, PR- Practical Examination, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Identify importance of Object Oriented Programming concepts
2. Select classes, objects, members of a class and the relationships among them needed for a specific problem.
3. Demonstrate the concepts of Constructor and Destructor.
4. Solve given problems using Inheritance.
5. Solve given problems using Polymorphism.
6. Read and write data on new or existing file.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
UNIT I INTRODUCTION TO OBJECT ORIENTED PROGRAMMING	1a Differentiate procedure and object oriented languages 1b Explain the general structure of C++ Language 1c List different data types available in C++ 1d Initialize Data using variables and develop simple C++ programs 1e Differentiate various operators	1.1 Introduction to OOP , need And requirements of OOP, Limitations of C 1.2 Procedure–oriented programming Vs Object-Oriented programming Concept 1.3 Features of OOPs, Structure of C++ programming, C++ I/O statements. 1.4 Data types in C++, Defining Constants .Declaration of variables and Dynamic Initialization of variables. 1.5 Reference variables Operators in C++. Scope Resolution Operators. Member dereferencing Operators.Memory Management Operators and Manipulators .Type cast Operator.
UNIT II **OBJECTS AND CLASSES**	2a Develop Simple Programs using class and objects, array of objects, friend functions, passing and returning objects 2b Differentiate static members and normal members. 2c Develop programs using	2.1 Classes: Specifying a class Defining member functions Arrays within a class 2.2 Objects

	inline functions. 2d Develop Simple Programs using class and objects, array of objects, friend functions, passing and returning objects. 2e Develop Simple Programs using class and objects, array of objects, friend functions, passing and returning objects	2.2.1Creating objects 2.2.2 Memory allocation for objects 2.3 Static data and member function 2.4 Array of objects 2.5 Objects as function arguments 2.6 Inline Functions 2.7 Friend Function 2.8 Arrays of Objects passing and returning objects
UNIT III CONSTRUCTORS AND DESTRUCTORS	3a Define constructor & Destructor. 3b Differentiate between types of constructor. 3c Differentiate between Constructor & destructor. 3d Develop program using 3e constructor and destructor	3.1 Concept 3.2 Types of Constructors 3.2.2 Default 3.2.2 Parameterized 3.2.3 Copy 3.3 Overloaded Constructors (Multiple Constructor) 3.4 Constructor with default argument 3.5 Destructor
UNIT IV **INHERITANCE**	4a Define Inheritance 4b List the applications of inheritance, types of inheritance and develop programs using single, multilevel and multiple inheritance 4c Apply the concept of 4d constructor in derived classes 4e Define Virtual base classes & Abstract classes	4.1 Introduction 4.1.1Base Classes 4.1.2Derived classes 4.2 Types Of Inheritance 4.2.1 Single inheritance 4.2.2 Multilevel inheritance 4.2.3 Hybrid inheritance 4.2.4 Multiple inheritance 4.2.5 Hybrid Inheritance 4.3 Making a Private Member Inherited 4.4 Virtual base classes 4.5 Abstract classes 4.6 Constructors in derived
UNIT V POLYMORPHISM & POINTERS IN C++	5a Apply Pointer to objects 5b Define derived classes and virtual functions 5c Differentiate between Overloading Vs Overriding 5d Differentiate between Compile Time	5.1 Pointers to objects, 5.2 Develop programs using pointers to objects 5.3 Pointer to Derived Classes 5.4 Virtual Functions, Pointer to virtual Functions 5.5 Compile Time Polymorphism 5.5.1 Functions overloading 5.5.2 Operator Overloading (unary and

	Polymorphism & Run Time Polymorphism	binary) 5.5.3 Overloading Vs Overriding 5.6 Run Time Polymorphism 5.7 Virtual functions 5.8 Static and dynamic binding
UNIT VI FILE HANDLING IN C++	6a. Select appropriate method for opening a file 6b. Read and write data on new or existing file	6.1 File 6.2 File Streams and File I/O 6.2.1 Streams 6.2.2.Standard File handling Classes 6.3 Opening and Closing File 6.4 General functions used in File Handling 6.5 Reading from and writing to a file

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
I	**INTRODUCTION TO OBJECT ORIENTED PROGRAMMING**	**06**	**2**	**3**	**4**	**09**
II	**OBJECTS AND CLASSES**	**08**	**2**	**6**	**6**	**14**
III	**CONSTRUCTORS AND DESTRUCTORS**	**08**	**2**	**4**	**6**	**12**
IV	**INHERITANCE**	**10**	**2**	**8**	**8**	**18**
V	**POLYMORPHISM & POINTERS IN C++**	**10**	**4**	**6**	**8**	**18**
VI	**FILE HANDLING IN C++**	**06**	**2**	**3**	**4**	**09**
	Total	**48**	**14**	**30**	**36**	**80**

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1.	I	Implement two C++ programs using Input /output statements	02
2.	I	Implement program for printing formatted output (Make use of manipulators)	04
3.	I	Implement program making use of C++ control structures.(if,if-else,while,do-while,for loop switch case.)	04
4.	I	Implement any three programs using different type of function approach.	04
5.	II	Implement a complete C++ program which makes use of classes & objects by considering any one problem like banking.	06
6.	II	Implement a complete C++ program which makes use of classes Static data and member function	04
7.	II	Implement C++ program which makes use of array of objects for students information.	04
8.	III	Implement C++ program using Types of constructors & destructors.	04
9.	III	Implement C++ program using Overloaded Constructors(Multiple Constructor)	02
10.	III	Implement C++ program using Constructor with default argument	02
11.	IV	Implement program making use of single inheritance	02
12	IV	Implement program making use of multiple inheritance	02
13	IV	Implement program making use of multilevel inheritance	02
14	IV	Implement program making use of hybrid inheritance.	02
15	IV	Implement program making use of hierarchical inheritance.	02
16	IV	Implement a program which makes use of friend function.	02
17	V	Implement program making use of Function Overloading.	02

18	V	Implement program using operator overloading	04
19	V	Implement C++ programs using pointers to objects	04
20	V	Implement a program which uses virtual function & polymorphism	04
21	VI	Implement a program for opening and closing of File	02
22	VI	Implement a program for reading and write to a File of File	02
TOTAL			64

8. SUGGESTED STUDENTS ACTIVITIES

Other than class room and laboratory activities following are the suggested guided co-curricular students activities which need to be undertaken to facilitate the attainment of various course outcomes of this course. The students are required to maintain portfolio of their experiences which he/ she will submit at the end of the term.

Following is the list of proposed student activities like:

1. Students will prepare file for the above mentioned Practical.
2. Students will prepare the tutorial book for tutorial sessions. The questions and assignments will be solved in that and progressive assessment will be done by the teacher.
3. Present seminar, develops mini projects, panel discussion, and develops a program with real life application examples on a particular topic.
4. Students are expected to develop minimum one program of particular topic as an example to exhibit real life application.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

1. Guide students in preparing charts and display boards.
2. Guide students in searching information regarding real world problems.
3. Demonstrate practical thoroughly before the students perform.
4. Show Flash/Video/Animation clippings for functioning Pillars if OOPS
5. Observe continuously and monitor the performance of students in lab.
6. Assign different types of Mini-projects

7. Guide students in preparing Micro-projects.

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Object Oriented Programming with C++.	Balaguruswami,E.	Tata McGraw-Hill
2.	C++ The Complete Reference	Herbert Scildt	Tata McGraw-Hill
3.	Let Us C++	Kanetkar, Yashavant	BPB Publication

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment	Brief specification
1.	Computer System with latest configuration and memory	As per Computer industry specification

12. LEARNING WEBSITE & SOFTWARE

1 www.nptel.com
2 www.cplusplus.com
3 www.mycplus.com

Software's:

1. **C Compiler(Windows and Ubuntu)**

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Recognize and Interpret the importance of Object Oriented Programming concepts	-	3	1	-	-	-	-	-	-	-	-	-
2	Identify classes, objects, members of a class and the relationships among them needed for a specific problem.	-	3	3	-	-	-	-	-	-	-	-	-
3	Demonstrate the concepts of Constructor and Destructor.	-	3	3	-	-	-	-	-	-	-	2	-
4	Examine and solve given problems using Inheritance.	-	3	3	-	-	-	-	-	-	2	2	-
5	Analyze and solve given problems using Polymorphism	-	3	3	-	-	-	-	-	-	1	-	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Prajakta Sadafule	Lecturer in Computer Engineering, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- RELATIONAL DATABASE MANAGEMENT SYSTEM

COURSE CODE 6S401

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering & Information Technology	Third

1. RATIONALE

Relational Database Management System is applied level course aims to design and manipulate database. Database system plays a vital role to manage huge volume of data for commercial applications. This course includes data models, SQL commands, techniques, normalization concepts and queries performance.

2. COMPETENCY

Students will be able to

"Design, develop and manage databases for applications using Structured Query Language (SQL) in ORACLE."

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (PR)	PA (TW)	150
3	-	4	07	80	20	#25	25	
Duration of the Examination (Hrs)				3	1	--	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Select/Explore database management concepts and its applications.
2. Design relational data model using given Constraints.
3. Perform SQL queries and execute PL/SQL block.
4. Design database applying normalization rules.
5. Design Entity –Relation model.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit - I Database Management Concepts	1a. Applications of database system 1b. Objective of database system 1c. Level of data 1d. Explain database languages 1e. List of database users and administrator 1f. Describe database architecture	1.1 Database system application 1.2 Purpose of Database systems 1.3 View of data 1.4 Database languages 1.5 Database design 1.6 Database users and administrators 1.7 Database architecture
Unit - II Relational Model and Integrity Constraints	2a Describe structure of relational database 2b Concept of database schemas 2c Types of keys 2d Explain relational query languages and relational operations 2e Types of Constraints on relational model	2.1 Structure of relational databases 2.2 Database schemas 2.3 Keys 2.4 Relational query languages 2.5 Relational operations 2.6 Relational model constraints 2.6.1 Domain entity constraints 2.6.2 On delete cascade 2.6.3 NOT NULL
Unit - III Introduction to SQL	3a. Overview of SQL query language and its data definition 3b. Explain structure of SQL queries 3c. Queries of modifying database 3d. Queries to execute set operations 3e. Queries to execute aggregate functions	3.1 SQL query language 3.2 SQL data definition 3.3 Basic structure of SQL queries 3.4 Modification of database 3.5 Additional basic operations 3.6 Set operations 3.7 Null values 3.8 Aggregate functions 3.9 String , Date and Time functions 3.10 PL/SQL introduction : control structures, cursors, triggers, functions,

	3f. Queries to execute string , date and time functions 3g. Introduction to PL/ SQL	packages, procedures, error handling
Unit - IV Relational database design	4a. List features of good relational design 4b. Types of normal forms 4c. Differentiate between 3NF and BCNF 4d. Describe decomposition techniques using functional dependencies	4.1 Features of good relational designs 4.2 Atomic domains and First normal form 4.3 More normal forms 4.4 Comparison of 3NF and BCNF 4.5 Decomposition using functional dependencies 4.6 Decomposition using multivalued dependencies
Unit - V Entity relationship model	5a. Overview of E-R model 5b. Constraints 5c. Design E-R diagram 5d. E-R design issues 5e. Features of extended E-R	5.1 The entity relationship model 5.2 Constraints 5.3 Removing redundant attributes in entity sets 5.4 Entity relationship diagrams 5.5 Entity relationship design issues 5.6 Extended E-R features

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
1	Database Management Concepts	08	5	5	4	14
2	Relational Model and Integrity Constraints	08	5	5	4	14
3	Introduction to SQL	12	4	6	8	18
4	Relational database design	10	6	6	6	18
5	Entity relationship model	10	5	5	6	16
	Total	48	25	27	28	80

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours

1	03	Execute SQL query to create table and insert 10 records. 1. Execute DDL queries. 2. Execute DML queries. 3. Execute DCL queries. 4. Execute TCL queries.	04
2	03	Execute SQL queries for views and index	04
3	03	Execute SQL queries for 1. Date functions with all formats. 2. Time functions with all-time formats. 3.Conversion function	04
4	03	Execute SQL queries for all aggregate functions.	02
5	03	Execute SQL queries for all numeric functions.	04
6	05	Execute SQL queries for character/String functions.	04
7	03	Execute SQL queries to use operators. 1. Arithmetic 2. Relational 3.Comparison 4.Logical	04
8	03	Execute SQL queries using Group by, Having and Order by clause	04
9	03	Execute SQL queries to show the record in the table (Using 1.Like 2. Between 3.In 4.Any 5.All etc.)	04
10	03	Execute SQL queries using Set operators	02
11	03	Execute SQL queries using join operation.	04
12	03	Execute SQL queries to retrieve data from multiple tables using sub/correlated queries.	04
13	03	Execute PL/SQL block to find the greatest number amongst 3 numbers	02
14	03	Execute PL/SQL block to find Factorial of a number using FOR and WHILE	02
15	03	Execute PL/SQL block for error handling 1.Pre-defined 2.User defined	04
16	03	Execute PL/SQL block for cursors 1.Explicit 2.Implicit	04
17	03	Execute PL/SQL block for triggers 1.After and Before insert 2. After and Before delete	04
18	03	Execute PL/SQL block for Packages	04
		Total	64

8. SUGGESTED STUDENTS ACTIVITIES

Other than class room and laboratory activities following are the suggested guided co-curricular student's activities which need to be undertaken to facilitate the attainment of various course outcomes of this course. The students are required to maintain portfolio of their experiences which he/ she will submit at the end of the term.

a. Creating database which can perform insert, update, and delete operations.
b. Design a model for any real time database system.
c. Draw an E-R diagram for any database system.
d. Design relational database at different levels of normalized form.
e. Mini project: Create any database system i.e. Hostel reservation, Air ticket reservation, Student database system etc.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-
b. Q & A technique.
c. Designing real time entity relationship model.
d. Guiding students for designing real time database system.
e. Observe students and monitor the performance of students.
f. Activity based learning.
g. Assign mini projects.

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Database system concepts	Henry Korth	MGH
2.	SQL / PL-SQL	Ivan Bayross	BPB
3	An Introduction to Database Systems	C. J. Date	Pearson Education
4	Oracle – The complete reference	Oracle Press	TMH

11. **LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED** :

Hardware: Desktop Computer P-IV processor or higher
Software: Microsoft 2003 /any higher version , Oracle, SQL Server, MySQL

12. LEARNING WEBSITE & SOFTWARE

a. Ms-Access Tutorial : http://www.quackit.com/microsoft_access/tutorial/
b. SQL Basic Concepts: http://www.w3schools.com/sql/
c. SQL Tutorial : http://beginner-sql-tutorial.com/sql.htm
d. DBMS:http://nptel.iitm.ac.in/video.php?subjectId=106106093

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Select/Explore database management concepts and its applications.	-	3	-	-	-	-	-	-	-	-	1	-
2	Design relational data model using given Constraints.	-	3	2	2	-	-	-	-	-	-	-	-
3	Perform SQL queries and execute PL/SQL block.	-	3	-	3	-	-	-	-	-	2	2	-
4	Design database applying normalization rules.	-	3	3	3	-	-	-	-	-	2	-	-
5	Design Entity –Relation model.	-	3	2	2	-	-	-	-	-	-	-	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Prachi P. Deshpande	Lecturer in Information Technology, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **SOFTWARE ENGINEERING (SE)**

COURSE CODE- **6S405**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering/Information Technology	Third

1. RATIONALE

Software Engineering deals with reliability and quality assurance of the software under development. It provides framework for development of quality software product. The course enables the students to write specifications for software system, design and develop test plans according to design specifications and the process to deploy software. The course also covers important aspects of Software Engineering.

2. COMPETENCY

At the end of studying this course students will be able to

"Apply software development lifecycle phases and process framework activities to develop prototype of enterprise application."

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE @ (PR/OR)	PA (TW)	125
3	1	-	4	80	20	--	25@	
Duration of the Examination (Hrs)				3	1	--	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Classify and select appropriate software.
2. Use software process, models and framework to develop software.
3. Apply principles of software and requirement engineering.
4. Select appropriate software models for designing software.
5. Estimate risk arises in software project.
6. Prepare project scheduling and maintain its quality.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
UNIT-I An Introduction to software Engineering	1a. Comprehend the difference between software and software engineering	1.1. Software-defination,evolving role,characteristics,types of software 1.2. Changing nature of software 1.3. Software Myths 1.4. Software Engineering-Basic, Definition.
UNIT-II Process and Models Of Software	2a. Know the process framework of software; 2b. Learn the different process models.	2.1. Software Engineering.-A layered Technology approach 2.2. A Process Framework-CMMI,Process Patterns, Process Assessment 2.3. Personal and Team process models 2.4. ProcessModels-waterfall,Incremental,RAD,Prototype,Spiral,Concurrent Development Model, Component Based Development, Formal Method Model 2.5. Agile Software Development-Difference between prescriptive and agile process Model, Feature of the Agile Software Development Approach
UNIT-III Software Engineering Practices and Requirement Engineering	3a. Recognize the basic Principles of software engineering and engineering phases; 3b. Able to understand the requirement engineering.	3.1. Software engineering core Principles 3.2. Communication Practices, Planning Practices, Modeling Practices, Construction Practices 3.3. Deployment-Principles, Concept of Delivery cycle, support cycle and feedback cycle 3.4. Requirement Engg.-Concepts, Tasks, Initiating the requirement Process, Eliciting requirements, Building the analysis model, Negotiating requirements, Validating requirements 3.5. SRS (Software Requirement Specification): Concept of SRS, General Format of SRS, Need/Importance of SRS.

UNIT-IV Software Design and Testing	4a. Use design concept of software engineering. 4b. Apply testing on software	4.1. Design approaches of software engineering 4.2. Design process and quality: Design concept, Design Model, Pattern based Design 4.3. UID: The golden rules, User interface analysis and Design steps 4.4. Introduction to Software Testing-Testing fundamentals, Testing objectives, testing principles 4.5. Basics of software testing-Black Box and White Box Testing
UNIT-V Risk Management and Estimation	5a. Comprehend the Risk Management; 5b. Know the actual estimation of software Project.	5.1. Reactive vs. Proactive Risk Strategies 5.2. Software Risks 5.3. Risk Identification 5.4. Risk Projection 5.5. Software Scope and Feasibility 5.6. Resources 5.7. Software Project Estimation 5.8. Empirical Estimation Models: The COCOMO II Model, The Software Equation
UNIT-VI Software Project and Quality Management	6a. Appreciate the software project structure and its need; 6b. Know the Quality concept of software	6.1. Introduction to software project Management and its need 6.2. The management spectrum-4P's and their significance 6.3. Project Scheduling; Concept, Project Scheduling, Defining Task Network, Scheduling, Earned Value Analysis 6.4. Software configuration management 6.5. Basic Quality concept: SQA, Software Reviews, Software Reliability

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
1	An Introduction to software Engineering	08	4	5	4	13
2	Process and Models Of Software	08	5	4	4	13
3	Software Engineering. Practices and Requirement Engineering	08	6	4	4	14
4	Software Design and Testing	08	4	6	4	14
5	Risk Management and Estimation	08	4	3	3	10
6	Software Project and Quality Management	08	4	6	6	16
Total		**48**	**27**	**28**	**25**	**80**

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	II.	Write an assignment on SDLC	02
2	II.	Write the implementation SDLC on your mini project	02
3	IV.	Write an assignment on DFD of your mini project	01
4	IV.	Write an assignment on software testing of your mini project.	02
5	II &III.	Write an assignment on calculating efforts of your mini project.	03
6	V.	Write an assignment on risk management	02
7	VI.	Write an assignment on quality assurance	02
8	VI.	Write an assignment on six sigma technology	02
		Total	16

8. SUGGESTED STUDENTS ACTIVITIES

- **Prepare project feasibility report on given application.**
- **Case Study.**

9. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Roger Pressman	Software Engineering	Mc-Graw Hill
2.	Elias Awad	System Analysis and Design	Galgotia Publications
3	Senn	Analysis & Design of Information System	-

10. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

S.No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Relate the software and software engineering concept.	3	3	-	-	3	-	-	-	-	3	-	-
2	Comprehend the software process, models and framework.	1	3	-	1	1	-	-	1	-	1	-	-
3	State the software engineering principles and requirement engineering.	1	3	-	-	-	-	-	-	-	-	-	-
4	Apply design engineering concepts and test the software.	-	2	-	-	-	-	-	-	-	-	-	-
5	Summarize the actual risk and estimation of software project.	-	3	1	-	-	-	-	-	-	-	1	-
6	Able to manage the project and quality of software	1	1	-	-	-	-	-	-	-	-	-	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1.	Prof.R.P.Tiwari	Lecturer in Computer Engineering,Govt.Polytechnic, Aurangabad
2.	Prof.Dipali P.Sapkal	Lecturer in Information Technology,Govt.Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE: DATA STRUCTURE (DS)

COURSE CODE: 6S207

Diploma programme in which course is offered	Semester in which course is offered
Computer Engineering/Information Technology	Fourth Semester

1. RATIONALE

Data structure is basic technology course for organizing and arranging data in given structure. Organizing or structuring data is important for implementation of efficient algorithms and program development. This course includes searching, sorting techniques and different algorithms to represent data. After learning this subject student will be able to identify the problem, analyse different algorithms to solve the problem & choose most appropriate data structure to store data and retrieve data.

2. LIST OF COMPETENCIES

At the end of studying this course students will be able to

"Develop C programs for arranging and manipulating data using given data structure."

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PT	ESE @ (PR)	PA	
03	00	04	07	80	20	@25	25	150
Duration of the Examination (Hrs)				3	2	2	2	

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; **C** – Credit, **ESE** - End Semester Examination; **PT**- Progressive Test; **PA**- Progressive Assessment **OR**-Oral examination.

4. COURSE OUTCOMES

1 Identify different data structures and operations on it.

2 Apply searching and sorting techniques on given problems.

3 Use the stack to evaluate given expressions.

4 Use Queue to store and manipulate data.

5 Develop the program for linked list.

6 Use tree and graph data structure to represent data.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics and Sub-topics
UNIT-I **Introduction to Data Structure**	1a Identify the approaches for designing the effective algorithms. 1b Identify operations on data structure. 1c Design and implement programs using arrays	1.1 Concept & Need of Data Structure, Abstract data Type, Types of data structure: Linear and nonlinear. 1.2 Time and space complexity. 1.3 Operations on data structure- Creation, traversing, insertion, deletion, merging, searching, sorting. 1.4 Arrays and its physical allocation: One dimensional and 2-D array and operations on them like Creation, Insertion, Deletion and Display.
UNIT-II **Sorting, searching and Hashing techniques.**	2a Identify and apply sorting techniques for sorting the data. 2b Identify and apply searching techniques for searching 2c Identify and apply various hashing techniques	2.1 Sorting Techniques (Concept, Example & algorithm): Bubble sort, Selection sort and Insertion sort. (Concept & Example) Merge sort, quick sort, Radix sort. 2.2 Searching Techniques: Linear search, Binary search. 2.3 Hashing Techniques: Hash functions- Division method, mid square method.
UNIT-III **Stack**	3a Develop an algorithm for PUSH and POP operations. 3b Evaluate various Expressions based on stack. 3c Identify the areas where stack is applicable.	3.1 Definition of stack, Stack as an ADT. 3.2 Array representations of stack 3.3 PUSH and POP operations on stack, Stack Underflow & Overflow. 3.4 Applications of stack. 3.5 Expression Conversion: Infix to Prefix & Infix to Postfix. Evaluation of postfix & prefix Expression.
UNIT-IV **Queue**	4a Implement queue with various operations on queue. 4b Select appropriate queue for given problem.	4.1 Define queue and its terms, Queue as an ADT 4.2 Array representation of Queue, Operations on Queue, Queue Overflow & Underflow. 4.3 Limitation of Single Queue. 4.4 Types of queue (Introductory approach only): Circular Queue, priority queue, double ended queue. 4.5 Applications of queue

UNIT-V **Linked List**	5a Write algorithms for to insertion deletion at beginning, middle and end of list. 5b Identify types of linked list.	5.1 Define linked list and its terminologies. 5.2 Linked List representation using structure and array. 5.3 Operations on linked list: insertion and deletion at Beginning, middle and end of list. Count number of nodes in list. 5.4 Limitations of singly linked list. 5.5Concept of circular linked list and doubly linked list 5.6 Representation of Stack using Linked list.
UNIT-VI **Trees and** **Graphs**	6a Identify types of tree. 6b Implement various tree manipulations algorithms. 6c Prepare adjacency matrices and adjacency list 6d Find the Spanning tree using Kruskal algorithm.	6.1 Definition and terminologies in tree: root, leaf node, level, depth, degree, path and sibling. 6.2 Types of Tree**:** Binary tree, complete binary tree and full binary tree. Binary search tree: insertion and deletion of a node in binary search tree, Expression Tree. 6.3 Tree traversal: in-order, pre-order, post-order. 6.4 Graph: Definition and its terminologies, Representation of Graph: adjacency matrices and adjacency list, spanning tree using Kruskal Algorithm.

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	**Unit Title**	**Teaching Hours**	**Distribution of Theory Marks**			
			R	**U**	**A**	**Total**
I	Introduction to data structure	06	4	2	2	08
II	Sorting, searching and Hashing techniques.	09	4	4	8	16
III	Stack	09	4	4	6	14
IV	Queue	06	4	6	2	12

V	Linked List	08	4	6	4	14
VI	Trees and Graph	10	2	6	8	16
Total		**48**	**21**	**29**	**30**	**80**

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's Taxonomy)

7. SUGGESTED LIST OF EXERCISES/PRACTICAL/EXPERIMENTS (Practicals should implemented using C programming)

Sr.no.	Unit No.	Practical Exercises	Total Hrs.
1	1	Prepare chart for types of data structure and their operations	04
2		Write program for implementing operations on array like creating, inserting & deleting.	04
3		Write program for creating and displaying 2D array	02
4	2	Write program for bubble sort and insertion sort to sort given array list.	04
5		Write program for selection sort.	02
6		Write program for to search a particular item in array using Linear search.	02
7		Write program for to search a particular item in array using Binary search.	04
8	3	Write program for implementing PUSH & POP Operation of stack.	04
9		Write program to convert infix to postfix expression	04
10		Write program to convert infix to prefix expression	02
11	4	Write program for implementing Queue operations	04
12		Write program for implementing circular Queue.	04
13	5	Write program for adding and deleting data at the end of the linked list.	04
14		Write program for adding and deleting data at the beginning of the linked list.	04
15		Write program for adding and deleting data at the middle of the linked list.	04
16		Write program for counting number of nodes in Linked List	04
17	6	Write program for constructing Binary Search Tree and tree traversal (Inorder, Preorder & Postorder)	06
18		Solve problem for given graph for designing spanning tree.	02
		Total	**64**

8. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

1. Students will prepare chart/poster for given topics

2. Prepare presentation and deliver seminar on various topics covered like sorting, searching, stack, linked list, queue, tree
3. Students are expected to develop minimum one program of particular topic as an example to exhibit real life application.
4. Design and implement program for stack using linked list.
5. Design and implement program for queue using liked list

9. SPECIAL INSTRUCTIONAL STRATEGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-

b. Q & A technique.

c. Demonstration

d. Seminars

e. Activity based learning

10. SUGGESTED LEARNING RESOURCES

List of Books

Sr.No	Author	Title of Books	Publication
1	Yashwant Kanetkar	Data Structure using C	BPB Publications
2	Aaron M. Tenenbaum	Data Structures Using C	BPB Publications
3	Ellis Horowitz, Anderson-Freed, Sahni	Fundamentals Of Data Structures in C	Universities of Press

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED:

S. No.	Name of equipment	Brief specification
1	Desktop Computer	i5 processor or higher,4gb RAM
2	C compiler	Turboc3.4 and above versions

12. LIST OF LEARNING WEBSITES

1. 'C' Programming Language: http://www.w3schools.in/cprogramming-language/intro/
2. Learn DS Online**:** http://www.learndsonline.com/

3. **'DS'** Frequently Asked Questions**:** http://www.ds-faq.com

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

Sr.No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
CO1	Implement the algorithms of different data structure.	-	1	1	-	-	-	-	-	-	-	2	2
CO2	Apply searching and sorting techniques on problems.	-	-	3	3	-	-	-	-	-	-	2	2
CO3	Evaluate the stack expressions.	-	1	1	1	-	-	-	-	-	-	2	2
CO4	Develop the program for Queue.	-	-	2	3	-	-	-	-	-	-	2	2
CO5	Develop the program for linked list.	-	-	3	3	-	-	-	-	-	-	2	2
CO6	Construct the tree structure and graph structure.	-	2	2	3	-	-	-	-	-	-	2	2

Course Curriculum Design Committee

Sr No	**Name of the faculty members**	**Designation and Institute**
1	Mrs. R.S. Sindge	Lecturer In Information Technology
2	Mrs V.B.Kundlikar	Lecturer In Information Technology
3	Mr. P B Lahoti	Lecturer In Computer Engineering

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE: MICROPROSESSOR & PRAOGRAMMING (MPP)

COURSE CODE: 6P301

Diploma programme in which course is offered	Semester in which course is offered
COMPUTER ENGINEERING	**FOURTH SEMESTER**

1. RATIONALE

Microprocessor is brain of computer. Intel family is widely used all over the world. 8085 is the 8-bit CPU and 8086 is the 16-bit CPU. 8086 is the base of all upward developed processors. It is more powerful and efficient computing machine. It overcomes all major limitations of the previous processors. Itis able to get interfaced with 8-bit, 16-bit systems. This subject covers Basics of 8085, architecture of 8086 along instruction set. It also covers assembly language programming with effective use of procedure and macros. This will act as base for the advanced assembly language programming for next generation microprocessors.

2. LIST OF COMPETENCIES

The student will be able to:

"Develop code, debug, test and execute various assembly language programs using 8086 instructions set"

TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PT	ESE @ (PR)	PA	
03	00	02	05	80	20	25@	25	150
Duration of the Examination (Hrs)				3	2	2	2	

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; **C** – Credit,**ESE**-End Semester Examination; **PT**- Progressive Test; **PA**- Progressive Assessment **OR**-Oral examination.

3. COURSE OUTCOMES

I. Describe the architecture of 8085 microprocessor.

II. Analyse 8086 microprocessor architecture and its operating modes.

III. Identify the addressing modes, instruction sets of 8086.

IV. Illustrate the functions of APL Tools, Procedure and Macro.

V. Develop interfacing of 8086 with memory devices.

4. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics and Sub-topics
UNIT-I **Basics of Microprocessor**	1a Explain Memory based system. 1b State & explain type of buses. 1c Draw pin diagram of 8085 microprocessor. 1d Draw and explain block diagram of 8085 1e Describe generation of control signal.	1.1 Organization of microprocessor-based system, memory, input and output. (PO1, PO2) 1.2 Types of Buses. (PO2) 1.3 Features of 8-bit microprocessors (PO1) 1.4 Pin configuration of 8085, Functional Pin diagram of 8085 (PO2) 1.5 Architecture of 8085 microprocessor, Functional block diagram of 8085. (PO2)
UNIT-II **16 bit** **Microprocessor:8086.**	2a Draw pin diagram of 8086 2b Explain architecture of 8086 2c Draw timing diagram of 8086 in maximum mode 2d Calculate 20 bit physical address having CS: 5093H & IP:2000H 2e Describe Memory segmentation.	2.1 8086 Microprocessor: Salient features, Pin descriptions, Architecture of 8086 - Functional Block diagram, Register organization, Concepts of pipelining, Memory segmentation, and Physical memory addresses generation. (PO 1, PO2, PO3) 2.2 Minimum Mode operation and its timing diagram, Maximum Mode operation and its timing diagram (PO 2, PO3)
UNIT-III **Instruction Set of 8086 Microprocessor**	3a State & explain different addressing mode of 8086. 3b Give syntax & use of MOVS & CMPSB instruction	3.1 Machine Language Instruction format, addressing modes. (PO1,PO2, PO3) 3.2 Instruction set, Groups of Instructions: Arithmetic Instructions, Logical

	3c List any four process control instruction	Instructions, Data transfer instructions (PO3) 3.3 Bit manipulation instructions, String Operation Instructions, Program control transfer or branching Instructions, Process control Instructions. (PO3)
UNIT-IV Procedure, Macro & Assembly Language Programming	4a State use of ALP tool. 4b List different assembly directive & operator. 4c Develop program on branch instruction 4d Differentiate between NEAR & FAR CALL. 4e Explain Macro with suitable example.	4.1 Assembly Language Programming. Tools: Editors, Assembler, Linker, Debugger. (PO1, PO2) 4.2 Assembler directives and Operators (PO1) 4.3 Procedure: Defining Procedure - Directives used, FAR and NEAR, CALL and RET instructions, Reentrant and Recursive procedures, Assembly Language Programs using Procedure. 4.4 Defining Macros: Assembly Language Programs using Macros. 4.5 Assembly Language Program on: Sum of series, Arithmatic operation on BCD & Hex numbers, finding smallest and largest number in array, arranging ascending and descending order, finding even/odd number, Block Transfer, String operation- find length, reverse, concatenate, compare and copy, count numbers of "1" and "0"in 16 bit no.
UNIT-V **Special architectural features and Interfacing with 8086**	5a Explain Stack structure of 8086. 5b Explain interrupt of 8086 5c Differentiate maskable and non-maskable interrupt 5d Explain RAM interfacing.	5.1 Stack structure of 8086, Interrupt & interrupt service routine, Interrupt cycle of 8086. 5.2 Non-maskable interrupt, Maskable interrupt 5.3 Timing and delay. 5.4 Static RAM Interfacing

5. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R	U	A	Total
I	Basics of Microprocessor	07	4	6	0	10
II	8086: 16-bit Microprocessor	10	6	8	4	18
III	Instruction Set of 8086 Microprocessor	12	4	8	6	18
IV	Procedure, Macro & Assembly Language Programming	12	4	6	12	22
V	Special architectural features and Interfacing with 8086	07	4	6	2	12
Total		48	22	34	24	80

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's Taxonomy)

6. SUGGESTED LIST OF EXERCISES/PRACTICAL/EXPERIMENTS

Sr.no.	Unit No.	Practical Exercises	Total Hrs.
1	1	Demonstrate kit/simulator of 8085 and its instruction manual	02
2	2	Identify the Assembly Language programming tools like Assembler, linker, debugger, editor.	02
3	2	Write an Assembly Language Program to add / subtract two 16 bit numbers.	02
4	2	Write an ALP to find sum of series of numbers.	02
5	2	Write an ALP to multiply two 16 bit unsigned/ signed numbers.	02
6	2	Write an ALP to divide two unsigned/ signed numbers (32/16 , 16/8, 16/16, 8/8)	04
7	2	Write an ALP to add / Sub / multiply / Divide two BCD numbers.	04
8	2	Write an ALP to find smallest/ largest number from array of n numbers.	02
9	3	Write an ALP to arrange numbers in array in ascending/ descending order.	02
10	4	Write an ALP to perform block transfer data using string instructions / without using string instructions.	04

11	4	Write an ALP to compare two strings using string instructions / without using string instructions.	02
12	4	Write an ALP to display string in reverse order, string length, Concatenation of two strings.	04
		Total	32

7. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

1. Develop programs related with unit wise topics in computer laboratory.
2. Develop any module of to be useful in real life application.
3. Multimedia presentation of module developed by students.

8. SPECIAL INSTRUCTIONAL STRATEGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods: -

Concepts should be explained thoroughly in theory sessions

b. Concept implemented in laboratory appropriately along with the problem solving

c. Activity based learning: -

Concept should be developed by giving problems to students as assignments.

9. SUGGESTED LEARNING RESOURCES

List of Books

Sr.No	Author	Title of Books	Publication
1	Douglous V. Hall	Microprocessor & interfacing (programming & hardware) Revised Second Edition	Tata -McGraw Hill
2	Ramesh S. Gaonkar	Microprocessor Architecture, Programming and Applications with the 8085	Penram International Publishing (India)
3	A.K. Ray, K.M.Bhurchandi	Advanced Microprocessors and Peripherals	Tata -McGraw Hill
4	Walter A. Triebel, Avtar Singh	The 8088 and 8086 Microprocessors	Pearson Publications

10. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED:

S. No.	Name of equipment	Brief specification
1	8085 microprocessor kits / Simulation software	8085 microprocessor kits
2	Computer System	Computer Systems with minimum PIII processor (equivalent/higher) and 512 MB RAM.

11. LIST OF LEARNING WEBSITES

1. Simulator such as: http://8085simulator.codeplex.com/ http://gnusim8085.org/ or its equivalent
2. www.pcguide.com/ref/CPU
3. www.CPU-World.com/Arch/
4. www.tutorialspoint.com/assembly_programming/
5. Intel 8086 microprocessor architecture: http://www.cpu-world.com/Arch/8086.html
   http://www.emu8086.com/

12. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

Sr.No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
CO1	Describe the architecture of 8085 microprocessor.	1	2	0	0	0	0	0	0	0	0	2	0
CO2	Analyse 8086 microprocessor architecture and its operating modes.	2	3	3	0	0	0	0	0	0	0	1	0
CO3	Identify the addressing modes instruction sets of 8086.	2	2	3	0	0	0	0	0	0	0	1	0
CO4	Illustrate the functions of ALP Tools, Procedure and Macro.	2	2	2	0	0	0	0	0	0	0	0	0
CO5	Ability to Develop programs on 8086microprocessors.	1	3	3	0	0	0	0	0	0	0	1	0

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Mr. P. S. Hiwale	Lecturer In Computer Engineering
2	Mr. P. B. Lahoti	Lecturer In Computer Engineering

COURSE TITLE- **SOFTWARE DEVELOPMENT TOOLS (SDT)**

COURSE CODE **6S402**

PROGRAMME & SEMESTER

Diploma programme in which course is offered	Semester in which course is offered
Computer Engineering Information Technology	Fourth semester

1. RATIONALE

Software development tool is applied level course. This course provides .net framework for designing and developing business application and desktop applications. It includes core C# construct, windows programming and database connectivity with ADO.NET.

2. COMPETENCY

The course will be able to

"Develop business applications and windows application using C# as the programming platform"

3. TEACHING AND EXAMINATION SCHEME

Teaching scheme (In hours)			Total credits (L+T+P)	Examination scheme				
				Theory Marks		Practical marks		Total Marks
L	**T**	**P**	**C**	**ESE**	**PA**	**ESE (PR)**	**PA**	
00	00	04	04	00	00	#50	75	125
Duration of the Examination (Hrs)				--	--	2	--	

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; **C** – Credit, **ESE** -End Semester Examination; **PT**- Progressive Test; **PA**- Progressive Assessment **OR**-Oral examination

4. COURSE OUTCOMES:

I. Identify the role of .Net Framework with .Net platform.

II. Demonstrate console applications using OOP concepts in C#.

III. Develop effective GUI application using Windows Forms.

IV. Develop interactive GUI application with database connectivity.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics and Sub-topics
Unit –I Introduction to Building Blocks of the .NET Platform	1a Identify the role of .Net framework/platform.	1.1 Building blocks of .net: CLR, CTS, and CLS. 1.2 The Role of the Base Class Libraries, core C# features. 1.3 The Role of the Common Intermediate Language, The Role of .NET Type Metadata, Understanding the Common Type System, 1.4 Building .NET Applications Using Sharp Develop: introduction to C# in .net platform
Unit -II Core C# Programming Constructs	2a. Develop console application using C#. 2b. Implement OOP concepts using C#	2.1 A Simple C# Program, Variations on the Main() Method, Specifying an Application Error Code, Processing Command-Line Arguments. 2.2 The System. Console Class, System Data Types and C# Shorthand Notation, Variable Declaration and Initialization, Narrowing and Widening Data Type Conversions. 2.3 C# Iteration Constructs (loops) Decision Constructs (statements), Methods and Parameter Modifiers. 2.4 C# Arrays: Array Initialization Syntax, Defining an Array of

		Objects, Understanding the Enum Type, Understanding the Structure Type, Understanding Value Types and Reference Types, C# Nullable Types. 2.5 Object oriented concepts in C# Class, inheritance, polymorphism, structured exception handling, Object lifetime, interface, Delegates, Events, and Lambdas.
Unit –III Programming with Windows Forms Controls	3a Develop different GUI using Windows Forms 3b Develop Attractive GUI using different controls.	3.1 Windows Forms Control Hierarchy, Adding Controls to Forms (IDE-Free), Adding Controls to Forms (via VS .NET) 3.2 The TextBox Control, Button Control, Radio button Control, Checkbox Control, Listboxes & comboboxes Control, The Month Calendar Control, Date Time Type, Assigning ToolTips to Controls, Track Bar Control, Working with Panel Controls . 3.3 The UpDown Controls: Domain UpDown and Numeric UpDown, Configuring a Control's Anchoring Behaviour, Configuring a Control's Docking Behaviour, Building Custom Dialog Boxes, Creating the Images.
Unit –IV Database connectivity with ADO.NET	4a Interpret role of ADO.NET to establish connection with database. 4b Design and develop interactive GUI	4.1 The Need for ADO.NET, The Role of ADO.NET Data Providers. 4.2 Types of System.Data, Examining

	using ADO.NET	the Data Column Type, DataRow type Building a Complete DataTable, Understanding the DataView Type. 4.3 The Role of the DataSet, Building a Simple Test Database, Selecting a Data Provider. 4.4 The Types of the System.Data.OleDb, namespace, working with the Connected Layer of ADO.NET. 4.5 Working with the OleDbDataReader, Inserting, Updating, and Deleting Records Using OleDbCommand. 4.6 Executing a Stored Procedure Using OleDbCommand, Working with the SQL Data Provide

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours/ Practical Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Introduction to Building Blocks of the .NET Platform.	**Not Applicable**				
II	Core C# Programming Construct					
III	Programming with Windows Forms Controls					
IV	Database connectivity with ADO.NET					

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's Taxonomy)

7. SUGGESTED LIST OF EXERCISES/PRACTICAL/EXPERIMENTS

Sr.no.	**Unit No.**	**Practical Exercises**	**Hours**
1	01	Install latest version of visual studio IDE	02
2	02	Implement Simple C# program	02
3		Program for implementing loops	
4		Program for implementing decision statements	02
5		Program for implementing array	02
6		Program for implementing structure	02
7		Program for implementing class &object	02
8		Program for implementing inheritance.	02
9		Program for implementing interface	02
10		Program for implementing exception handling	02
11		Program for implementing Delegates	02
12		Program for implementing user defined Delegates	02
13		Program for implementing events	02
14	3	Implement a program to create window's form using different control such as label, textbox, button, radio button and checkbox.	04
15		Implement a program to create window's form using List boxes & combo boxes Control, The Month Calendar Control, Date Time Type,	04
16		Create simple login form.	04
17		Implement a program to create window's form using Building Custom Dialog Boxes,	
18		Create registration form to create mail-id for account.	04
19		Create application using all controls.	04
20		Create students registration form	04
21	4	Program to create database connectivity using ADO.Net	04
22		Program to create database connectivity using OleDb provider	
23		Program for reading data, inserting data from database.	04
24		Program to display database table using datagrid view.	
25	All	Create mini project based on database.	08

Total	64

8. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

1. Design creative GUI for given application
2. Design desktop application in C#
3. Design scientific calculator using C#
4. Design desktop application with database connection

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-
b. Q & A technique.
c. Demonstration
d. Seminars
e. Activity based learning

10. SUGGESTED LEARNING RESOURCES

List of Books

Sr.No	Author	Title of Books	Publication
1	Pro C# 2010 and the .NET 4 Platform, Fifth Edition	Andrew Troelsen	Paul Manning
2	C# and the .NET Platform, Second Edition	Andrew Troelsen	
3	CLR via C#	Jeffrey Richter	Microsoft Press

11. LIST OF MAJOR EQUIPMENT/ SOFTWARE

S. No.	Name of equipment/Software	Brief specification
1	Desktop Computer	i5 processor or higher,4gb RAM
2	Visual Studio IDE	Visual studio 2010 or onwards.
3	Database s/w	SQL server 2008 or onwards/ Any other database software

12. LIST OF SOFTWARE / LEARNING WEBSITES

1. https://www.tutorialspoint.com/csharp
2. http://csharp.net-tutorials.com/basics/
3. download.cnet.com

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
CO1	Summarize the role of .Net Framework with .Net platform.	-	3	-	3	-	-	-	-	-	-	-	-
CO2	Develop console applications using oop concepts in C#.	-	3	3	3	-	-	-	-	-	-	-	3
CO3	Develop attractive GUI application using Windows Forms.	-	3	3	3	-	-	-	-	-	-	3	-
CO4	Develop interactive GUI application with database connectivity.	-	3	3	3	-	-	-	-	-	-	3	3

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Mrs V.B.Kundlikar	Lecturer In Information Technology
2	Mrs. D.P.Sapkal	Lecturer In Information Technology

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **JAVA PROGRAMMING (JP)**
COURSE CODE **6S403**

PROGRAMME & SEMESTER

Diploma programme in which course is offered	Semester in which course is offered
Computer Engineering Information Technology	Fourth Semester

1. RATIONALE

Java programming is applied level course which enhances and refines the object oriented paradigm. Java is rapidly becoming the dominant application development language and system programming language. JAVA being platform independent language and open source software is used to develop business & mobile applications. This course includes OOP concept, multithreading, java database connectivity and applet programming.

2. COMPETENCY

The course will be able to

"Implement java program for solving real world problems."

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PT	ESE (PR)	PA	
03	00	04	07	80	20	#25	25	150
Duration of the Examination (Hrs)				3	1	2	--	

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; **C** – Credit, **ESE** -End Semester Examination; **PT**- Progressive Test; **PA**- Progressive Assessment **OR**-Oral examination

4. COURSE OUTCOMES

I. Select programming language for implementing OOP concepts

II. Implement encapsulation in java.

III. Implement reusability, extensibility concept and import, create packages.

IV. Demonstrate multithreaded program and handle runtime exception.

V. Establish connection between database and java program.

VI. Design window using applet and frame.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics and Sub-topics
Unit –I Introduction to Java Programming	1a Select best object oriented programming language. 1b Write simple java program using structure of java program. 1c Use java features to develop programs. 1d Write java programs using different operators. 1e Use array data type for storing and assessing group of data in java. 1f Use decision statement and loop statement in given programs.	1.1 Definition of JAVA, Getting started with JAVA, difference between java, c, c++. 1.2 Rules & Structure of JAVA, java features, 1.3 Variable and data types, declaring variables, variables assigning, literal,number literal, Boolean literal, expression. 1.4 Operators:- arithmetic operator, relational operator, logical operator, assignment operator, increment & decrement operator, operator precedence 1.5 Arrays: declaring array variable, creating array objects , accessing array elements and multidimensional array 1.6 Decision making statement: if statement, if-else statement, Switch statement.Loop statement: for loops, while & do loops, while loops. do…. While loops, breaking out of loops.
Unit –II Classes and Wrapper classes.	2a Create class and object for given application. 2b Demonstrate method overloading in	2.1 Declare and Define classes, define member function of a class. Create instance/object of class. 2.2 Object as function arguments,

	program. 2c Choose appropriate constructor in a program 2d Use various string functions in program. 2e Use wrapper classes in java.	Method overloading. 2.3 Constructor and their types, constructor overloading, this keyword. 2.4 Strings class, string constructors. String functions: string length, concatenation, comparison. 2.5 Vectors, Wrapper classes: Number: Double, Float, Byte, Short, Integer, Long. 2.6 Command line arguments, garbage collector.
Unit-III Inheritance and packages	3a Identify the use of inheritance. 3b Apply appropriate type of inheritance in given program. 3c Demonstrate multiple inheritance using interface. 3d Make use of built in packages in java. 3e Create and use user defined packages in given application.	3.1 Inheritance: Need of inheritance, creating subclasses, types: single inheritance, multilevel inheritance, hierarchical inheritance. Use of super keyword. 3.2 Method overriding, final keyword, finalize method, abstract method & class. 3.3 Interface: Defining interface, Extending interface, implementing interface, accessing interface variable. 3.4 Packages: introduction to all build in packages. 3.5 Creating user defined packages, accessing packages, adding class to a package, putting classes together. 3.6 Creating package within a package.
Unit-IV Exception handling and Multithreading	4a Identify exceptions occurred in a program. 4b Detect exception and manage that exception in a given application. 4c Develop a threads for	4.1 Types of error, exception. 4.2 Exception handling mechanism using try-catch statements, throws exception. User defined exception.

	given program.	4.3 Thread, thread life cycle. 4.4 Creating thread: by extending thread class and implementing runnable class. 4.5 Stopping & blocking a thread, thread exception. 4.6 Thread priority, synchronization.
Unit-V **I/O Basics and JDBC**	5a Identify the role of input stream and output stream. 5b Use character byte stream classes for writing and reading data. 5c Identify components of JDBC. 5d Design a code to connect to database using java.sql. Connection. 5e Develop an application to read and write data from and to database using statement and result set classes.	5.1. I/O stream classes: Input stream classes, Output stream classes, Byte stream classes, and Character stream classes. 5.2. Other I/O stream classes: random access file, stream tokenizer. 5.3. Introduction to JDBC: JDBC Architecture, Common JDBC Components. JDBC Driver types. 5.4. java.sql, Connection, Statement, and Result set, SqlException.
Unit-VI **Introduction to AWT**	6a Select appropriate class for designing window. 6b Create an applet for given application. 6c Create frame for given application. 6d Draw different shapes using graphics function	6.1 Introduction to AWT package's classes and interfaces. 6.2 Windows fundamentals. Introduction to applets. 6.3 How applets& application are different. Applet life cycle, applet tag, creating applets & parameters to applets. 6.4 Working with frame windows, creating a frame window in applet, display information within a window. 6.5 Creating Graphics & Colors: graphical class, lines, rectangle,

		circle & ellipse, drawing arc, drawing & fillings text & font, creating font objects, using color objects.

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R	U	A	Total
1	Introduction to Java Programming	8	3	5	4	12
2	Classes and Wrapper classes	8	3	5	4	12
3	Inheritance and packages	8	4	4	6	14
4	Exception handling and Multithreading	8	4	4	6	14
5	I/O Basics and JDBC	10	4	4	8	16
6	Introduction to AWT	6	4	4	4	12
Total		**48**	**22**	**26**	**32**	**80**

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's Taxonomy)

7. SUGGESTED LIST OF EXERCISES/PRACTICAL/EXPERIMENTS

Sr. No	Unit No.	Practical/Exercises	App. Hours Required
1	1	Install JDK for java.	4
		Write a simple java program	
2		Implement programs using arithmetic operators for given problem.	4
		Demonstrate programs using condition statements for given problems	
3		Demonstrate program using 1D array for given problem	4
		Demonstrate program using 2D array for given problem.	
4	2	Write Program To Create Instance & Class Variable and member function for given problem	4
		Implement program for method overloading.	
5		Demonstrate constructor and its type for given problem.	4
6		Write a java program to demonstrate use of Command Line Argument	4
		Write a java program to demonstrate string functions, vector data type.	
7		Demonstrate a program for use of wrapper classes in given problem.	4

8	3	Write a java program to demonstrate for inheritance and its types	4
9		Write a java program Using Method Overriding	4
		Write Program for multiple inheritance using interface.	
10		Write Program to use built in packages in given problem and write a program for creating user defined packages.	4
11	4	Write a java program for implementing multithreading using both methods	4
12		Write a java program to implement concept of Exceptional handling	4
13	5	Implement program for writing data from keyboard using I/O stream classes	4
14		Write a program to select data from database and display selected data. Write a program to insert data in database and display inserted data.	4
15	6	1. Write a Simple Program On Applets. 2. Write a java program Using Graphics To Draw ,Fill, Use Color	4
16		1. Create Small Application For frame 2. Create Small Application using graphics in frame	4
		Total	**64**

8. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

1. Install different versions of JDKs
2. Install IDE for java such as Net beans, eclipse.
3. Install any one database(My SQL, SQL server, Oracle)

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-
b. Q & A technique.
c. Demonstration
d. Seminars
e. Activity based learning

10. SUGGESTED LEARNING RESOURCES

Sr. N	Author	Title	Publisher
01	Patrick Naughton, Herbert Schildt	Complete reference for java	Tata McGraw Hill

02	E. Balaguruswami.	Programming with java	BPB
03	Keyur Shah	Java2 Programming	Tata McGraw Hill
04	John R.Hubbard	Programming with Java	Tata McGraw Hill

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment/Software	Brief specification
1	Desktop Computer	i5 processor or higher,4gb RAM
2	JDKs or IDEs	jdk1.7 or higher version, NetBeans, Eclipse

12. LIST OF SOFTWARE / LEARNING WEBSITES

a. **Creating a GUI using AWT**

http://www.tutorialspoint.com/awt/

b. **JDBC Database Access**

https://docs.oracle.com/javase/tutorial/jdbc/

https://www.tutorialspoint.com/jdbc/index.htm

https://www.tutorialspoint.com/jdbc/jdbc_tutorial.pdf

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

Sr. No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
CO1	Differentiate between Java and C++	-	3	3	-	-	-	-	-	-	-	-	-
CO2	Make use of object and built in classes of java.	-	3	3	-	-	-	-	-	-	-	-	-
CO3	Implement reusability and extensibility concept and create user defined packages	-	3	3	1	-	-	-	-	-	-	1	-
CO4	Create multithreaded program and handle runtime exception	-	2	2	2	-	-	-	-	-	-	-	-
CO5	Establish connection between database and java API.	-	3	3	2	-	-	-	-	-	-	-	-
CO6	Design window using applet and frame	-	2	2	2	-	-	-	-	-	-	2	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Mrs V.B.Kundlikar	Lecturer In Information Technology
2	P. S. Sadafule	Lecturer In Computer Engineering
3	Mr.J.P.Joshi	Lecturer In Information Technology

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE : OPERATING SYSTEMS

COURSE CODE : 6S404

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering/ Information Technology	IV

1. RATIONALE:

Operating system is the applied level course that makes a computer system operational so as to manage computer resources and to control users and software. This course obtains requisite knowledge about operating system concepts, it drives all the hardware parts of the computer and is the first piece of software to run on the machine when the system boots. Students will learn process concept, CPU scheduling, Memory Management, Storage Management.

2. COMPETENCY:

At the end of studying this course students will be able to,

"Install & configure various Operating Systems"

3. TEACHING AND EXAMNATION SCHEME:

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE @ (OR)	PA (TW)	150
4	-	2	6	80	20	@25	25	
Duration of the Examination (Hrs)				3	1	--	--	

Legends : L-Lecture**; T**-Tutorial/Teacher Guided Theory Practice **; PR**- Practical**; C**-Credits**; ESE**- End Semester Examination**; PT – Progressive Test, PA**- Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal, ~ Online Examination.

4. COURSE OUTCOMES:

At the end of studying this course students will be able to: -

1. Identify structure and component of different operating system.
2. Use of process and thread for inter-process communication.
3. Apply different algorithm for scheduling and deadlock avoidance.
4. Apply paging and segmentation for memory management.
5. Distinguish between various file access and allocation methods.
6. Compare and contrast UNIX and Linux operating system.

5. DETAILED COURSE CONTENTS:

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit - I Operating System Concepts	1a. Identify operating system for given application. 1b. Compare operating systems. 1c. Arrange system components for given system. 1d. Identify architecture for given operating system. 1d. Use system calls.	1.1 Operating System- Evolution, Generation 1^{st}, 2^{nd}, 3^{rd}. 1.2 Different Types of Operating system, Multi Programmed, Multitasking, Time shared OS, Multiprocessor System, Distributed Systems, Cluster Systems, and Real time Systems. 1.3 System components- main memory, file management, Input-output Management, Secondary storage management. 1.4 Simple structure, Layered, Monolithic, Microkernel. 1.5 System calls- uses, process control, file management, device management.
Unit – II Processes and Thread	2a. Modify process state using system calls. 2b. Compare schedulers. 2c. Synchronize process using semaphores. 2d. Select Thread model for given application.	2.1 The process model, process state, process control block, context switch. 2.2 Process scheduling- Scheduling Queues, Schedulers. 2.3 Interprocess communication- Introduction, shared memory system & message passing system, critical section problem, semaphores. 2.4 Threads- Benefits, users and kernel threads, Multithreading Models- Many to One, One to One, Many to Many.
Unit - III CPU Scheduling and Deadlocks	3a. Separate CPU and IO burst statements from given program. 3b. Compare scheduling algorithm. 3c. Arrange processes to avoid deadlocks.	3.1 Scheduling & its types- Objectives, concept, CPU and IO burst cycles, Pre-emptive, Non Pre-emptive scheduling, Scheduling criteria. 3.2 Types of scheduling algorithms- First come first served(FCFS), Shortest Job First (SJF), Shortest Remaining Time(SRTN), Round Robin (RR), Priority scheduling, multilevel queue scheduling. 3.3 Deadlock- System Models, Necessary conditions leading to Deadlocks, Deadlock Handling- Preventions, avoidance, Banker's algorithm.
Unit - IV Memory Management	4a. Utilize main memory. 4b. Compare paging and segmentation. 4c. Calculate page fault for	4.1 Main Memory: Background 4.2 Swapping, Contiguous Memory Allocation 4.3 Paging, Structure of the Page Table. 4.4 Segmentation

	given problem. 4d. Identify free space management techniques.	4.5 Virtual Memory: Background, Demand Paging, Copy on Write, Page Replacement algorithm- LRU, FIFO, Optimal, Allocation of frames, Thrashing. 4.6 Partitioning, Fixed and Variable, Free space management Techniques- Bitmap, Linked List.
Unit - V Storage Management	5a. Compare file and directory. 5b. Identify file system structure.	5.1 File system Interface- File concept, Access Methods, Directory and Disk structure, File System Mounting, File sharing, Protection. 5.2 File system Implementation: File system structure. File System Implementation, Directory Implementation, Allocation Methods, Free Space Management, Efficiency and performance, Recovery.
Unit - VI Introduction to Unix/Linux Operating System	6a. Compare Unix and Linux Operating System. 6b. Change boot sequence. 6c. Modify inodes.	6.1 Unix vs Linux operating System. 6.2 Structure of UNIX OS. 6.3 Booting in Linux 6.4 File System of UNIX. 6.5 Inodes, directory, Superblock.

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
I	Operating System Concepts	12	4	4	4	12
II	Processes and Thread	10	2	4	4	12
III	CPU Scheduling and Deadlocks	10	4	4	4	12
IV	Memory Management	12	8	4	4	16
V	Storage Management	10	4	4	4	12
VI	Introduction to Unix/Linux Operating System	10	8	4	4	16
	Total	64	30	24	24	80

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIMENTS/ TUTORIALS :

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	I	Installation of Linux Operating System-Fedora/Ubuntu/Centos	4
2	II	Execute program to create process in Linux using fork ( ) System calls.	2
3	II	Execute program to create thread in Linux using pthread library.	4
4	II	Execute program to understand multithreading.	2
5	III	Execute program to understand IO burst and CPU burst processes.	2
6	III	Execute program for FCFS Algorithm in C.	2
7	III	Execute program for SJF and RR Algorithm in C.	2
8	III	Execute program for Banker's Algorithm in C.	2
9	IV	Execute program for Memory Allocation method in C.	2
10	IV	Execute following command to display system memory information- free, cat /proc/meminfo, vmstat, top, htop, atop, pagesize, df -g.	2
11	V	Execute program to understand disk allocation method in C.	4
12	VI	Modify and execute GRUB configuration files.	2
13	VI	Execute C program to modify inodes of given file.	2
TOTAL			**32**

8. SUGGESTED STUDENTS ACTIVITIES:

Other than class room and laboratory activities following are the suggested co-curricular students activities which need to be undertaken to facilitate the attainment of various course outcomes of this course. The students are required to maintain portfolio of their experiences.

SR. NO.	ACTIVITY
1	For Real time system suggests appropriate Operating System.
2	For Latest Mobile System suggest appropriate Operating System.
3	Collect Operating System specification for educational institutes.
4	Prepare List of System call for given situations in System Software.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES:

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-
b. Q & A technique.
c. Demonstration.
d. Activity based learning.
f. Use of video, animation films to explain concepts, facts and applications of Operating System.

10. SUGGESTED LEARNING RESOURCE:

S.No.	Name of Book	Author	Publication
1	Operating System Concepts	Silberschatz, Peter B. Galvin and Greg Gagne	WileyIndian Edition
2	Modern Operating Systems	Andrew S Tanenbaum	Prentice Hall India
3	Principles of Operating Systems	Naresh chauhan	Oxford Press
4	Operating Systems	D.M. Dhamdhere	Tata McGraw Hill
5	Operating Systems-Internals and Design Principles	William Stallings	Prentice Hall India
6	UNIX Concepts and Applications	Sumitabha Das	Tata McGraw Hill.
7	Unix Shell Programming	Yashwant Kanetkar	BPB publications.

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

Sr. No.	Name of equipment	Brief specification
1	Computer System	Computer System with latest configuration.
2	Linux	Fedora/Ubuntu/Centos.

12. LEARNING WEBSITE & SOFTWARE:

1. http://nptel.ac.in/courses/106108101/
2. https://onlinecourses.nptel.ac.in/noc17_cs29/preview
3. https://computer.howstuffworks.com/operating-system.htm

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs) :

Sr. No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Identify structure and component of different operating system.	2	2	-	-	-	-	-	-	-	1	1	1
2	Use of process and thread for inter-process communication.	1	2	1	1	-	-	-	-	-	-	-	-
3	Apply different algorithm for scheduling and deadlock avoidance.	1	2	2	-	-	-	-	-	-	2	-	-
4	Apply paging and segmentation for memory management.	-	1	1	-	-	-	-	-	-	-	-	-
5	Distinguish between various file access and allocation methods.	-	1	2	-	-	-	-	-	-	-	-	-
6	Compare and contrast Unix and Linux operating system.	1	1	1	-	-	-	-	-	-	2	2	2

Course Curriculum Design Committee:

Sr No	Name of the faculty members	Designation and Institute
1	Jitendra Joshi	Lecturer in Information Technology, Govt. Polytechnic, Aurangabad
2	Shashikant Bankar	Lecturer in Computer Engineering, Govt. Polytechnic, Aurangabad
3	Om Varma	Lecturer in Information Technology, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- PYTHON PROGRAMMING

COURSE CODE- **6S408**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering/Information Technology	Fourth

1. RATIONALE

Python is an easy to learn, powerful programming language. It has efficient high-level data structures and a simple but effective approach to object-oriented programming. Python code is simple, short, readable, intuitive, and powerful, and thus it is effective for introducing computing and problem solving to beginners. It's elegant syntax and dynamic typing, together with its interpreted nature, make it an ideal language for scripting and rapid application development in many areas on most platforms.

2. COMPETENCY

The course content should be taught and implemented with the aim to develop the following competencies.

"Develop general purpose programming using python"

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE @ (PR/OR)	PA (TW)	125
1	0	4	5	00	00	50	75	
Duration of the Examination (Hrs)				00	00	2	00	

Legends : L-Lecture**; T**-Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE**- End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Install and configure python editor/IDE.
2. Use primitive data types, selection statements, loops, functions to write programs in python.
3. Develop applications using OOP basics in Python.
4. Design and develop interactive GUI application using database connectivity.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
UNIT-1 **Introduction to Python**	1a.install and configure the Python IDE and editor 1 b Describe History of Python 1 c Write and run a simple Interactive and script Modes.	1.1 What is Python; Python download and installation; Comments; Documentation;Multiple Statements on a Single Line 1.2 Python editors; IDLE, the Python editor. 1.3 History of Python 1.4 Basic syntax of a Python program 1.5 Write and run a simple Interactive Mode, Script mode
UNIT –2 **Basic Data Types ,dictionaries, Modules , control structures and operators**	2.a State and Explain basic data types with General Syntax and use. 2.b Write a program on if selections , while loop, break, continue, pass for loops with examples. 2.c State the Modules basics, Modules files	2.1 Basic Data types: variables, Multiple Assignment in Variables Data types and ints Multiple assignment, number ,set, string, listArrays, List functions 2.2 Dictionaries: dictionary functions, tuples. 2.3 Module basics module files are a namespace name qualification import variants 2.4 Reloading modules package imports odds and ends module design concepts. 2.5 Modules are objects: meta programs. 2.6 Assignment expressions, Relational operators, logical operators.Arithmetic Operators, Comparison (Relational) Operators, Assignment Operators, Logical Operators, Bitwise Operators, Membership Operators, Identity Operators

	2.d Describe reloading modules 2.e Design a program on modules as objects (meta programs	2.7 Decision making Statement : Print if selections ,if else statement, nested ifelse, Elif Statement, Multiple Statement Groups as Suites 2.8 Python syntax rules documentation sources interlude truth tests. 2.9 While loops break, continue, pass, and For loops, Nested For loops with examples, Prime number Generators.
Unit – 3 **Exceptions and Functions built in and user defined**	3.a State the Exceptions and it's types .with examples. 3. b Develop simple program using exceptions 3.c State exception idioms, exceptions caching modes ,class exceptions with examples. 3.d State functions scope global and local more on return type 3. e Develop a program on argument passing special modes odds and ends	3.1 Exception basics first examples. 3.2 Exception idioms exception catching modes , class exceptions. 3.3 Function basics scope. 3.4 Rules in functions more on "global" (and "nonlocal") more on "return" 3.5 More on argument passing special argument matching modes odds and ends 3.6 Generator expressions and functions 3.7 Function design concepts : return statement 3.8 Pass by reference vs value functions are objects: indirect calls 3.9 built in functions and user defined functions Abs(),bool(),dir(),help(),eval(),exec(),len() and sum(),range() 3.10 Data conversion functions :int(),str() and float() 3.11 Basic I/O statements in Python: 3.12 Reading Keyboard Input : raw_input, input
Unit - 4 ***OOP basics*** **inheritance, methods, live demo, new-style, OO design**	4.a Define OOP's concept with example using class statement 4.b Write a program for object and classes. 4.c write a program on inheritance, polymorphism with inherited methods	4.1 Oop basics: the big picture class basics a more realistic example using the class statement 4.2 Object and Classes 4.3 Encapsulation. Abstraction 4.4 Data Hiding. Polymorphism 4.5 Inheritance 4.6 Learning Python, using class methods 4.7 Customization via inheritance specializing inherited methods 4.8 Operator overloading in classes 4.9 Namespace rules: the whole story 4.10 OOP examples: inheritance and composition classes and methods are objects odds and ends new style classes

Unit – 5 **GUI programming using tkinter and SQLite database**	5a. Import tkinter module to create window 5b Design GUI application using different widgets. 5c. Design GUI application using database connection	5.1 the tkinter module 5.2 Geometry Management: pack(),grid() and place() method 5.3 tkinter widgets(components/control) : button, canvas, checkbox, entry, frame, label, listbox, menu, menubutton, message, radiobutton, scrollbar, text , etc. 5.4 SQLite database: installation of sqlite database, sqlite3 module, create connection:sqlite3.connect(), create table, insert data, display and update data

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
1	**Introduction to Python**	02	NOT APPLICABLE			
2	**Basic Data Types ,dictionaries, Modules , control structures and operators**	03				
3	**Exceptions and Functions built in and user defined**	04				
4	***OOP basics concept used in Python***	03				
5	**GUI programming using tkinter and SQLite database**	04				
	Total	**16**				

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. SUGGESTED EXERCISES/PRACTICALS

The tutorial/practical/exercises should be properly designed and implemented with an attempt to develop different types of cognitive and practical skills **(Outcomes in cognitive, psychomotor and affective domain)** so that students are able to acquire the competencies.

S. No.	Unit No.	**Practical Exercises** (Outcomes in Psychomotor Domain)	Approx. Hrs. required
1	1	Install python editor or IDE	02
2	1	Execute a program to give input any two numbers and to find Quotient and Remainder	02
3	1	Execute a program to find the simple interest based upon number of years. If number of years is more than 12 rateof interest is 10 otherwise 15.	02
4	2	Execute a program to give input any number and to find square and square root.	02
5	2	Execute a program to find simple interest using function.	02
6	2	Execute a program to find area of the circle.	02
7.	2	Execute a program To write expressions that use the conditional expressions.	02
8.	2	Execute a program on to give input any choice	02
9.	2	Execute a program to input any number and to print all natural numbers up to given number	02
10.	2	Execute a program to input any number and to find reverse of that number	02
11	2	Execute a program on interchange for loop into while loop	02
12	3	Execute a program on arguments in function call	02
13	3	Execute a program on **String methods & built in functions:** len() capitalize() find(sub[,start[, end]]) isalnum() isalpha() isdigit() lower() islower() isupper() upper() lstrip()	02
14	3	Execute a program to input any string and count number of uppercase and lowercase letters	02
15	3	Execute a program on lists and their operations	02

S. No.	Unit No.	**Practical Exercises** (Outcomes in Psychomotor Domain)	Approx. Hrs. required
16	3	Execute a program on the overloaded function definitions of add()- on adds two numbers and other concatenates two strings..	02
17	3	Develop programs to understand working of exception handling and assertions.	02
18	4	Develop program for creating class and object	02
19	4	Execute a program for constructor and their types	02
20	4	Execute a program on single inheritance.	02
21	4	Execute a program on multiple inheritances.	02
22	4	Execute a program for new style classes	02
23	5	Design GUI for login form	02
24	5	Design form for adding controls using different methods of geometry management	02
25	5	Design GUI for application form for specific example using all controls	04
26	5	Design GUI application with database connectivity using SQLite	04
27	All	Design a mini project using all concepts(maximum 2 group members)	08
Total			64

8. SUGGESTED STUDENT ACTIVITIES

Following is the list of proposed student activities like:

i. Prepare power point presentation showing relation between Python programming.

ii. Develop sample Application using Python.

9. SPECIAL INSTRUCTIONAL STRATEGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-

b. Q & A technique.

c. Demonstration

d. Seminars

e. Activity based learning

10. SUGGESTED LEARNING RESOURCE

S. No.	Title of Book	Author	Publication
1	Computer Science With Python-II CBSE board	CBSE board	First Edition 2014, CBSE, India
2	Introduction To Programming Using Python	Y. Daniel Liang	*Armstrong Atlantic State University*
3	Hands-on Python Tutorial	Dr. Andrew N. Harrington.	Loyola University Chicago

11. List of Major Equipment/ Instrument with Broad Specifications

S. No.	Name of equipment	Brief specification
1	Desktop Computer	i5 processor or higher,4gb RAM
2	Python editor / IDE	Python editor 3.5 and above / IDE – pycharm/ Jupiter

12. List of Software/Learning Websites

Software: Wiindows 7 ,. Python 3.4.3

1 http://python.swaroopch.com/

2 Learn Basic of python programming Online**:**

https://github.com/swaroopch/byte-of- python /

4 Text books online

https:// www.**tutorials**point.com/**python/python_tutorial.pdf**

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

CO. NO.	Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2	No. of hours allocated in curriculum
CO1	Analyze and design strategies for solving basic programming problems	1	1	1	1	0	0	0	0	0	0	1	0	**8**
CO2	Use primitive data types, selection statements, loops, functions to write programs.	0	0	3	0	0	0	0	0	0	0	0	2	**12**
CO3	Develop proficiency in creating based applications using the Python Programming Language.	1	3	1	1	0	0	0	0	0	0	1	0	**14**
CO4	Understand the various data structures available in Python programming language and apply them in solving computational problems.	0	3	2	0	0	0	0	0	0	0	0	2	**10**
CO5	Make use of testing and debugging of code written in Python	1	3	2	0	0	0	0	0	0	0	0	2	**12**

Sr No	Name of the faculty members	Designation and Institute
1	S.M. Bankar	Lecturer in Computer Engineering Government Polytechnic Aurangabad
2	P.B. Lahoti	Head of the Department Computer Engineering Government Polytechnic Aurangabad
3	V.B.Kundlikar	Lecturer in Information Technology, G P Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE: PHP PROGRAMMING (PP)

COURSE CODE: 6S406

Diploma programme in which course is offered	Semester in which course is offered
COMPUTER ENGINEERING / INFORMATION TECHNOLOGY	**FOURTH SEMESTER**

1. RATIONALE

PHP and MYSQL is an applied level course, provides server side scripting for creating dynamic and interactive database driven websites. PHP is widely used as efficient open source technology. Student will be able to design dynamic interactive web based applications such as online banking, ticket/hotels booking sites, E-Commerce etc..

2. LIST OF COMPETENCIES

The student will be able to:

"Develop interactive web based application using PHP and MySQL"

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PT	ESE (PR)	PA	
01	00	04	05	00	00	#50	75	125
Duration of the Examination (Hrs)				00	00	2	00	

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; **C** – Credit, **ESE** -End Semester Examination; **PT**- Progressive Test; **PA**- Progressive Assessment **OR**-Oral examination.

4. COURSE OUTCOMES

I. Demonstrate simple programs using basic PHP concepts
II. Use built in and user defined functions in PHP programming.
III. Design Web pages using form controls to display web-based content.
IV. Develop Web pages to handle cookies, session and exceptions.
V. Demonstrate CRUD (Create, Retrieve, Update and Delete) application

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics and Sub-topics
UNIT– I Introduction to PHP	1a Define the basic of PHP scripts 1b Write the syntax and use of Block of PHP statements. 1c Explain Global And super global variables. 1d List the Data types and Elaborate it. 1e list and describe the different operators 1f Use of variables and constants. 1g Write syntax and use of conditional statement and loop statement	1.1 Configuration of PHP, Apache Web Server, MySQL and Open Source 1.2 Relationship between Apache, MySQL and PHP(AMP Module) Installing PHP for (Windows, Wamp server , XAMP server), 1.3 PHP Structure and Syntax , Creating PHP pages, Rules of PHP syntax Integrating HTML with PHP 1.4 Constants Predefined Constants: Static and Global Variable Super global 1.5 The echo Statement and print() Function 1.6 Combining HTML and PHP Adding Comments to PHP Code 1.7 Data Types Conversions . Changing Type with settype() Changing Type by Casting 1.8 Operators and Expressions. The Assignment Operator Arithmetic Operators The Concatenation Operator Combined Assignment Operators Automatically Incrementing and Decrementing an Integer Comparison Operators Creating More Complex Test Expressions with the Logical Operators Operator Precedence 1.10 The if Statement Using the else Clause with the if Statement Using the else if Clause with the if

		Statement The switch Statement Using the ? Operator 1.11 Loops : The while Statement do...while Statement The for Statement Breaking Out of Loops with the break Statement Skipping an Iteration with the continue Statement Nesting Loops
UNIT – II **Working with In Built Functions**	2a Develop a web page using function variable, string like predefined and formatted, math, date, Array and File. 2b Develop a web page using function.	2.1 Variable Function: (gettype, settype, isset, strval, floatval, intval,print_r) 2.2 string function: (Chr, ord, strtolower, strtoupeer, strlen, ltrim, rtrim, trim, substr, strcmp, strcasecmp, ctrops, strops, stristr, str_replace, strrev, echo, print) **2.3** Formatting Strings with PHP Working with printf() Specifying a Field Width Argument Swapping Storing a Formatted String Manipulating Strings with PHP . Cleaning Up a String with trim() and ltrim() and strip_tags(). 2.4 Replacing a Portion of a String Using substr_replace() Replacing Substrings Using str_replace Converting Case Wrapping Text with wordwrap() and nl2br(),Breaking Strings into Arrays with explode() 2.5 MATH functions: (Abs, ceil, floor, round, fmod, min, max, pow, sqrt, rand) 2.6 Date function:

		(Date, getdate, setdate, checkdate, time, mktime) 2.7 Array Function: (Count, list, in_array, current, next, previous, end, each, sort, array_merge, array_reverse) 2.8 File function: (Fopen, fread, fwrite, fclose) 2.9 What Is a Function? Calling Functions Defining a Function Returning Values from User-Defined Functions Variable Scope 2.10 Accessing Variables with the global Statement Saving State Between Function Calls with the static Statement More About Arguments Setting Default Values for Arguments Passing Variable References to Functions Testing for the Existence of a Function.
UNIT – III **Working with data and forms using Arrays in PHP and OOPS in PHP**	3a Implement a web page to read the data using forms controls. 3b Develop a web page to submit the values using different form methods and it's Array. 3c Develop a web page using OOPs concepts.	3.1 Reading data using Form Controls (Text Fields, Text Areas, CheckBoxes, Radio Buttons, List Boxes, Password Controls, Hidden Controls, Image Maps, File Uploads, Buttons) 3.2 Submitting form values, using $_*Get* and $_*Post* Methods, $_REQUEST 3.3 Accessing form inputs with *Get/Post* functions 3.4 Combining HTML and PHP codes together on single page, Redirecting the user 3.5 Arrays in PHP

		What Is an Array? Creating Arrays Creating Associative Arrays Creating Multidimensional Arrays Some Array-Related Functions 3.6 Arrays, constructs User Defined function, argument function, variable function, Return function, default argument, variable length argument 3.7 Creating an Object Properties , Object Methods, Constructors. Object Inheritance.
UNIT– IV **Working with Forms and User Sessions, Cookies and Exception Handling**	4a Demonstration about validating User Input with html and PHP and the usage of DOM, HTML. 4b Implement server side programming, sending data to the server using POST and GET methods, using inner functions, downloading and executing scripts from the server.	4.1 Creating a Simple Input Form Accessing Form Input with User-Defined Arrays . 4.2 Combining HTML and PHP Code on a Single Page. 4.3 Using Hidden Fields to Save State. 4.4 Redirecting the User Sending Mail on Form Submission System Configuration for the mail() Function Creating the Form Creating the Script to Send the Mail Formatting Your Mail with HTML 4.5 Working with File Uploads Creating the File Upload Form Creating the File Upload Script 4.6 Working with User Sessions Session Function Overview Starting a Session Working with Session Variables Passing Session IDs in the Query String Destroying Sessions and Unsetting Variables

		4.7 Error Types in PHP Exception Handling in PHP
UNIT– V **Developing Applications in PHP using MySQL**	5a Identify and apply the concept of a PHP Data Object to connect to a MySQL database. 5b Design a web based application with data transfers from and to a backend database table without errors.	5.1 Introduction to Databases Creating database , tables 5.2 Inserting values in table , Displaying, changing, searching, deleting records from the table 5.3 Developing applications in PHP a. Arithmetic operators through GUI b. Web calculator 5.4 SQL queries- insert, select, delete, update, where, order by.

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R	U	A	Total
I	Introduction to PHP	2	NOT APPLICABLE			
II	Working with In Built Functions	4				
III	Working with data and forms	4				
IV	Session, Cookies and Error Handling	2				
V	Database Connectivity using MYSQL	4				
Total		16				

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's Taxonomy)

7. SUGGESTED LIST OF EXERCISES/PRACTICAL/EXPERIMENTS

Sr.no.	Unit No.	Practical Exercises	Total. hrs
1	1	Execute a PHP script to display Welcome message.	04
2	2	Develop a PHP script to demonstrate arithmetic operators, comparison operator, and logical operator.	04

3	3	Develop PHP Script to print Fibonacci series.	02
4	1	Develop PHP Script to generate result and display grade.	02
5	1	Develop PHP Script to find maximum number out of three given numbers.	02
6	1	Implement PHP Script for addition of two 2x2 matrices.	02
7	2	Implement PHP script to demonstrate Variable function	02
8	2	Implement PHP script to obtain 5! Using function	02
9	2	Execute PHP script to demonstrate string function.	02
10	2	Develop PHP script to demonstrate Date functions.	02
11	2	Develop PHP script to demonstrate Math functions.	02
12	2	Develop PHP script to demonstrate Array functions.	02
13	2&4	Execute PHP script to demonstrate File functions	04
14	3	Develop student registration form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.	04
15	3	Develop Website Registration Form using text box, check box, radio button, select, submit button. And display user inserted value in new PHP page.	04
16	3	Implement two different PHP script to demonstrate passing variables through a URL.	02
17	4	Develop two different PHP script to demonstrate passing variables with sessions.	02
18	4	Implement PHP script to demonstrate passing variables with cookies.	02
19	4	Implement a program to keep track of how many times a visitor has loaded the page.	02
20	4	Develop an example of Error-handling using exceptions.	02
21	5	Develop a PHP script to connect MySQL server from your website.	04
22	5	Execute a program to read customer information like cust_no, cust_name, Item_purchase, and mob_no, from customer table and display all these information in table format on output	02

		screen.	
23	5	Execute a program to edit name of customer to “Bob” with cust_no =1, and to delete record with cust_no=3.	02
24	5	Execute a program to read employee information like emp_no, emp_name, designation and salary from EMP table and display all this information using table format.	02
25	5	Develop a dynamic web site using PHP and MySQL	04
		Total	64

8. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

1. Students will prepare chart/poster for given topics
2. Prepare power point presentation showing relation between PHP, APACHE and MYSQL
3. Students are expected to develop minimum one application of particular topic as an example to exhibit real life application.
4. Develop sample web based Application using PHP and MYSQL and present the same.

9. SPECIAL INSTRUCTIONAL STRATEGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-

b. Q & A technique.

c. Demonstration

d. Seminars

e. Activity based learning

10. SUGGESTED LEARNING RESOURCES

List of Books

Sr.No	Author	Title of Books	Publication
1	W. Jason Gilmore	Beginning PHP and MySQL, 4th Edition	Apress, 2010
2	Steven Holzner	PHP: The Complete Reference	McGraw-Hill, 2008
3	Robin Nixon	Learning PHP, MySQL, JavaScript, CSS & HTML5, Third	O'reilly Media , 2014

		Edition	
4	Julie C. Meloni,	Teach yourself PHP, MySQL and Apache All in One , 5th Edition	Pearson Education, 2012

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED:

S. No.	Name of equipment	Brief specification
1	Desktop Computer	i5 processor or higher,4gb RAM
2	UBUNTU 16.04 WINDOWS 7	WAMP server / XAMPP server

12. LIST OF LEARNING WEBSITES

1. Developing Web Pages- Udacity https://www.udacity.com/
2. Build your firs App http:// http://www.codecademy.com/tracks/web
3. Android App Development Tutorial http://www.w3schools.org/php

13. APPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

Sr.No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
CO1	Demonstrate simple programs using basic PHP concepts.	2	3	2	-	-	-	-	-	-	-	-	-
CO2	Use built in and user defined functions in PHP programming.	-	3	3	-	-	-	-	-	-	-	-	-
CO3	Design eb pages using form controls to display web based content.	-	2	3	3	-	-	-	-	-	-	-	-
CO4	Develop Web pages to handle cookies, session and exceptions.	-	1	3	3	-	-	-	-	-	-	-	-
CO5	Demonstrate CRUD (Create, Retrieve, Update and Delete) application	-	2	3	3	-	-	-	-	1	-	-	-

Course Curriculum Design Committee

Sr No **Name of the faculty members** **Designation and Institute**

1	S.M. Bankar	Lecturer in Computer Engineering
2	P.B. Lahoti	Head of the Department Computer Engineering

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE: RUBY PROGRAMMING (RP)

COURSE CODE: 6S407

Diploma programme in which course is offered	Semester in which course is offered
COMPUTER ENGINEERING / INFORMATION TECHNOLOGY	**FOURTH SEMESTER**

1. RATIONALE

Ruby programming is applied level course, use for designing light weighted programs. This course use OOP concepts and has clean and easy syntax that allows a new developer to learn very quickly and easily.Ruby has similar syntax to that of many object oriented programming languages. Ruby has a rich set of built-in functions, which can be used directly into Ruby scripts.

2. LIST OF COMPETENCIES

The student will be able to:

"Perform General purpose programming to develop standalone application using ruby programming"

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PT	ESE (PR)	PA	
01	00	04	05	00	00	#50	75	125
Duration of the Examination (Hrs)				00	00	2	00	

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; **C** – Credit, **ESE** -End Semester Examination; **PT**- Progressive Test; **PA**- Progressive Assessment **OR**-Oral examination.

4. COURSE OUTCOMES

I. Select strategies for solving basic programming problems using Ruby.

II. Use the Data types, selection, loops, functions to write programs.

III. Develop proficiency in creating scripts using Ruby programming.

IV. Find user defined and predefined exception errors in Ruby.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics and Sub-topics
UNIT– I Introduction to Ruby Environment.	1a Install Ruby with it's Editor 1b Use of puts and gets methods 1c Select the IDE environment to run the programs and making Ruby interactive and script modes 1d Write and run a simple Interactive and script Modes.	1.1 What is Ruby; Ruby download and installation; irb and SciTE; Free format; Case sensitive; Comments; Statement delimiters; Documentation; 1.2 Whitespace in Ruby Program. Line Endings in Ruby Program Reserved Words, Ruby Identifiers., Features of Ruby. 1.3 Ruby editors; text editor like Notepad or Edit plus; .rb file; RubyWin is a Ruby Integrated Development Environment (IDE) for Windows ,Ruby Development Environment (RDE) . 1.4 Interactive Ruby (IRb) 1.5 Usage of puts, gets methods; Ruby conventions; BEGIN and END Statements; Garbage collection
UNIT – II Variables, Constant, concept of scope operators Numbers and Arrays in Ruby	2a Identify and state basic data types with syntax it's use eg. Variable constants class and naming conventions and rules. 2b Execute programs on local global variables float integer Fixnum Binum etc.with examples.	2.1 Basic Data Types :Name characters; Variables – local, instance, class , global; 2.2 Constants naming, rules and 2.3 scope operator ::; Naming conventions; 2.4 Dynamically typed; Usage of method type 2.5 Concept and usage with Class Numeric, Float, Integer, Fixnum and Bignum Random

	2c Write a program on class array methods like delete sort length using do end.	Numbersrand method 2.6 Arrays Concept; Class Array methods like delete, sort, length and each using do end .
UNIT – III **Strings conditional branching statement, Operators, Regular expression and Ranges hashes**	3a Develop a programs on String literals using single and double-quotes. 3b. Write program on simple usage of << and symbols. 3c Execute a program on different string methods. 3d Execute a program on conditional and case statement. 3e Execute a program on Operators 3f Execute a program on Regular Expressions ranges and hashes	3.1 String literals using single- and double-quotes and their differences; 3.2 Usage of #{expression}; 3.3 Conversions using .to_i, .to_f, .to_s; Usage of <<; Concept of symbols; 3.4 String methods like chomp, reverse, length, upcase, downcase, swapcase, capitalize, strip, length, index, slice, upcase!, downcase!, swapcase! and capitalize! 3.5 Conditional Statement Constructs if else end elsif; while end; case when end . 3.6 Operators (with precedence and associatively rules) assignment comparison, bitwise operators, logical, Range, conditional and Ternary operators; 3.7 Regular Expressions Simple examples 3.8 Ranges and Hashes
UNIT– IV **Code Blocks List File I/O Basic OOPS Concept and Exception handling**	4a Develop a program on code blocks using do end {} and proc it's method call.	4.1 Code Blocks: Using do end and { }; Usage of yield method; Concept of Proc and it's method call; lambda. 4.2 File I/O File class and its method

	4b Develop a program on File I/O using File class it's open method 4c Develop a program on object class and method 4d Develop a standard class initialize new method and use access modifiers. 4e Write a program on inheritance and use of super. 4f Execute a program on Modules 4g Develop a program on exception handling	open 4.3 Concept of an object and that everything is an object in Ruby; Object class and its methods; 4.4 Writing a class : Standard class Class; initialize; new methods; Access modifiers private and protected; Usage of attr_reader, attr_writer, attr_accessor; 4.5 Methods: Writing own methods using def end; class and instance methods (with getter and setter); return and concept of value returned by last statement in a method; variable number of parameters using * 4.6 Inheritance and using <; Using super 4.7 Modules: Examples of writing a module; Usage of require and include; Concept of mix-ins 4.8 List. 4.9 Exception handling: Exception class and its hierarchy; begin rescue ensure end;

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours		Distribution of Theory Marks			
				R	U	A	Total
I	Fundamental of Ruby	2					
I	Variables, Constant, Arrays in Ruby	4					

III	Strings conditional branching statement, Regular expression and Ranges hashes	4	NOT APPLICABLE
IV	Code Blocks, List, File I/O Basic OOPS Concept and Exception handling	6	
Total		16	

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's Taxonomy)

7. SUGGESTED LIST OF EXERCISES/PRACTICAL/EXPERIMENTS

Sr.no.	Unit No.	Practical Exercises	Total Hrs.
1	1	Create a simple program in ruby	04
2	2	Ruby BEGIN Statement Ruby END Statement using puts statement comment hides a line, part of a line, or several lines from the Ruby interpreter You can use the hash character (#) at the beginning of a line	02
3	4	Write a program using class and object.	02
4	2	Write a program on local variable and global variable instance variable and class variable in Ruby	02
5	4	Create Objects in Ruby Using new Method	02
6	4	Create a Ruby Class called Customer two methods: *display_details*: This method will display the details of the customer. *total_no_of_customers*: This method will display the total number of customers created in the system	02
7	2	Execute a program on Constant in Ruby	02
8	2,3	Create a program on string literals	02
9	3	Execute a program on Arrays and Hashes.	02
10	3	Create a program on assignment , comparison, bitwise operators.	02
11	3	Create a program on logical, Range, conditional and Ternary operators.	04
12	3	Execute a program String methods & built in functions: chomp, reverse, length, upcase, downcase, swapcase, capitalize, strip, length, index, slice, upcase!, downcase!, swapcase! and capitalize!	06
13	4	Execute a program to input any string and count number of uppercase and lowercase letters	04

14	2	Create a program on lists	04
15	4	Execute a program on single inheritance.	02
16	4	Execute a program on multiple inheritance..	02
17	3	Create a program To write expressions that use the conditional expressions.	02
18	3	Execute the overloaded function definitions of add()- on adds two numbers and other concatenates two strings..	02
		Total	64

8. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

1. Students will prepare chart/poster for given topics
2. Prepare power point presentation showing relation between Interactive Ruby.
3. Students are expected to develop minimum one application of particular topic as an example to exhibit real life application.
4. Develop sample Application using Ruby.

9. SPECIAL INSTRUCTIONAL STRATEGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-

b. Q & A technique.

c. Demonstration

d. Seminars

e. Activity based learning

10. SUGGESTED LEARNING RESOURCES

List of Books

Sr.No	Author	Title of Books	Publication
1	Peter Cooper	Beginning Ruby	
2	Chris Pine	Learn to Program	
3	Yukihiro Matsumoto.	Ruby programming Language Tutorial	

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED:

S. No.	Name of equipment	Brief specification
1	Desktop Computer	i5 processor or higher,4gb RAM
2	Windows 7	Ruby1.6.7, Apache 1.3.19-5 Web server.

12. LIST OF LEARNING WEBSITES

1. http://www.ruby-lang.org
2. Text books online **http://**www.**tutorials**point.com/**ruby/ruby_tutorial.pdf**

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

Sr.No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
CO1	Select the strategies for solving basic programming problems with Ruby	2	3	2	-	-	-	-	-	-	-	-	-
CO2	Use data types, selection statements, loops, functions to write programs	-	3	3	-	-	-	-	-	-	-	-	-
CO3	Develop proficiency in creating scripts using the Ruby Programming Language.	-	2	3	3	-	-	-	-	-	-	-	-
CO4	Find the error handling using exception with examples	-	1	3	3	-	-	-	-	-	-	-	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	S.M. Bankar	Lecturer in Computer Engineering
2	P.B. Lahoti	Head of the Department Computer Engineering

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE: ANDROID PROGRAMMING (AP)

COURSE CODE: 6S409

Diploma programme in which course is offered	Semester in which course is offered
COMPUTER ENGINEERING / INFORMATION TECHNOLOGY	**FOURTH SEMESTER**

1. RATIONALE

Android Programming is applied level course provides platform for mobile application development. This course is designed to enable student to build mobile applications on android operating system. This course covers the basics of Android along with required programming codes for developing necessary programming skills for mobile applications.

2. LIST OF COMPETENCIES

The student will be able to:

"Develop GUI based mobile applications with Eclipse Android SDK on open source Android and propriety platforms with database connectivity"

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PT	ESE # (PR)	PA	
01	00	04	05	00	00	#50	75	125
Duration of the Examination (Hrs)				00	00	2	00	

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; **C** – Credit, **ESE** -End Semester Examination; **PT**- Progressive Test; **PA**- Progressive Assessment **OR**-Oral examination.

4. COURSE OUTCOMES

I. Identify the role of android framework in android platform.

II. Develop android user interface Layout.

III. Develop interactive event driven mobile application.

IV. Develop application using menus and dialog boxes using SQLite.

V. Find the error handling using exception with examples.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics and Sub-topics
UNIT– I Introduction to Android environment with architecture	1.a Identify components of Android Architecture and framework.	1.1 Overview of different mobile application development platforms. 1.2 Linux Kernel : Libraries ,Android Runtime ,Application Framework, Android Startup and Zygote, Android Debug bridge, Android Permission model, Android Manifest File . 1.3 Mobile technology : Overview of Android - An Open Platform for Mobile development 1.4 Open Handset Alliance , Use Android for mobile app development, Android Marketplaces , Android Development Environment setup . 1.5 Android development Framework - Android-SDK, Eclipse Emulators / Android AVD. 1.6 Creating & setting up custom Android emulator 1.7 Android Project Framework and its applications
UNIT – II Android Activities	2.a Describe Android application components and activity.	2.1 Android application components Intent, Activity, Activity Lifecycle, Broadcast receivers, Services and Manifest 2.2 Create Application and new Activities 2.3 Expressions and Flow control, Android Manifest.

UNIT – III **Advanced UI Programming and UI Design**	3.a Develop an Event driven programs on text edit and button clicked. 3.b.Develop simple UI layout. 3.c Describe GUI object in XML.	3.1 Event driven Programming in Android (Text Edit, Button clicked) 3.2 Creating a splash screen 3.3 Introduction to threads in Android 3.4 Simple UI -Layouts and Layout properties Fundamental Android UI Design Introducing Layouts Creating new Layouts Drawable Resources Resolution and density independence (px,dp,sp) 3.5 XML Introduction to GUI objects 3.6 Push Button Text / Labels EditText Toggle Button WeightSum Padding Layout Weight.
UNIT– IV **Toast, Menu, Dialog, List and Adapters Working with Database**	4a Design and develop menus, dialogs and toast 4b Create Android Manifest.xml File 4c Connect and create SQLite database.	4.1 Menu: Custom Vs. System Menus 4.3 Creating and Using Handset menu Button (Hardware) 4.4 Android Themes, Dialog, create an Alter Dialog 4.5 Toast in Android, List & Adapters 8.6 Android Manifest.xml File 4.7 SQLite: Open Helper and create database 4.8 Open and close a database

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R	U	A	Total
I	Introduction to Android environment with architecture	2				
II	Android Activities and UI	4				

	Design		NOT APPLICABLE
III	Advanced UI Programming and UI Design	4	
IV	Toast, Menu, Dialog, List and Adapters Working with Database	6	
Total		16	

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's Taxonomy)

7. SUGGESTED LIST OF EXERCISES/PRACTICAL/EXPERIMENTS

Sr.no.	Unit No.	Practical Exercises	Total Hrs.
1	1	Develop "Hello World" application to "Hello World" in the middle of the screen in the red color with white background.	04
2	1	Develop sample application with login module.(Check username and password), validate it for login screen or alert the user with a Toast.	04
3	2	Execute a login application using username as Email ID else login button must remain disabled.	02
4	2	Develop Login application and open a browser with any one search engine.	02
5	3	Develop an application to display "Hello World" string the number of times user inputs a numeric value. (Example. If user enters 5, the next screen should print "Hello World" five times.)	04
6	3	Develop spinner with strings from the resource folder (res >> value folder). On changing spinner value, change image.	04
7	3	Develop an application to change screen color as per the user choice from a menu.	04
8	3	Develop an application that will display toast (Message) at some regular interval of time.	04
9	3	Develop a background application that will open activity on specific time.	04
10	4	Develop an application that will have spinner with list of animation names. On selecting animation name, that animation should affect on the images displayed below.	04
11	3	Develop an UI listing the diploma engineering branches. If user selects a branch name, display the number of semesters and subjects in each semester.	04
12	4	Use content providers and permissions by implementing read phonebook contacts with content providers and display in the list.	04
13	4	Develop an application to call a phone number entered by the user the Edit Text.	04
14	4	Develop an application that will create database to store username and password.	04
15	4	Develop an application to insert, update and delete a record from the database.	04

Total	64

8. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

1. Students will prepare chart/poster for given topics
2. Prepare presentation and deliver seminar on Developed application on mobile device.
3. Students are expected to develop minimum one application of particular topic as an example to exhibit real life application.
4. Design and implement sample GUI.

9. SPECIAL INSTRUCTIONAL STRATEGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-

b. Q & A technique.

c. Demonstration

d. Seminars

e. Activity based learning

10. SUGGESTED LEARNING RESOURCES

List of Books

Sr.No	Author	Title of Books	Publication
1	Reto Meier	Professional Android 2 Application Development	Wiley India Pvt Ltd
2	Mark L Murphy	Beginning Android	Wiley India Pvt Ltd
3	Sayed Y Hashimi and Satya Komatineni	Professional Android	Wiley India Pvt Ltd

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED:

S. No.	Name of equipment	Brief specification
1	Desktop Computer	i5 processor or higher,4gb RAM
2	Android Open Source Project, Android SDK, Eclipse Environment	Android Open Source Project, Android SDK, Eclipse Environment with latest versions

12. LIST OF LEARNING WEBSITES

1. Developing Android Apps- Udacity https://www.udacity.com/course/ud853
2. Build your firs App http://developer.android.com/training/basics/firstapp/index.html
3. Android App Development Tutorial http://www.codelearn.org/android-tutorial
4. ADT Plugin http://developer.android.com/tools/sdk/eclipse-adt.html
5. Installing the Eclipse Plugin http://developer.android.com/sdk/installing/installing-adt.html
6. Eclipse Download https://www.eclipse.org/downloads/

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

Sr.No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
CO1	Identify the role of Android framework in android platform for mobile application development.	2	2	2	1	-	-	-	-	-	-	2	-
CO2	Develop Android user interface Layout	2	3	2	-	-	-	-	-	-	-	-	-
CO3	Develop interactive event driven mobile application.	1	3	3	-	-	-	-	-	-	-	-	3
CO4	Develop an applications using menus and dialog boxes using SQlite databases	1	2	2	-	-	-	-	-	-	-	-	3
CO5	Find the error handling using exception with examples	-	3	3	-	-	-	-	-	-	-	-	3

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	S.M. Bankar	Lecturer in Computer Engineering
2	P.B. Lahoti	Head of the Department Computer Engineering

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE **INDUSTRIAL ORGANIZATION AND MANAGEMENT**

COURSE CODE **6G305**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
ME/EE/CE/AE/ET/CO/IT	Fifth / Sixth

1. RATIONALE

Diploma graduate works at middle management level in the industries/engineering organizations. Therefore he has to be proficient in planning, organizing & coordinating various activities of industries/ organizations or when he is required to work in different types of projects. They are also expected to deal with workforce and management problems. In the present era of competition, optimum utilization of the resources with achieving higher productivity is essential for any industry to survive. Quality and cost controls are also other important factors which contribute to the day to day supervision issues. This course aims to deal effectively with such issues along with familiarization of acts and laws applied to industries.

2. COMPETENCY

At the end of studying this course students will be able to

"Plan, organize and Coordinate various activities/ processes in industry/projects by ensuring optimal use of resources"

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE@ (PR/OR)	PA (TW)	125
03	-	02	05	80	20	-	25	
Duration of the Examination (Hrs)				02 (Online Exam)	01	-	-	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term. Work, # External, @ Internal,~ Online Examination.

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Identify the different sector and industry of given company name.
2. Plan, organize and Coordinate various activities in industry or a project.
3. Ensure proper management of human resources.
4. Identify the need of finance and its optimal use in an organization.
5. Manage materials &stores.
6. Apply PERT/CPM method for project scheduling of given project
7. Apply marketing strategies to promote the sales & services.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics **(Containing POs and PSOs assignment in each Sub-topic)**
Unit 1 Business overview	1a Classify businesses. 1b Outline the impact of Globalization and IPR on business. 1c Identify& need of e-commerce.	1.1 Type of sectors. Service, Manufacturing, Trade. 1.2 Globalization and IPR- Introduction, Advantage and Disadvantage w.r.t India. 1.3 e - Commerce: Merits and Demerits.
Unit 2 Evolution of Scientific Management.	2a Outline the historical perspective of management. 2b Identify the functions of management. 2c Develop organization structure. 2d Select appropriate form of ownership.	2.1 Evolution of management thoughts. 2.2 Definition of management, Levels of management. 2.3 Scientific management by F W Taylor. 2.4 Administration Vs. Management 2.5 Henry Fayol's 14 Principles of management. 2.6 Functions of management - Planning, Organizing, Staffing, Directing & controlling 2.7 Types of organization- Line, Line & Staff, Functional & Project. 2.8 Centralization and Decentralization. 2.9 Forms of Ownership- Proprietorship, Partnership, Joint Stock Company, Co-operative society & Government Sector.
Unit 3 Personnel Management & Legislative Act.	3a Identify & develop human resource 3b Apply strategies of motivation. 3c Practice safety procedure 3d Identify the features of industrial	3.1 Definition, Objectives and Function of Personnel management 3.2 Recruitment & Selection Procedure 3.3 Training & its type: Induction, Skill Enhancement & Motivational Training. 3.4 Leadership & its styles.

	acts.	3.5 Motivation-Definition, its type & Maslow Theory 3.6 Safety management: Causes of Accident and Safety procedure 3.7 Salient Features of (Introduction, Objective, Scope, Important definition & Related provision) 1 Indian Factory act 1948. 2 Industrial dispute acts 1947. 3 Workmen compensation act 1923. 4 The employees state insurance Act 1948. 5 Contract Labour Act.
Unit 4 Financial Management	4a Identify sources of finance 4b Prepare budget. 4c Acquaint with prevailing taxation policy.	4.1 Objectives & Functions of financial management. 4.2 Capital, Types of Capitals-Fixed & Working Capital 4.3 Direct Cost & Indirect Cost 4.4 Sources of raising Capital- Internal & External sources. 4.6 Introduction of budget & budgetary control. 4.7Production Budget (including Variance Report) 4.8Labour Budget 4.9Introduction to Profit & Loss Account (only concepts) 4.10Introduction of Income Tax & GST (Good & Service Tax)
Unit 5 Materials Management	5a. Plan Inventory for processes. 5b. Calculate EOQ. 5c. Practice purchase procedure.	5.1 Objective and function of material management. 5.2 Inventory – Concept, its Classification & Objective. 5.3 Economic Order Quantity (EOQ) - Concept & Graphical Representation. 5.4 ABC Analysis- Definition & Step of ABC Analysis. 5.5 Purchase Procedure 5.6 Overview of ERP, JIT, 5's, Kaizen& six sigma (Introduction, Objective & Benefit).
Unit 6 Project Management	6a Use CPM/PERT for project scheduling for execution. 6b Track the project with the help of project management techniques.	6.1 Introduction of Project Management, project Network Analysis 6.2 Concept and introduction of CPM/PERT. 6.3 Solving simple network using CPM/ PERT 6.4 Concept of Breakeven analysis.

		6.5 Progress tracking charts-bar charts, Gantt charts and histogram.
Unit 7 Marketing Management	7a. Apply marketing strategies.	7.1 Objective & Function of marketing management 7.2 Sellers and Buyers markets, Marketing, Sales, Selling vs. Marketing, Sales promotion, Marketing Mix, Pricing Policies. 7.3 Marketing Strategies: Segmentation, Targeting & Positioning. 7.4 Marketing Information System.

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Business Overview	03	02	04	00	06
II	Evolution of Scientific Management	09	04	10	00	14
III	Personnel Management & Legislative Act	11	04	10	04	18
IV	Financial Management.	07	04	06	02	12
V	Materials Management	06	04	04	02	10
VI	Project Management	07	02	06	04	12
VII	Marketing Management	05	02	04	02	08
	Total	**48**	**22**	**44**	**14**	**80**

Legends: *R– Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

The practical/exercises should be properly designed and implemented with an attempt to develop different types of skills **(outcomes in psychomotor and affective domain)** so that students are able to acquire the competencies/ programme outcomes. Following is the list of practical exercises for guidance.

Faculty should refer to that common list and should ensure that students also acquire outcomes in affective domain which are required for overall achievement of Programme Outcomes/Course Outcomes.

The tutorial/practical/exercises should be properly designed and implemented with an attempt to develop different types of cognitive and practical skills **(Outcomes in cognitive, psychomotor and affective domain)** so that students are able to acquire the competencies.

1. Identify the different sector and industry of given company name.
2. Plan, organize and Coordinate various activities in industry or a project.
3. Ensure proper management of human resources.
4. Identify the need of finance and its optimal use in an organization.
5. Manage materials &Stores.
6. Apply PERT/CPM method for project scheduling of given project
7. Apply marketing strategies to promote the sales &services.

S. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
		Part A- Common to all Programme	
1.	I	To collect data / information and prepare report about business/organization and identify the nature of business and prepare organization structure.	04
2.	III	Identify and propose Safety requirements/ mechanism for an industry.	04
3	V	Prepare a report of inventory by visiting stores of an industry/organization.	02
4	VI	Prepare network diagram using CPM& PERT (3-4 networks each) for identified Projects	04
5.	IV/VII	Undertake Survey/Data Collection, Presentation and Data interpretation for following. (Any One) a. Sales Promotion. b. Channel of Distribution	04

		c. Capital Generation & Management	
		Part B- Programme Specific Practical for CO/IT/ET/EE/ME/AE (Five Numbers)	
6	III	Prepare a report on Human Resource (HR) policies used in Multinational companies	02
7	IV	Give presentation (PPT) on various Financial budgets of any company	02
8	IV/V/VII	Data collection on i) GST ii) Six sigma iii) Market segmentation	02
9	VII	Discuss Global marketing strategies by making small presentation (PPT).	04
10	All Units	Micro Project (visit to an industry, observe & prepare a report on various management techniques adopted by the	04
Total			**32Hrs**
		Part B- Programme Specific Practical for Civil Engineering (Five Numbers)	
6	III	Prepare a small report on Human Resource (HR) policies used in any Multinational companies/infrastructure development company/manufacturing of civil engineering materials.	02
7	VI	Prepare a bar chart of construction activities of bunglow / residential building.	02
8	V	Study and collection of various records pertaining to store like Goods received sheet, store indent, priced store ledger, register of materials at site account, statement of receipts, issues& balance of road metals, cement register etc.	02
9	II/III/V	Group Discussions and report writing on (Any one form following or likewise) 1) Modern Techniques of material Management 2) Causes of Accident and safety management. 3) Production and Labour budget	04
10	All Units	Micro Project (visit to an PWD/WRD/Large private construction organization/infrastructure development company to observe & prepare a report on construction management techniques/working adopted by the organization)	04

Total	**32Hrs**

8. SUGGESTED STUDENTS ACTIVITIES

Sr No	Activities
1	Prepare a group of five students and write qualities of a good leader.
2	Prepare a group of 10 students and conduct a group activity like housekeeping of a class room.
3	Draw a network for given set of activities and identify the critical path
4	Calculate the total time required to accomplish a task when t_e, t_p and t_m is given.
5	Visit to nearest ESIC office and collect information about services provided by ESIC office to the working employees.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

Sr No.	Unit no.	Unit name	Strategy
1	1	Business Overview	Live explanation, videos.
2	2	Evolution of Scientific Management	Live explanation, , case study
3	3	Personnel Management & Legislative Act	Live explanation, movie, case study
4	4	Financial Management.	Case study, survey, industrial visits
5	5	Materials Management	Net survey, Case study, industrial visits
6	6	Project Management	Net survey, Case study, industrial visits
7	7	Marketing Management	Net survey, Case study, industrial visits

10. SUGGESTED LEARNING RESOURCE

Sr No.	Title of Book	Author	Publication
1.	Industrial Organization and Management	O.P.Khanna,	DhanpatRai and Sons
2.	Industrial Organization and Management	Banga and Sharma,	Khanna Publications

3.	Modern Business Organization & Management	S.A.Sherlekar& V.A. Sherlekar,	Himalaya Publications

11. LEARNING WEBSITE & SOFTWARE

1. https://mitpress.mit.edu
2. http://iveybusinessjournal.com/publication/a-new-role-for-management
3. https://en.wikipedia.org/wiki/Project_management
4. http://www.pmi.org.in/

12. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs)WITH COURSE OUTCOMES (COs)

SRNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Identify the different sector and industry of given company name.	-	-	-	-	3	-	-	1	-	-	3	-
2	Plan, organize and Coordinate various activities in industry or a project	3	3	2	-	3	-	-	1	-	-	3	-
3	Ensure proper management o human resources.	2	3	-	2	3	-	-	1	-	-	2	2
4	Identify the need of finance and its optimal use in an organization	3	3	-	2	-	-	-	-	-	1	3	3
5	Manage materials & Stores	2	3	-	3	-	-	-	-	-	-	3	-
6	Apply PERT/CPM method for project scheduling of given projec	1	3	-	3	-	-	-	-	-	2	3	2
7	Apply marketing strategies to promote the sales &services.	-	3	-	3	-	-	2	2	-	2	3	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	A. B. Deshpande	Lecturer in Mechanical Engineering, Govt. Polytechnic, Aurangabad
2	K.S. Borde	Lecturer in Civil Engineering, Govt. Polytechnic, Aurang

3.	P.B. Lahoti	Lecturer in Computer Engineering, Govt. Polytechnic, Aurangabad

COURSE TITLE- **ADVANCE MICROPROCESSOR AND MICROCONTROLLER**

COURSE CODE **6P401**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering	Fifth

1. RATIONALE

Advanced Microprocessor & Microcontroller is applied level course aims for interfacing of various peripheral elements with microcontroller to design an automated system. This course covers introduction to families of microprocessors from 32 bit 64 bit and embed C programming environment to control peripheral devices.

2. COMPETENCY

At the end of studying this course students will be able to

"Develop interface between microprocessor and microcontroller"

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (OR)	PA (TW)	175
04	-	02	06	80	20	#25	50	
Duration of the Examination (Hrs)				03	01	02	--	

Legends : L-Lecture**; T**-Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Identify architecture of 80286 and 80386 microprocessors feature.
2. Examine architecture of Pentium microprocessors.
3. Develop program in assembly language using different functions of DOS and BIOS interrupt.
4. Compare and contrast microprocessor and microcontroller.
5. Develop C program for 8051 counter and timer.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit - I **32 bit Microprocessor: 80286 & 80386**	1.a State any four salient features of 80286 & 80386. 1.b Explain privileges of 80286 microprocessor. 1.c Describe paging concept used in 80386 microprocessor.	1.1 80286: Salient feature, Internal architecture, Register organization (General purpose register, Segment register, status and control register, instruction pointer, segment descriptor cache register), Addressing mode such as Real, Protected Virtual Addressing mode, privilege, protection. (PO2, PO3, PO4) 1.2 80386: Salient feature, Internal architecture, Register organization (General-purpose register, segment register, status and control register, instruction pointer), Addressing modes of 80386, real, PVAM, paging, virtual 8086 mode. (PO2, PO3, PO4)
Unit - II **Introduction to Pentium Processor**	2.a Give salient feature of Pentium 2.b Explain floating point exception.	2.1. Salient features of 80486 (PO2) 2.2. Salient features of Pentium, System architecture (Super-scalar Execution, Separate code & data cache, Floating Point Exceptions, Branch prediction. (PO2)
Unit - III **Interrupts of X86**	3.a. Develop program on INT	3.1. Introduction to X86 interrupts (Hardware, software and exceptions),

microprocessor	16H. 3.b. Explain Interrupt vector table.	Interrupt vector table, Interrupt processing sequence. (PO2, PO3) 3.2. Hardware or exception interrupts (Singles step, divide by zero/overflow, non-maskable, breakpoint, overflow) software interrupts (INT, INTO instructions) (PO2,PO3, PO4) 3.3. Introduction to.com and .exe programs, DOS & BIOS Interrupts- INT 21H, INT 25H, INT 26H, INT 10H, INT 16H, INT 17H. (PO2,PO3,PO4)
Unit - IV **8051 Microcontroller**	4.a. Differentiate microprocessor and microcontroller. 4.b. Draw and explain PSW of 8051 microcontroller. 4.c. Explain memory organization of 8051.	4.1. Introduction, Comparison with Microprocessor, Evolution of Microcontroller, Microcontroller and embedded systems (PO2) 4.2. Microcontroller selection criteria 4.4 Architecture and Block Diagram of 8051, Flag bits and PSW, ROM memory space allocation, RAM memory space allocation. (PO2) 4.3. Pin diagram of 8051, Addressing modes, Memory organization of 8051. (PO2)
Unit - V **8051 Programming in C**	5.a. Classify data types in 8051 C. 5.b. Explain modes of timer. 5.c. Write a program for time delay generation using loop and timer of 8051.	5.1. Bit Addresses of I/O and RAM (PO2) 5.2. Data types in 8051 C, Time delay in 8051 C, I/O programming, Logic operations, Data conversion. (PO2,PO3) 5.3. Accessing Code ROM Space, Data Serialization, Registers for Timer Programming.(PO2,PO3,PO4) 5.4. Modes of Timers, Counter

		Programming, Programming Timers of 8051. (PO2,PO3,PO4) 5.5. Execution of program using cross compiler like Keil IDE, SPJ, RIDE. (PO2,PO3,PO4)

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
1	32 bit Microprocessor: 80286 & 80386	20	08	16	00	24
2	Introduction to Pentium Processor	08	06	04	00	10
3	Interrupts of X86 microprocessor	12	04	06	04	14
4	8051 Microcontroller	10	06	06	02	14
5	8051 Programming in C	14	04	08	06	16
Total		**64**	**28**	**40**	**12**	**80**

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	1	Develop a program to display the status of Flag register and Machine Status Word register of 286 on the screen	02
2.	1	Develop a program to display the status of Flag register and Machine Status Word register of 386 on the screen.	02
3.	2	Develop a program to demonstrate CPUID instruction of Pentium Processor	02
4.	3	Develop a program to display the status of keys described in 02H functions of BIOS INT 16H.	02

5.	3	Develop a program to read password & validate the user with the help of DOS INT 21H functions.	04
6.	3	Develop a program to 1. Scroll Screen up (use of function-06H of DOS INT 10H) 2. Scroll Screen down (use of function-07H of DOS INT 10H)	02
7.	3	Develop a program to 1. Delete file (use of function-41H of DOS INT 21H) 2. Rename file (use of function-56H of DOS INT 21H)	04
8.	3	Develop a program to 1. Set/Get file attribute (use of function-43H of DOS INT 21H) 2. Set/Get file time & date (use of function-57H of DOS INT 21H)	02
9.	3	Develop a program to 1. Create/Make directory (use of function-39H of DOS INT 21H) 2. Delete/Remove Directory (use of function-3AH of DOS INT 21H)	04
10.	4	Develop a program for different C data types for 8051.	02
11.	5	Develop a program for time delay generation using loop and timer of 8051.	02
12.	6	Develop a Program to toggle bits of P1 continuously forever with some delay.	02
13.	6	Develop a program to send out the value 44H serially one bit at a time via P1.0. The MSB should go out first.	02
Total			**32**

8. SUGGESTED STUDENTS ACTIVITIES

Other than class room and laboratory activities following are the suggested guided co-curricular student's activities which need to be undertaken to facilitate the attainment of various course outcomes of this course. The students are required to maintain portfolio of their experiences which he/ she will submit at the end of the term.

a. Develop programs related with unit wise topics in computer laboratory.

b. Develop any module of to be useful in real life application.

c. Multimedia presentation of module developed by students.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods

b. Q & A technique.

c. Activity based learning

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	A. K. Ray. K. M. Bhurchandi	Advanced microprocessor & peripheral	TATA McGraw Hill
2.	Peter Abel	IBM PC Assembly Language and Programming	Prentice Hall India
3	Douglous Hall	Microprocessor & Interfacing	Tata -McGraw Hill
4	James L. Antanakos	The Pentium Processor	Pearson Publication
5	Muhammad Ali Mazidi,Janice Gillispie Mazidi,Rolin D. McKinlay	The 8051 Microcontroller and Embedded Systems Using Assembly and C	Pearson Education
6	Rajkamal	Embedded Systems Architecture, Programming, Design	Tata -McGraw Hill

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment	Brief specification
1.	Desktop PC	Computer Systems with minimum i-3 intel pentium processor (or equivalent) and 1 GB RAM.
2.	Tasm / Masm Software	Freeware Software
4	Keil IDE, SPJ, RIDE	Freeware Software

12. LEARNING WEBSITE & SOFTWARE

a. www.intel.com
b. www.pcguide.com/ref/CPU
c. www.CPU-World.com/Arch/
d. www.techsource .com / engineering- parts/microprocessor.html
e. http://www.embeddedindia.com/

f. http://www.esacademy.com/
g. www.EmbeddedTechJournal.com

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Identify architecture of 80286 and 80386 microprocessors feature.	-	3	3	3	-	-	-	-	-	-	-	-
2	Examine architecture of Pentium microprocessors.	-	3	-	-	-	-	-	-	-	-	-	-
3	Develop program in assembly language using different functions of DOS and BIOS interrupt.	-	2	3	2	-	-	-	-	-	-	1	1
4	Compare and contrast microprocessor and microcontroller.	-	3	-	-	-	-	-	-	-	-	2	-
5	Develop C program for 8051 counter and timer.	-	3	3	2	-	-	-	-	-	-	1	1

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	P B Lahoti	Head of the Department, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **MOBILE COMPUTING (MOC)**

COURSE CODE **6P402**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
COMPUTER ENGINEERING	FIFTH SEMESTER

1. RATIONALE

Mobile computing is applied level course that designed to needs more skilled technicians for operation, maintenance & servicing of mobile cellular system. As exponential growth in mobile computing, student needs to learn different technologies such as GSM and CDMA with their variations and the 4G. This course includes wireless communication, mobile handset, cellular concepts, VoIP, WLL, WAP and WML.

2. COMPETENCY

"Apply WAP language to operate and develop standalone mobile application."

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE @ (PR/)	PA (TW)	150
03	-	02	05	80	20	25	25	
Duration of the Examination (Hrs)				3	1	20	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

On successful completion of the course, the students will be able to:

1. Identify different mobile network architecture.
2. Troubleshoot GSM mobile handsets.

3. Identify handoff management in GSM.
4. Identify WAP model and WAP protocol.
5. Identify CDPD architecture and GPRS services.
6. Perform WML script programming.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit I Introduction to wireless communication system and mobile network Architecture	1a.Explain Evolution of mobile radio communication 1b. Explain AMPS,IS-95, GSM 1c.How cellular telephone call is made 1d.Explain principles of cellular communication. 1e .Explain 1G, 2G, 3G,4G and 5G technologies	1.1 Evolution of mobile radio communication, 1.2 Mobile radio system around the world-(Such as AMPS, NAMPS, IS-95, GSM), Related definition base station, control Channel, forward channel etc. 1.3 how cellular telephone call is made, 1.4 Principles of cellular communication, 1.5 overview of 1G, 2G, 3G,4G and 5G technologies
Unit–II Mobile Handset	2a. Explain the block diagram of mobile handset 2b. Explain the working principle of baseband section 2c. Explain the function of digital signal processing used in mobile hand set. 2d. Describe working function of charging control section 2e. Explain types of batteries used for mobile communication and their importance 2f. Differentiate various types of memories use in mobile handset 2g. Explain the subscriber identity module(SIM) pin connection 2h. Discuss the SIM card interface 2i. State the general faults occurring in mobile handset(GSM) 2j. Explain the fault finding procedure in mobile handset	2.1 Mobile handset: block diagram 2.2 Baseband section 2.3 Digital signal processor used in mobile hand set 2.4 Charging control section 2.5 Batteries 2.6 Memories 2.7 SIM card and SIM card interface 2.8 General faults and fault finding procedures
UNIT-III The cellular	3a. Explain Cellular concept 3b. What is Handoff?	3.1 Introduction a basic cellular system, 3.2 Hand off, Type of hand off, hard

concept.	3c.Explain Types of Hand off 3d.Expalin GSM architecture 3e.Explain mobility and roaming management.	hand off, soft hand off, Handoff management, 3.3 GSM architecture and mobility management, Roaming Management.
UNIT-IV Wireless Application Protocol (WAP**)**	4a. Explain WAP Model 4b. Explain WAP Gateway 4.c Explain WAP Protocol	4.1 WAP Model 4.2 WAP Gateway 4.3 WAP Protocol
UNIT-V Mobile IP protocol architecture	5a. Explain Mobile IP and IPV6 and its applications. 5.b Explain CDPD 5c.Explain GPRS service	5.1 Mobile IP and IPV6 and it's applications in mobile computing, 5.2 cellular digital packet data CDPD, VOIP, GPRS services
UNIT-VI Wireless Markup Language & script	6a.What is WML 6b. Explain fundamentals of WML 6c.Explain WML script 6d. Explain WML Script Control Structures 6E. Explain Navigating Between Cards and Decks, 6f. Explain WML Script Control Structures with an example.	6.1 An introduction to WML, 6.2 Markup languages, 6.3 fundamentals of WML, 6.4 WML script 6.5Writing and Formatting Text, Navigating Between Cards and Decks 6.6 Displaying Images, Tables 6.7 Using Variables, Acquiring User Input 6.8 An Introduction to WML Script 6.9 WML Script Control Structures, Events 6.10 validation of user input

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
1	Introduction to wireless communication system and mobile network Architecture	08	4	4	4	12
2	Mobile Handset	10	4	8	4	16
3	The cellular concept.	10	4	8	4	16
4	Wireless Application Protocol (WAP)	04	4	4	0	08
5	Mobile IP protocol architecture	08	4	4	4	12
6	Wireless Markup Language & script	08	4	4	8	16

	48	**24**	**32**	**24**	**80**

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	I	Analyze the behavior of 3G network using cellular phone on the 3G mobile trainer kit.	02
2	II	Identify and explore different sections and components of Mobile Phone Unit and Perform Installation of SIM Card in Mobile Phone	04
3	II	Analyze general fault finding procedure in GSM mobile handset.	02
4	II	Read contents of SIM card.	02
5	V	Analyze GPRS architecture and its services.	02
6	VI	Design & Develop a program to format a text.	02
7	VI	Design and develop program for navigating between cards and decks	02
8	VI	Design & Develop a program to display data in tabular format.	02
9	VI	Design & Develop a program for user input	02
10	VI	Displaying of Image using WML	02
11	VI	Design & Develop a program to handle different events.	04
12	VI	Design & Develop a program to convert currency	02
13	VI	Design & Develop a program to perform validation using WML script.	04

8. SUGGESTED STUDENTS ACTIVITIES

Following is the list of proposed student activities like:

a. Industrial visit to BTS site or MSC.

b. Workshop on mobile repair by service technician of any mobile repairing centre.

c. To explore websites to understand repairing of various mobile handsets.

d. To design and develop GSM/GPS and other wireless technology based working models.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Lecture and demonstration
b. Online animation/flash
c. Self Line learning
d. Arrange visit to nearby BTS/BSC/MSC of any service provider.
e. Power point presentations with visuals.
f. Arrange expert lectures on latest mobile communication technologies.
g. Expert video lectures on mobile technologies.
h. Faculty should allow students to use their creativity and during practical sessions let them struggle to learn on their own. However, faculty should remain around the students and should help them when they are stuck.
i. Organise workshop for repairing of mobile hand set.

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Wireless and Mobile network architecture	Yi-Bing Lin and Imrich	John Wiley & Sons
2.	Wireless communication principle & Practice	Rapport T.S.	PHI Learning, New Delhi, (Latest Edition)
3.	Mobile and Personal Communication System and Servicing	Pandya Raj	IEEE
4.	Mobile Communication	Lee C. Y.	Pearson, New Delhi (Latest Edition)
5.	Mobile Cellular Telecommunication System	Lee C.Y.	TMH, New Delhi, (Latest Edition)
6.	Wireless communication	Dalal Upena	OXFORD New Delhi,
7.	Advance Mobile Repairing	Pandit Sanjib	BPB, (Latest Edition)
8.	Mobile Communication	Schiller	PHI Learning, New Delhi, (Latest

			Edition)
9.	The beginning of WML and WML script	Wrox	Wrox publication

11. **LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED** :

S. No.	Name of equipment	Brief specification
1.	Computer systems	(P-IV and above)
2.	Nokia WAP toolkit	For windows OS
3.	Mobile Handset	-
4.	WinWap	For windows OS

12. LEARNING WEBSITE & SOFTWARE

(Please mention complete URL of the E- resource CO wise)

a. http://nptel.iitm.ac.in/courses.php?disciplineId=106
b. www.larnerstv.com
c. www.learnerstv.com

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Identify different mobile network architecture.	-	3	-	-	-	-	-	-	-	-	-	-
2	Troubleshoot GSM mobile handsets.	-	3	3	1	-	-	-	-	-	3	-	-
3	Summarize GSM architecture.	-	3	-	-	-	-	-	-	-	-	-	-
4	Summarize WAP model and WAP protocol	-	3	-	-	-	-	-	-	-	-	-	-

5	Summarize CDPD architecture and GPRS services.	-	3	-	-	2	-	-	-	-	2	-	-
6	Perform WML script programming.	-	2	2	2	-	-	-	-	-	2	1	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	O.R.Varma	Lecturer in IT Dept., Govt. Polytechnic, Aurangabad
2	P.B.Lahoti	Lecturer in CO Dept., Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **COMPUTER NETWORKS (CN)**

COURSE CODE **6P403**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
COMPUTER ENGINEERING	FOURTHSEMESTER

1. RATIONALE

Computer networks is an applied level course aims to use and share resources over the network for global connectivity. This course obtains requisite knowledge about hardware and software tools and requirements of networks to acquire skills for establishment of network. Students will learn to maintain and troubleshoot computer networks with its resources and services.

2. COMPETENCY

"Use resources and network technology to establish computer networks."

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE @ (PR/)	PA (TW)	150
4	-	2	6	80	20	25	25	
Duration of the Examination (Hrs)				3	1	20	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

On successful completion of the course, the students will be able to:

1. Identify computer network on the basis of classification and arrangement.
2. Use OSI-ISO and TCP/IP computer network models.
3. Select guided and unguided medium for given types of data transmission.

4. Configure IP address to the network and network components.
5. Identify protocols required for internet services.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit – I Network Fundamentals	1a. State the necessity of Computer Networks 1b. Discuss the applications of Computer Networks 1c. Describe the functions of various components of Computer Networks 1d. Compare various computer network topologies. 1e. Classify computer networks- Based on Transmission, scale , and Architecture 1f. Differentiate LAN, WAN,MAN 1g. Describe configuration of PAN with example 1h. State the applications service offered by WAN	1.1 Definition, Need and Advantages of Computer Networks 1.2 Applications of computer networks: Business, Industrial and home applications 1.3 Components of Computer Networks: hardware and software 1.4 Network topologies: Star, Ring, Bus, Mesh, Tree, Hybrid 1.5 Network Classification i. Based on Transmission Technologies: Point-to-point, broadcast ii. Based on scale: PAN, LAN, WAN, MAN,VPN, Internet iii. Based on Architecture: Peer to Peer, Client Server, advantages of Client Sever over Peer-to-Peer Model
Unit –II Reference Model	2a. Define the terms: Protocol, Interface, Services, Primitives, semantics, syntax 2b. Explain the need for layer modeling. 2c.Describe the functions of each layer of OSI Reference model. 2d.Describe the functions of each layer of TCP/IP Reference model. 2e. Compare the major features of OSI and TCP/IP model	2.1Terms:Protocol, Interface, Services, Primitives, semantics, syntax 2.2 The OSI-ISO Reference Model:, Brief functional description of each layers with list of protocols 2.3 The TCP/IP Reference Model: Brief functional description of each of the Layer with list of protocols
Unit –III Transmission Media and network devices	3a. Explain the characteristics of guided and unguided transmission media. 3b. Describe specifications of UTP and coaxial cable. 3c. Sketch construction details UTP and coaxial cable with	3.1 Transmission Media: Unguided and Guided media, Wired and Wireless, 3.2 Guided media :UTP, Coaxial and Fiber optical cable 3.3 Un-Guided Media: Wireless Communication–Communication

	labels. 3d. Explain functions of following network devices: Repeater, Hub, Bridge, Switch , Router, B-router, Gateway, Network Adapter, Access point, Wireless Access points	Band, Microwave Communication, Satellite Communication–Access Method, Cellular (Mobile) Telephone – Band in Cellular Telephony, Calls Using Mobile Phones, Transmitting receiving Operations, New Developments. 3.4 Network devices: Repeater, Hub, Bridge, Switch , Router, B-router, Gateway, Network Adapter, Access point, Wireless Access points
Unit – IV Internet architecture	4a. Explain IP addressing scheme with examples 4b. Distinguish various components of IP v4 and IPv6 protocol. 4c. Compare functions and services TCP and UDP 4d. Differentiate between DNS, Email and FTP 8e. Explain the working of firewall used for network security	4.1 Internet addresses: gateway addressing, network and broadcast addressing, dotted decimal notation, loopback addressing 4.2 IP layer Protocols: IPv4 and IPv6 frame Format 4.3 Connection oriented and Connectionless services, TCP and UDP frame format 4.5 Domain Name System: Introduction, mapping to IP addresses 4.6 Security –Social issues, Hacking, precautions and Firewall.
Unit-V Internet services and its applications	5a. Compare ADSL and broad band modem 5b. Classify different Internet Services 5c. Differentiate FTP and Remote login 5d. Explain how Voice and Video is transferred over IP	5.1 Cable Modem system 5.2 ADSL and broad band modem 5.3 Internet Services World Wide Web: Web browser, HTML, web servers 5.4 Electronic Mail: Functions of E-mail system, User agent, Message format , Mail Protocols (SMTP, POP3),FTP, Remote login 5.5 Voice and Video over IP 5.6 Social services :Forums, Newsgroup and blog

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
1	Network Fundamentals	14	6	5	4	15
2	Reference Model	10	4	5	4	13
3	Transmission Media	12	8	4	4	16
4	Internet architecture	16	8	8	4	20
5	Internet services and its applications	12	6	6	4	16

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	I	Prepare detailed report of existing LAN in the Department.	02
2	I	Connect computer terminal in various physical topologies and test the data transfer.	02
3	II	Install Network Interface Card with Proper Driver software to locate MAC address of Computer.	04
4	II	Execute Basic TCP/IP Utilities and Network Commands with all options.	04
5	II	Install and configure TCP/IP Protocols (Version 4 and version 6)	02
6	III	Install and configure/Test various networking devices.	02
7	III	Prepare and Test Straight UTP Cable.	02
8	III	Prepare and Test Cross UTP Cable.	02

9	IV	Install/configure/Test LAN and sharing of resources.	02
10	IV	Install/configure/Test Network operating System	02
11	IV	Set Firewall for the network security.	02
12	V	Execute Network Commands for the network control operations.	02
13	V	Install Wireshark software to capture packet and configure it to capture Ethernet Packet	04

8. SUGGESTED STUDENTS ACTIVITIES

Following is the list of proposed student activities like:

a. Prepare technical report on Current Network at your Department/ Institute.
b. Test the performance of HUB, Switches, router and Servers.
c. Project- Build a small PAN/ LAN at your Home /Community.
d. Enhance security of your network by introducing Firewall.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Lecture and demonstration
b. Online animation/flash
c. Practical exercises, LAN implementation
d. Mini project related with industrial applications and house hold applications
e. Self Line learning

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Data Communication and Networking,	Forouzan	Tata McGraw Hill, Education New Delhi (Latest edition)
2.	Computer Networks	Tannebaum Andrew S Wetherall David J	Pearson, New Delhi, 5th Edition, 2011
3.	Data and Computer Communication,	Stallings Williams	PHI Learning, New Delhi (Latest edition)
4.	Data Communication Networks	Sharma Sanjay	S.K.Kataria and Sons, New Delhi (Latest

			edition)
5.	Computer Networks	Trivedi Bhushan	Oxford University Press, New Delhi 2013

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment	Brief specification
1.	Computer systems	(P-IV and above)
2.	Network Cable	Cat 5/Cat 6.
3.	Crimping Tool	(RJ45,RJ11, Cat 5/Cat 6)
4.	UTP Cable Tester	Lan Tester
5.	Layer 2 Switch ,Hub(16 I /O)	24 port,48 port switches
6.	Wireless Access point and Wireless router	IEEE standard

12. LEARNING WEBSITE & SOFTWARE

(Please mention complete URL of the E- resource CO wise)

a. http://nptel.iitm.ac.in/courses.php?disciplineId=106
b. http://www.edrawsoft.com
c. Network Simulator Tool: GNS3 v0.8.5, NetSimK
d. www.learnerstv.com

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Identify computer network on the basis of classification and arrangement.	0	3	1	0	1	0	0	0	0	1	3	0
2	Use OSI-ISO and TCP/IP computer network models.	0	3	2	0	2	0	0	0	0	0	2	0

3	Select guided and unguided medium for given types of data transmission.	0	3	1	1	1	0	0	0	0	0	3	0
4	Configure IP address to the network and network components.	0	3	1	0	0	0	1	0	0	0	3	0
5	Identify protocols required for internet services.	0	3	0	0	2	0	0	0	0	0	3	0

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	O.R.Varma	Lecturer in IT Dept., Govt. Polytechnic, Aurangabad
2	J.P. Joshi	Lecturer in IT Dept., Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE : LINUX PROGRAMMING LAB

COURSE CODE : 6P404

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer	V

1. RATIONALE:

Linux Programming Lab is an applied level course to perform various activities on open source operating system. This course aims at extending the knowledge of open source operating system and get exposure of handling system call that directly talk to the kernel. This course includes basics of Linux operating system, system calls, Shell programming and process management.

2. COMPETENCY:

At the end of studying this course students will be able to,

"Manage and control functionality of Linux operating system"

3. TEACHING AND EXAMNATION SCHEME:

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (PR)	PA (TW)	100
1	-	4	5	--	--	# 50	50	
Duration of the Examination (Hrs)				--	--	--	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; PR-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal, ~ Online Examination.

4. COURSE OUTCOMES:

At the end of studying this course students will be able to: -

1. Identify component of Linux Operating System.
2. Perform various Linux command.
3. Develop shell script program in Linux.
4. Select proper system calls for file processing on a given problem.
5. Perform various activities related to Process Management.

5. DETAILED COURSE CONTENTS:

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit - I Introduction to LINUX operating	1a. Compare flavor of Linux Operating System. 1b. Identify Boot Loader. 1c. Modify Environment Variable. 1d. Identify GUI under Linux.	1.1 Introduction and installation, 1.2 UNIX and LINUX history, 1.3 Licensing, FSF / GNU and Open source. 1.4 Flavors of Linux Operating System, 1.5 kernel, shell and types of shells. 1.6 role of Kernel, role of shell, 1.7 Boot Loader-GRUB/LILO. 1.8 file system / directory structure, 1.9 Changing login shell, login scripts and profile, Environment Variables. 1.10 X- windows system, GUI Under LINUX.
Unit – II Commands in LINUX:	2a. Identify command structure. 2b. Arrange command output AWK programming. 2c. Use filter. 2d. Apply redirection. 2e. Select modes of vi-editor.	2.1 Command structure- ls, man, cat, cal, ps, du, df, passwd, less, more, wc, uname, who, tty, cpio, pr ,ifconfig, netstat, nslookup, tar, find, chmod, chown, su, diff, cmp, cp, mv, rename, crontab, iptables, mkdir. 2.2 Filter and redirection: head, tail, cut, paste, sort, uniq, tee, grep, pipe, and Input, Output and error redirection, awk, sed. 2.3 Creating and viewing files: using the Vi editor, modes.
Unit - III Shell Programming	3a. Use shell script in Linux. 3b. Use control structure. 3c. Generate series using function recursion.	3.1 Introduction to shell scripts, variable, expr command. 3.2 Control structure: if, test, for, while, case. 3.3 Command Line Parameters. 3.4 Creating functions, Array variable, Function Recursion.
Unit - IV Internal Representation of file and System calls	4a. Compare Inode and In-core Inode. 4b. Identify structure of superblock. 4c. Use System calls.	4.1 I-node, directory. 4.2 structure of regular file, superblock. 4.3 direct and indirect block of inodes. 4.4 File system calls- open, create, read, write, fseek, dup, pipe, chdir, chown, stat.
Unit - V Linux Process and Thread	5a. Modify process state using system calls. 5b. Utilize resources of system. 5c. Compare process and thread. 5d. Identify Thread APIs.	5.1 Process – Process concept, Kernel support for process, process attributes, process control - process creation, waiting for a process, process termination, zombie process, orphan process, 5.2 Multithreaded Programming: Differences between threads and processes. 5.3 Thread structure, Lightweight Processes, POSIX Thread APIs, and Creating Threads.

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
I	Introduction to LINUX operating	3	NOT APPLICABLE			
II	Commands in LINUX	4				
III	Shell Programming	3				
IV	Internal Representation of file and System calls	3				
V	Linux Process and Thread	3				
	Total	**16**				

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIMENTS/ TUTORIALS :

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	I	Install Linux Operating System (CentOS/Fedora/Ubuntu)	4
2	I	Modify GRUB configuration file to change boot order.	2
3	I	Set the environment variable for reference in a shell script program. (JAVA_HOME, PATH, CATALINA_HOME)	2
4	II	Execute following commands for file manipulation- ls, cat, copy, rename, rm, mv, comm, diff, cmp, tar.	4
5	II	Execute following commands for display and manipulate system information- who, tty, cpio, df, ifconfig, netstat, ps, iptables.	4
6	II	Execute following commands for desired output- head, tail, cut, paste, sort, uniq, pr, tee, grep, pipe, Input Redirection (0<), Output Redirection (1>) and Error Redirection (2>).	4
7	II	Operate different modes of vi-editor (input mode, command mode) to use functionality of vi-editor.	2
8	II	Write and execute Sum of column value using awk script.	2
9	III	Write and execute Shell script to calculate the gross salary.	2
10	III	Write and execute tests connectivity with the PCs whose IPs are provided as command line parameters.	2
11	III	Write and execute Shell script to check whether the given number is prime or not.	2
12	III	Write and execute Shell Script to Find Armstrong Numbers between Ranges.	2
13	III	Write and execute Shell script, which receives two filenames as arguments. It checks whether the two files contents are same or not.	2
14	III	Write and execute checks disk space and store the value to the variable and display it.	2
15	IV	Execute program to display file information (inode) of given file (stat system call).	4
16	IV	Execute program for output redirection using dup system call.	4
17	IV	Execute program to read file from end to start (reverse order) using fseek system call.	4
18	IV	Execute program for inter process communication using pipe system call.	4
19	V	Execute program for process creation using fork( ) system call.	2
20	V	Execute program for process creation using fork( ) and execl( ) system call.	2
21	V	Execute program for process termination using exit( ) system call, zombie process, orphan process.	4

22	V	Execute program to sending a signal to parent process (wait ( ) system call).	4
TOTAL			64

8. SUGGESTED STUDENTS ACTIVITIES:

Other than class room and laboratory activities following are the suggested co-curricular students activities which need to be undertaken to facilitate the attainment of various course outcomes of this course. The students are required to maintain portfolio of their experiences.

SR. NO.	ACTIVITY
1	Download Linux source code from kernel.org and add new system call into source code then compile it.
2	For Given problem suggest appropriate System calls.
3	Collect source code of file related system calls.

.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES:

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-
b. Q & A technique.
c. Demonstration.
d. Activity based learning.
f. Use of video, animation films to explain concepts, facts and applications of Linux Programming.

10. SUGGESTED LEARNING RESOURCE:

S.No.	Name of Book	Author	Publication
1	Linux: Command Line and Shell Scripting	Richard Blum	Wiley India
2	Linux : Complete Reference	Richard Pearson	Tata McGraw Hill
3	Easy Linux Commands	Jon Emmons Terry Clark	SPD Publications
4	Beginning Linux Programming	Neil Mathew, Richard Stones	Wrox Publications
5	Unix Concepts and Applications	Sumitabha Das	McGraw-Hill Education
6	The Design of the Unix Operating System	Maurice J. Bach	PHI
7	Red Hat Linux- A bible	Christophe Negus	Tech Media SAMS

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED:

Sr. No.	Name of equipment	Brief specification
1	Computer System	Computer System with latest configuration.
2	Linux	Fedora/Ubuntu/Centos.

12. LEARNING WEBSITE & SOFTWARE:

1. http://nptel.ac.in/courses/106108101/
2. https://onlinecourses.nptel.ac.in/noc17_cs29/preview
3. https://computer.howstuffworks.com/operating-system.htm
4. https://www.whoishostingthis.com/resources/linux-programming/
5. http://www.freeos.com/guides/lsst/

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs) :

Sr. No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Identify component of Linux Operating System.	2	2	2	2	-	-	-	-	-	2	2	-
2	Perform various Linux command.	2	2	1	-	-	-	-	-	-	2	2	1
3	Develop shell script program in Linux.	2	1	2	-	-	-	-	-	-	2	2	2
4	Select proper system calls for file processing on a given problem.	2	2	1	-	-	-	-	-	-	1	1	2
5	Perform various activities related to Process Management.	2	2	2	-	-	-	-	-	-	1	1	1

Course Curriculum Design Committee:

Sr No	**Name of the faculty members**	**Designation and Institute**
1	Jitendra Joshi	Lecturer in Information Technology, Govt. Polytechnic, Aurangabad
2	Pawan Lahoti	Lecturer in Computer Engineering, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE : LINUX PROGRAMMING LAB

COURSE CODE : 6P404

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer	V

1. RATIONALE:

Linux Programming Lab is an applied level course to perform various activities on open source operating system. This course aims at extending the knowledge of open source operating system and get exposure of handling system call that directly talk to the kernel. This course includes basics of Linux operating system, system calls, Shell programming and process management.

2. COMPETENCY:

At the end of studying this course students will be able to,

"Manage and control functionality of Linux operating system"

3. TEACHING AND EXAMNATION SCHEME:

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (PR)	PA (TW)	125
1	-	4	5	--	--	# 50	75	
Duration of the Examination (Hrs)				--	--	--	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; PR-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal, ~ Online Examination.

4. COURSE OUTCOMES:

At the end of studying this course students will be able to: -

1. Identify component of Linux Operating System.
2. Perform various Linux command.
3. Develop shell script program in Linux.
4. Select proper system calls for file processing on a given problem.
5. Perform various activities related to Process Management.

5. DETAILED COURSE CONTENTS:

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit - I Introduction to LINUX operating	1a. Compare flavor of Linux Operating System. 1b. Identify Boot Loader. 1c. Modify Environment Variable. 1d. Identify GUI under Linux.	1.1 Introduction and installation, 1.2 UNIX and LINUX history, 1.3 Licensing, FSF / GNU and Open source. 1.4 Flavors of Linux Operating System, 1.5 kernel, shell and types of shells. 1.6 role of Kernel, role of shell, 1.7 Boot Loader-GRUB/LILO. 1.8 file system / directory structure, 1.9 Changing login shell, login scripts and profile, Environment Variables. 1.10 X- windows system, GUI Under LINUX.
Unit – II Commands in LINUX:	2a. Identify command structure. 2b. Arrange command output AWK programming. 2c. Use filter. 2d. Apply redirection. 2e. Select modes of vi-editor.	2.1 Command structure- ls, man, cat, cal, ps, du, df, passwd, less, more, wc, uname, who, tty, cpio, pr ,ifconfig, netstat, nslookup, tar, find, chmod, chown, su, diff, cmp, cp, mv, rename, crontab, iptables, mkdir. 2.2 Filter and redirection: head, tail, cut, paste, sort, uniq, tee, grep, pipe, and Input, Output and error redirection, awk, sed. 2.3 Creating and viewing files: using the Vi editor, modes.
Unit - III Shell Programming	3a. Use shell script in Linux. 3b. Use control structure. 3c. Generate series using function recursion.	3.1 Introduction to shell scripts, variable, expr command. 3.2 Control structure: if, test, for, while, case. 3.3 Command Line Parameters. 3.4 Creating functions, Array variable, Function Recursion.
Unit - IV Internal Representation of file and System calls	4a. Compare Inode and In-core Inode. 4b. Identify structure of superblock. 4c. Use System calls.	4.1 I-node, directory. 4.2 structure of regular file, superblock. 4.3 direct and indirect block of inodes. 4.4 File system calls- open, create, read, write, fseek, dup, pipe, chdir, chown, stat.
Unit - V Linux Process and Thread	5a. Modify process state using system calls. 5b. Utilize resources of system. 5c. Compare process and thread. 5d. Identify Thread APIs.	5.1 Process – Process concept, Kernel support for process, process attributes, process control - process creation, waiting for a process, process termination, zombie process, orphan process, 5.2 Multithreaded Programming: Differences between threads and processes. 5.3 Thread structure, Lightweight Processes, POSIX Thread APIs, and Creating Threads.

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
I	Introduction to LINUX operating	3	NOT APPLICABLE			
II	Commands in LINUX	4				
III	Shell Programming	3				
IV	Internal Representation of file and System calls	3				
V	Linux Process and Thread	3				
	Total	**16**				

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIMENTS/ TUTORIALS :

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	I	Install Linux Operating System (CentOS/Fedora/Ubuntu)	4
2	I	Modify GRUB configuration file to change boot order.	2
3	I	Set the environment variable for reference in a shell script program. (JAVA_HOME, PATH, CATALINA_HOME)	2
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11	III	Write and execute Shell script to check whether the given number is prime or not.	2
12	III	Write and execute Shell Script to Find Armstrong Numbers between Ranges.	2
13	III	Write and execute Shell script, which receives two filenames as arguments. It checks whether the two files contents are same or not.	2
14	III	Write and execute checks disk space and store the value to the variable and display it.	2
15	IV	Execute program to display file information (inode) of given file (stat system call).	4
16	IV	Execute program for output redirection using dup system call.	4
17	IV	Execute program to read file from end to start (reverse order) using fseek system call.	4
18	IV	Execute program for inter process communication using pipe system call.	4
19	V	Execute program for process creation using fork( ) system call.	2
20	V	Execute program for process creation using fork( ) and execl( ) system call.	2
21	V	Execute program for process termination using exit( ) system call, zombie process, orphan process.	4

22	V	Execute program to sending a signal to parent process (wait ( ) system call).	4
TOTAL			64

8. SUGGESTED STUDENTS ACTIVITIES:

Other than class room and laboratory activities following are the suggested co-curricular students activities which need to be undertaken to facilitate the attainment of various course outcomes of this course. The students are required to maintain portfolio of their experiences.

SR. NO.	ACTIVITY
1	Download Linux source code from kernel.org and add new system call into source code then compile it.
2	For Given problem suggest appropriate System calls.
3	Collect source code of file related system calls.

.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES:

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-
b. Q & A technique.
c. Demonstration.
d. Activity based learning.
f. Use of video, animation films to explain concepts, facts and applications of Linux Programming.

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S.No.	Name of Book	Author	Publication
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2	Linux : Complete Reference	Richard Pearson	Tata McGraw Hill
3	Easy Linux Commands	Jon Emmons Terry Clark	SPD Publications
4	Beginning Linux Programming	Neil Mathew, Richard Stones	Wrox Publications
5	Unix Concepts and Applications	Sumitabha Das	McGraw-Hill Education
6	The Design of the Unix Operating System	Maurice J. Bach	PHI
7	Red Hat Linux- A bible	Christophe Negus	Tech Media SAMS

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED:

Sr. No.	Name of equipment	Brief specification
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2	Linux	Fedora/Ubuntu/Centos.

12. LEARNING WEBSITE & SOFTWARE:

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2. https://onlinecourses.nptel.ac.in/noc17_cs29/preview
3. https://computer.howstuffworks.com/operating-system.htm
4. https://www.whoishostingthis.com/resources/linux-programming/
5. http://www.freeos.com/guides/lsst/

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs) :

Sr. No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Identify component of Linux Operating System.	2	2	2	2	-	-	-	-	-	2	2	-
2	Perform various Linux command.	2	2	1	-	-	-	-	-	-	2	2	1
3	Develop shell script program in Linux.	2	1	2	-	-	-	-	-	-	2	2	2
4	Select proper system calls for file processing on a given problem.	2	2	1	-	-	-	-	-	-	1	1	2
5	Perform various activities related to Process Management.	2	2	2	-	-	-	-	-	-	1	1	1

Course Curriculum Design Committee:

Sr No	**Name of the faculty members**	**Designation and Institute**
1	Jitendra Joshi	Lecturer in Information Technology, Govt. Polytechnic, Aurangabad
2	Pawan Lahoti	Lecturer in Computer Engineering, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **INFORMATION STORAGE MANAGEMENT SYSTEM (ISMS)**

COURSE CODE **6P405**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering	Six

1. RATIONALE

Information Storage Management System is a applied level course aims to recognize the importance of Storage, Evolution of Storage Technology, Data and Information, Structured and Unstructured Information, Information Life cycle Management. This course gives insight to protect data, RAID, RAID levels, Implementation of Software and Hardware RAID, RAID Impact on Disk Performance.

2. COMPETENCY

After learning this course student will be able to

- **"Corporate governance, human resource management, product development and marketing will all have an important role to play in strategic ways, and we must not see one domain of activity alone as the sole source of strategic success.."**

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE @ (OR)	PA (TW)	150

3	2	-	05	80	20	25	25	
Duration of the Examination (Hrs)				3	1	2	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, PR- Practical Examination, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Select storage design based on given application
2. Identify given Raid and observe their impact on performance
3. Select fiber channel protocol stack, layers, services and ISCI
4. compare backup methods and replication, Advantages of object storage device, their key features
5. Use steps for business continuity planning for storage in an enterprise.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit – I Introduction to Storage Management	1a. Explain Storage Architecture 1b.State & explain type of Virtualization and Cloud Computing 1c. Data Centre Infrastructure. 1d.Describe Data Centre Environment.	1.1 Information Storage, 1.2 Evolution of Storage Architecture, 1.3 Data Centre Infrastructure, 1.4 Virtualization and Cloud Computing. 1.5 Data Centre Environment: Application, DBMS, Host, Connectivity, Storage, Disk Drive Components, Disk Drive Performance, Host Access to Data, Direct-Attached Storage, Storage Design Based on Application, Disk Native Command Queuing, Introduction to Flash Drives.
Unit -II Data Protection	2a Explain working of Logic Gates	2.1 RAID Implementation ,Methods, 2.2 Array Components, Techniques,

	2b Construct logical circuit using gates. 2a. Optimize logical circuit.	Levels, Impact on Disk Performance, Comparison, Hot Spares. 2.3 Intelligent Storage System: Components, Storage Provisioning, Types. (PO2)
Unit III: Fiber Channel Storage Area Networks	3a. FC Topologies 3b. Classify Login Types 3c.Explain Network-Attached Storage 3d. Which Factors Affecting NAS Performance.	3.1 FC Overview, Evolution, Components, FC Connectivity, Ports, FC Architecture, Fabric Services, Login Types, Zoning, FC Topologies, Virtualization in SAN.IP SAN and FCoE: iSCSI, FCIP, FCoE. 3.2 Network-Attached Storage: Benefits, Components, NAS I/O Operation, Implementations, File Sharing , Protocols, I/O Operations, Factors Affecting NAS Performance, File-Level Virtualization
Unit IV: Object Based and Unified Storage	4a State need of Backup Archive and Replication 4b Implement Use Cases 4c ExplainContent Addressed Storage, CAS .	4.1 Object Based Storage Devices, 4.2 Content Addressed Storage, CAS 4.3 Use Cases, Unified Storage. 4.4 Backup Archive and Replication
Unit V: Business Continuity	5a Explain Planning Lifecycle 5b Need of Securing the Storage Infrastructure 5c Give Challenges, Information Lifecycle Management	5.1 Information Availability, Terminology, 5.2 Planning Lifecycle, Failure Analysis, Impact Analysis, Solutions. 5.3 Securing the Storage Infrastructure: Framework, Risk Triad, 5.4 Domains Managing the Storage Infrastructure: 5.4.1Monitoring, Management Activities, 5.4.2Management Challenges, Information Lifecycle, Management, Storage , Tiering.

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit	Title Of Unit	Teaching	Distribution Of Theory Marks

No		Hours	R level	U Level	A Level	TOTAL
I	Introduction to Storage Management	10	06	06	04	16
II	Data Protection	08	02	06	06	14
III	Fiber Channel Storage Area Networks	12	06	06	08	20
IV	Object Based and Unified Storage	06	02	04	04	10
V	Business Continuity	12	06	08	06	20
Total		**48**	**22**	**30**	**28**	**80**

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	I	Learn information storage types & Evolution storage technologies	02
2	I	Analyze Data Centre Environment.	04
3	II	Learn implementation of RAID & Classification RAID Levels	02
4	II	RAID impact performance Analysis	04
5	III	Learn SAN its Evolution & Learn Components of SAN	02
6	III	FC connectivity & Learn Fiber Channel Architecture & FC Topologies	04
7	IV	Learn the types of Archives & Learn features & Benefits of CAS	02
8	IV	Architecture of CAS & Learn Object Storage & Retrieval in CAS & AN Example case Study on CAS	02
9	V	What is the data center infrastructure & To learn Challenges information management and Life cycle	02
Total			**32**

8. SUGGESTED STUDENTS ACTIVITIES

Other than class room and laboratory activities following are the suggested guided co-curricular students activities which need to be undertaken to facilitate the attainment of various course outcomes of this course. The students are required to maintain portfolio of their experiences which he/ she will submit at the end of the term.

Following is the list of proposed student activities like:

1 Prepare journals based on practical performed in laboratory.

2 Develop co-relation of DBMS and storage management.

3 Plan any module of to be useful in real life application.

4 Multimedia presentation of module planned by students

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

1. Use online tutorials to guide students in searching information regarding Storage Management
2. Demonstrate practical thoroughly before the students perform.
3. Show Flash/Video/Animation clippings for given Storage Management .
4. Observe continuously and monitor the performance of students in lab.
5. Assign different types of Mini-projects

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Information Storage and Management	Somasundaram G., Alok Shrivastava	2edition , Wiley India, 2012

2.	Storage Networks Explained	Ulf Troppens, Rainer Erkens and Wolfgang Muller	1st Edition, Wiley India, 2012.
3.	The Complete Reference	Robert Spalding	1st Edition, Tata McGraw Hill, 2011.

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment	Brief specification
1.	Computer System with latest configuration and memory	As per Comupter industry specification
2.	Multimedia Projector	As per Electronics industry specification

12. LEARNING WEBSITE & SOFTWARE

1 https://www.cna-aiic.ca/.../nursing-information
2 ii.www.mikeownage.com/mike/.../Information%20Storage%20and%20Management.pdf
3 https://education.emc.com/ismbook/

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Examine the storage design based on given application	0	3	2	2	0	0	0	0	0	0	0	0
2	Analyze different variants of Raid and observe their impact on performance	0	3	0	3	0	0	0	0	0	0	0	0
3	Recognize fiber channel protocol stack, layers, services and ISCI	0	3	3	0	0	0	0	0	0	0	0	0

4	Analyze and compare different backup methods and replication, Advantages of object storage device, their key features	0	3	2	1	0	0	0	0	0	0	0	0
5	Recognize steps for business continuity planning for storage in an enterprise.	0	3	2	0	2	0	0	0	0	2	0	0

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Prajakta Sadafule	Lecturer in Computer Engineering, Govt. Polytechnic, Aurangabad
2	Nilophar Masuldar	Lecturer in Computer Engineering, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **DATA WAREHOUSING and MINING**

COURSE CODE **6P406 /6T406**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering & Information Technology	Fifth

1. RATIONALE

Data warehousing and Mining is an applied level course. This course aims to make use of Data warehousing and mining techniques. After Learning this course students will improve the employment potential in the information management sector.

2. COMPETENCY

Students will be able to:

"Apply mining tools to extract information from data warehouse**."**

TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (OR)	PA (TW)	150
3	-	2	05	80	20	@25	25	
Duration of the Examination (Hrs)				3	1	--	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

3. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Identify the need Data Warehouse.
2. Use Data warehouse Components.

3. Build Data Warehouse by design consideration of Data Warehouse.
4. Apply data mining algorithms.
5. Apply classification techniques for knowledge discovery.
6. Demonstrate cluster analysis & types of data in cluster analysis

4. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit - I Data Warehouse Introduction	1a. Apply the concept of Data Ware housing 1b. Describe Architecture of Data Warehouse	1.1 Need of Data Warehousing 1.2 Differences between Operational Database Systems and Data Warehouses AND ALSO Informational Database system 1.3 Data warehouse Definition and Characteristics 1.4 Data Warehouse Architecture
Unit - II Data warehousing Components	2a Describe Data warehouse Database 2b Concepts of Sourcing Acquisition, Cleanup, and Transformation tools. 2c Explain Metadata, DataMart 2d Explain Discuss Information delivery system	2.1 Data Warehouse Database 2.2 Sourcing, Acquisition, Cleanup, And Transformation tools 2.3 Metadata 2.4 Data Marts 2.5 Information Delivery System
Unit - III Building a Data Warehouse	3a. Aspects of Design consideration 3b. Explain technical consideration 3c. Describe benefits of Data Warehousing 3d. Describe Intraquery parallelism	3.1 Design Considerations 3.1.1 Data Content 3.1.2 Metadata 3.1.3 Nine decisions in the design of a Data warehouse 3.2 Technical Considerations 3.2.1 Hardware Platforms 3.2.2 Data warehouse and DBMS specification 3.2.3 Communication Infrastructure 3.3 Benefits of Data Warehousing 3.3.1 Tangible Benefits 3.3.2 Intangible Benefits

Unit - IV Data Processing	4a. Describe the aspect of data preprocessing Explain distributed query processing 4b. Explain the concept of Data Cleaning & Integration 4c. Explain redundancy and correlation Analysis 4d. Express Data Value conflict detection.	4.1 Data Cleaning 4.1.1 Missing Values 4.1.2 Noisy Data 4.1.3 Data Cleaning as a Process 4.2 Data Integration 4.3 Entity Identification Problem 4.4 Redundancy and Correlation Analysis 4.5 Tuple Duplication 4.6 Data Value Conflict Detection and Resolution
Unit - V Data Mining Algorithms	5a. Data generalization and summarization. 5b. Explain mining Association rules. 5c. Illustrate Apriori algorithm. 5d. Definition of Classification and Prediction, issues regarding classification and prediction. 5e. Discuss Decision tree Algorithm & Bayesian Algorithm	5.1 Concept Description, Data generalization and summarization based characterization. 5.2 Mining Association Rules: Association rule mining, Market basket Analysis, Association rule classification. 5.3 The Apriori algorithm, Mining multilevel Association rules.Log based recovery 5.4 Classification and Prediction, Data classification process and issues regarding classification and prediction. 5.5 Classification by decision tree Induction, Bayesian Classification
Unit – VI Cluster Analysis	6a. Classification based on cluster. 6b. Discuss types of data in clustering 6c. Describe knowledge discovery. 6d. Application of Knowledge discovery techniques.	6.1 Classification based on cluster. 6.2 What is cluster analysis? Types of data in Cluster Analysis, Categorization of clustering methods. 6.3 Introduction to knowledge discovery. 6.4 Application of techniques of knowledge discovery in areas such as fraud detection, scientific data analysis, and web mining.

5. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
1	Data warehouse introduction	10	4	4	6	14
2	Data warehouse components	08	4	4	4	12
3	Building a data warehouse	08	6	4	8	18
4	Data processing	08	4	4	4	12
5	Data mining algorithms	08	4	4	6	14
6	Cluster analysis	06	3	3	4	10
		48	25	23	32	80

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

6. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	01	Introduction to data warehousing concepts	2
2	03	Preprocess and classify Customer dataset. http://archive.ics.uci.edu/ml/	4
3	03	Perform Preprocessing, Classification techniques on Agriculture dataset usinh WEKA tool. (http://archive.ics.uci.edu/ml/)	4
4	06	Preprocess and classify Weather dataset. http://archive.ics.uci.edu/ml/	4
5	06	Perform Clustering technique on Agriculture dataset.	4
6	05	Problem solving using Market Basket Analysis	2
7	04	Classify the dataset using decision tree. www.kdnuggets.com/datasets/	2
8	04	Apply XLMiner tool for classification technique	4
9	03	Apply rapid miner tool for Mining.	4
10	03	Classification based on cluster analysis	2
		Total	32

7. SUGGESTED STUDENTS ACTIVITIES

Other than class room and laboratory activities following are the suggested guided co-curricular student's activities which need to be undertaken to facilitate the attainment of various course outcomes of this course. The students are required to maintain portfolio of their experiences which he/ she will submit at the end of the term.

a. Student should do as much practice as possible on related software to develop the Mastery.
b. Students in groups should visit different business organization where data mining and warehousing is done and should study the methods and software in use. Moreover each group should study that for what purpose data mining is carried out and how mined data is used. All groups should prepare reports on their study and present in class. These presentations should generate group discussions.
8. Search the net and find out different data mining and warehousing techniques and Software being used.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-
b. Q & A technique.
c. Observe students and monitor the performance of students in lab.

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Database system concepts	Henry Korth	MGH
2.	SQL / PL-SQL	Ivan Bayross	BPB
3	An Introduction to Database Systems	C. J. Date	Pearson Education
4	Oracle – The complete reference	Oracle Press	TMH

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

Hardware : Desktop Computer P-IV processor or higher
Software : Microsoft 2003 /any higher version , Oracle, WEKA, XLMiner

12. LEARNING WEBSITE & SOFTWARE

a. Ms-Access Tutorial : http://www.quackit.com/microsoft_access/tutorial/

b. WEKA: WEKA is an open source application that is freely available under the GNU general public license agreement. Originally written in C the WEKA application has been completely rewritten in Java and is compatible with almost every computing platform. It is user friendly with a graphical interface that allows for quick set up and operation.

WEKA is a computer program that was developed at the University of Waikato in New Zealand for the purpose of identifying information from raw data gathered from agricultural domains. WEKA supports many different standard data mining tasks such as data preprocessing, classification, clustering, regression, visualization and feature selection

c. http://dataminingtools.net

d. Data Mining Tutorial http://www.tutorialspoint.com/

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Describe the architecture of Data Warehousing and apply the concept of Data Warehousing.	-	3	-	-	-	-	-	-	-	-	2	-
2	Demonstrate ability to develop warehouse source specifications with cleanup and Transformation tools.	-	3	-	2	-	-	-	-	-	2	-	-
3	Explain building components of Data Warehouse and Design consideration of Data Warehouse.	-	2	2	2	-	-	-	-	-	2	2	-
4	Use various data mining algorithms	-	2	2	2	-	-	-	-	-	1	1	-
5	Apply various classification techniques and use innovative technique for knowledge discovery	-	2	2	2	-	-	-	-	-	1	2	-
6	Describe and demonstrate cluster analysis & types of data in cluster analysis	3	3	3	3	3	3	3	3	3	3	3	3

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Prachi P. Deshpande	Lecturer in Information Technology, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- CLOUD COMPUTING

COURSE CODE- **6T407/6P407**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering/Information Technology	Sixth

1. RATIONALE

This course provides a comprehensive study of Cloud concepts and capabilities across the various Cloud service models including Infrastructure as a Service (IaaS), Platform as a Service (PaaS),Software as a Service (SaaS). It consists of topics like cloud service models, virtualization and cloud infrastructure, and security and management of cloud.

2. COMPETENCY

The course content should be taught and implemented with the aim to develop the following competencies.

1. To provide students with the fundamentals and essentials of Cloud Computing.
2. Recognize the importance of virtualization in distributed computing and how this has enabled the development of Cloud Computing.

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE @ (PR/OR)	PA (TW)	150
3	00	02	07	80	20	25	25	
Duration of the Examination (Hrs)				03	1	2	00	

Legends : L-Lecture; T-Tutorial/Teacher Guided Theory Practice ; P- Practical; C-Credits; ESE- End Semester Examination; PT – Progressive Test, PA- Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Identify the appropriate cloud services for a given application.
2. Assess the comparative advantages and disadvantages of Virtualization technology.
3. Analyze authentication, confidentiality and privacy issues in cloud computing.
4. Identify security implications in cloud computing.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
UNIT– I Introduction to Cloud Computing	1.a Identify cloud computing and the characteristics. 1.b Illustrate the components of cloud computing 1.c compare deployment model and service model 1.d compute the benefits of cloud computing and limitations of it. 1.e Compare between Grid computing and cloud computing	1.1Defining Cloud computing, 1.2Characteristics, 1.3 Benefits of cloud computing, Limitations of cloud computing. 1.4 Grid Computing vs Cloud Computing 1.5 Infrastructural components of cloud computing 1.6 deployment model: 1) public cloud 2) private cloud 3) hybrid cloud 4) community cloud 1.7 service model: a) Infrastructure as a Service (IaaS), b) Software as a Service (SaaS), c) Platform as a Service (PaaS)
Unit II Cloud architecture and Services	2.a Illustrate the platforms, virtual appliances, communication protocols used in cloud. 2.b Identify the following cloud service : a. IaaS b.SaaS c.PaaS	2.1 Exploring cloud computing stack – Compos ability, Infrastructure, Platforms, Virtual Appliances, Communication Protocols, Applications. 2.2 Explore characteristics,benefits and issues : a) Infrastructure as a Service (IaaS), b) Software as a Service (SaaS), c) Platform as a Service (PaaS) 2.3 Introduction of cloud service Providers use,benefits

		and issues: a) Amazon Web Services b) Google AppEngine c) Microsoft Azure
UNIT – III Cloud computing technologies and Virtualization	3.a use the components clients security and networks and services provided as hardware and infrastructure in cloud 3.b Illustrate Virtualization and it's benefits 3.d Use of Virtualization and load balancing 3.e Use of Hypervisors in virtualization also explain the benefits of Virtualization.	3.1 Cloud Computing Technologies: Virtualization, Service-Oriented Architecture (SOA), Grid Computing, Utility Computing. 3.2 Use of Virtualization technology, Load Balancing and Virtualization, 3.3 Virtualization benefits, 3.4 Hypervisors, porting application, 3.5 Defining cloud capacity by defining baselines and Metrics
UNIT – IV Cloud Administration and Security Management	**4**.1 Use the following terms in cloud management: 4. a cloud sercurity and data security 4.b Identify the availability management in SaaS, IaaS, PaaS, Access Control, Security Vulnerability. 4.c Select the Future of Security in Cloud computing.	4.1. Cloud security, data security, 4.2 Identity and presence protocol standards, 4.3 Availability management in SaaS, IaaS, PaaS, Access Control, Security Vulnerability, 4.4 Patch and Configuration Management, Security as a Service of cloud, 4.5 Future of Security in Cloud computing. 4.6 Planning a Cloud Computing Based IT Strategy: Develop an IT strategy to deliver on strategic business objectives in the business strategy.
UNIT– V HDFS and it's Architecture	5.a Illustrate the advantages and disadvantages Distributed file system. 5.b Select the functionalities of Platform as a Service with it's advantages 5.c Design the case study to create and single node	5.1 Introduction to Hadoop Distributed File System and Google File System. 5.2 Architecture of HDFS, 5.3 Comparison with Traditional Technology with distributed file system 5.4 What is Big Data?

	cluster using Hadoop.	5.5 Human Generated Data and Machine Generated Data 5.6 Where does Big Data come from 5.7 Examples of Big Data in the Real world 5.8 Challenges of Big Data

6.SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
I	**Introduction to Cloud Computing**	10	**4**	**4**	**4**	**12**
II	**Cloud architecture and Services**	12	**4**	8	**8**	20
III	**Cloud computing technologies and Virtualization**	10	4	6	8	18
IV	**Cloud Administration and Security Management**	8	3	6	6	15
V	**HDFS and it's Architecture**	8	3	6	6	15
	Total	48	14	22	14	80

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. SUGGESTED EXERCISES/PRACTICALS

The tutorial/practical/exercises should be properly designed and implemented with an attempt to develop different types of cognitive and practical skills **(Outcomes in cognitive, psychomotor and affective domain)** so that students are able to acquire the competencies.

S. No.	**Unit No.**	**Practical Exercises** (Outcomes in Psychomotor Domain)	**Approx. Hrs. required**
1.	I	Assignment on Grid Computing vs Cloud computing.	4
2.	II	Assignment on Software as a Service (SaaS), , Platform as a Service (PaaS), Infrastructure as a Service (IaaS), Network as a Service (CaaS	4
3.	III	Create 5 machines on Google Apps and Web Services	6

4.	IV	Create 5 Virtual Machines using Vmware Workstation	4
5.	V	Write steps to configure and installation Hypervisors with KVM	4
6.	IV	Develop an dynamic web application and upload it on to the cloudbees.	4
7.	V	Develop private cloud using any other free cloud service providers like clousim, IBM Bluemix Openshift.	6
Total			64

8.SUGGESTED STUDENT ACTIVITIES

Following is the list of proposed student activities like:

i. Make a VMs or Multiple VMs

ii. Present the the installation of Hypervisors

9.SUGGESTED LEARNING RESOURCE

A) **List of Books***

S. No.	Title of Book	Author	Publication
1	Cloud Computing Bible	Barrie Sosinsky	Wiley India Pvt Ltd
2	Cloud Computing – A Practical Approach	Anthony Velte, tobyVelte, Robert Elsenpeter,	Tata McGraw-Hill Edition
3	OpenNebula 3 Cloud Computing	Giovanni Toraldo	Packt Publishing, 2012
4	Enterprise Cloud Computing - A Strategy Guide for Business and Technology Leaders	Andy Mulholland, Jon Pyke, Peter Finger	Meghan Kiffer,2010

B. List of Major Equipment/ Instrument with Broad Specifications

i. Computer System with latest configuration OS-Windows 7 UBUNTU 14.04 DESKTOP

ii. Internet

iii. Open Source Software

vi. VMware Player

V. Eclipse latest version

C Additional Resources of CLOUD that can be used for conducting Practical as well as case studies

- http://www.amazon.com/tracks/web ,

10.POs and PSOs assignment and its strength of assignment with each CO of the Course

CO. NO.	Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2	No. of hours allocated in curriculum
CO1	**Introduction to Cloud Computing**	2	3	2	0	0	0	0	0	0	0	0	0	**12**
CO2	**Cloud architecture, Services and Applications**	0	3	3	0	0	0	0	0	0	0	0	0	20
CO3	**Cloud Infrastructure and Virtualization**	0	2	3	3	0	0	0	0	0	0	0	0	18
CO4	**Exploring cloud services**	0	1	3	3	0	0	0	0	0	0	0	0	15
CO5	**Cloud Administration and Security Management**	0	2	3	3	0	0	0	0	1	0	0	0	15

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	P.B. Lahoti	Head of the Department Computer Engineering Government Polytechnic Aurangabad
2	S.M. Bankar	Lecturer in Computer Engineering Government Polytechnic Aurangabad
3	V.B.Kundlikar	Lecturer in Information Technology G.P. Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- SEMINAR

COURSE CODE 6S501

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering / Information Technology	Fifth

1. RATIONALE

Seminar is the important aspect of any curriculum. Here the students has unlimited scope to integrate his knowledge and skills. This course is essential to understand the recent developments and latest trends in the field. This will help the students to acquire the skill like mining for information, analysis, communication, presentation skills etc. For effective presentation student must have good communication skill. With a given time limit student should be able to express his ideas and concepts, thoroughly in front of faculty members and other students, student should be able satisfy the queries raised by them as well as student should learn to take any feedback positively.

2. COMPETENCY

After learning this course student will be able to

"Deliver presentation to expose to recent development in technologies, researches, products, algorithms, protocols and so on"

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (OR)	PA (TW)	75
00	-	02	02	00	00	#25	50	
Duration of the Examination (Hrs)				--	--	--	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Collect the information on selected topic.
2. Prepare the synopsis on the identified content.
3. Make use of internet / book / research paper to assimilate information
4. Deliver presentation on selected topic.
5. Prepare report on seminar topic.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit – I **Literature Survey**		1.1. Detailed Survey of any three seminar topics which are a recent trend in the field of information technology and coputing technology. 1.2. Seminar topic should not be a part of any course which student has already studied or will study in final semester of diploma. Also topic should not be repeated in last three batches. 1.3. No two students are allowed to take same topic. Also contents of seminar of no two students should match more than 30%.
Unit -II **Topic selection**		2.1. Each student has to make synopsis of three topic selected by student. 2.2. Submit this entire synopsis to the seminar coordinator. 2.3. Finalize a topic from seminar coordinator after the confirmation from panel of faculty from dept.

Unit III: **Collection and Assimilation of Information**		3.1. Student should gather/collect all information related to final topic either from internet, book or from any research / journal paper. 3.2. Assimilate the information so that student gets to know that how they were applied these concepts into existing technology.
Unit IV: **Prepare and Deliver Presentation of Seminar**		4.1. Each student will prepare a seminar presentation in the term making use of audio/visual aids for duration of 10-15 minutes and deliver it on the assigned date only. Every student is required to give presentation independently. 4.2. All students must attend seminars and it is expected that they should listen it carefully and take part in questioning actively. 4.3. A panel of faculty members along with guide will assess the seminar internally during the presentation. Faculty members should ask questions.
Unit V: **Preparing Seminar Report**		5.1. Each student should prepare seminar report containing at least 35 pages as per the format prescribed by department. Student should submit the seminar report in the form of spiral bound journal duly signed by the Guide, Head of Department and Principal.

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching / Practical Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Literature Survey	**06**	**NOT APPLICABLE**			
II	Topic selection	**06**				
III	Collection and Assimilation of Information	**08**				
IV	Presentation of Seminar	**06**				
V	Preparing Seminar Report	**06**				

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	1	Literature Survey	06
2	2	Topic selection	08
3	2	Collection and Assimilation of Information	08
4	2	Presentation of Seminar	06
5	2	Preparing Seminar Report	04
		Total	**32**

8. SUGGESTED STUDENTS ACTIVITIES

i) Aspects to be considered for report writing

- To study recent developments and technological advances in current technology.
- Develop communication skills.
- To enhance the presentation skills
- Seminar reports preparation.

II) SUGGESTED AREAS FOR THE SEMINAR:

AREA OF COMPUTER ENGINEERING / INFORMATION TECHNOLOGY	1. Image Processing 2. Cloud Computing 3. Networking 4. Software Engineering 5. Internet of Thing 6. Computer, Information, Web & Network Security 7. Computer Vision 8. Machine Learning 9. Data Warehousing & Mining 10. Soft Computing 11. Artificial Intelligence 12. Parallel Computing 13. Web Mining 14. Semantic Analysis 15. Optimization Technique 16. Mobile Computing

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

i. Do literature survey and identify area of interest for seminar preparation.
ii. Visit the site if required.
iii. Search on internet for information gathering.
iv. Do comparative study of methods, identify case study etc
v. Prepare report of seminar as per above instructions.
vi. Prepare power point presentation of Seminar topic.

Seminar Report Format

1. Seminar report shall be in the print form on A-4 size white bond paper.
2. Typing shall be in Times New Roman with spacing of 1.5 using one side of paper.
3. Margins: Left = 37.5 mm Right, Top and Bottom = 25mm.
4. Front page: Titles - TNR 18 bold, other – TNR 14 bold. With Institute Logo.
5. Inner Pages: Titles –TNR – 14 Bold, other TNR 12.
6. Page Nos: Should appear on the right hand top corner of each page starting after index page.
7. Tables to be preferable in the Text format only.
8. Sketches to be drawn on separate sheet / pages in black ink.
9. The Last content in the index to be of references. Acknowledgement to be added in the report.
10. Binding: Spiral binding is preferred for the seminar report. The number of copies are to be prepared by the student are 3 nos. (Student + Guide + Department copy)

10. SUGGESTED LEARNING RESOURCE

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment	Brief specification
1.	Desktop PC	Computer Systems with minimum i-3 intel pentium processor (or equivalent) and 1 GB RAM.
2.	LCD Projector	

12. LEARNING WEBSITE & SOFTWARE

1. http://www.seminarsonly.com/
2. http://a4academics.com/be-seminar-topics
3. http://www.seminarstopics.com/branch/latest-seminar-topics-for-cse-2017

4. http://www.collegelib.com/t-71-topics-for-computer-engineering-and-cse-technology-seminars-listed-latest-topics.html

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

S No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Collect the information on selected topic.	--	3	--	3	--	--	--	---	--	--	--	2
2	Prepare the synopsis on the identified content.	--	1	--	---	--	--	--	---	---	--	--	2
3	Make use of internet / book / research paper to assimilate information	---	--	3	3	---	---	--	1	--	--	1	--
4	Deliver presentation on selected topic.	--	2	3	--	--	--	---	--	--	--	2	2
5	Prepare report on seminar topic.	--	3	--	--	--	--	--	2	--	--	2	2

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	P B Lahoti	Head of the Department, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- ENTREPRENEURSHIP DEVELOPMENT

COURSE CODE 6G306

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
All Programmmes	Sixth

1. RATIONALE

In the post liberalization era significant growth in industrial sector has led to creation of huge opportunities in manufacturing and service sector. In such a scenario especially in Indian contest it has led to innumerable opportunities for first generation entrepreneurs on a large scale. Therefore it is expected that engineers need to be developed for manufacturing, service sector and entrepreneurship development. This course, which represents Allied level of courses, aims at imparting entrepreneurial skills amongst engineers of all disciplines.

2. COMPETENCY

At the end of studying this course students will be able to

"Design a project proposal for an enterprise"

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE @ (PR/OR)	PA (TW)	50
2	-	2	4	--	--	--	50	
Duration of the Examination (Hrs)				--	--	--	--	

Legends : L-Lecture**; T**-Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C**- Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal,~ Online examination.

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -.

1 Apply business/enterprise principals and characteristics.
2 Design information and supporting system related to start a business.
3 Estimate and record financial requirements.
4 Develop detailed project report.
5 Use various software related to business.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit –I Basic Concepts of Entrepreneur	1a. Describe Entrepreneur. 1b. Identify Risk Use Creative skills 1c. Describe Risk Situation. 1d. Generate Business Idea Methods and techniques to generate Business. 1e. Plan for Transforming Ideas in to opportunities. 1f. Carryout of SWOT Analysis.	**Basic Concepts** of Entrepreneur 1.1. Concept, Classification & Characteristics of Entrepreneur. Creativity and Risk taking, Concept of Creativity & Qualities of Creative person. Risk Situation, Types of risk & risk takers. 1.2 Business Idea Methods and techniques to generate business idea. 1.3 Transforming Ideas in to opportunities- transformation involves Assessment of idea & Feasibility of opportunity, 1.4 SWOT Analysis.

Unit– II **Information And Support Systems**	2a. Use Information data for business. 2b. Information related to support system. 2c. Lay down the Procedures and related to Information. 2d. Identify Govt. Support Systems related to EDP. 2e. Explore subsidies to entrepreneur.	2.1Information Needed and Their Sources. Information related to project, Information related to support system, Information related to Procedures and formalities. 2.2 Support Systems: • Small Scale Business Planning, Requirements. • Govt. & Institutional Agencies, Formalities • Statutory Requirements and Agencies. Government Support and subsidies to entrepreneur.
Unit– III **Market Assessment**	3a Undertake Market survey. 3b Use Marketing skills and Survey. 3c Assess market for business opportunities.	**Market Assessment** 3.1 Marketing -Concept and Importance 3.2 Market Identification, Survey Key components. (Market Segmentation) 3.3 Market Assessment.
Unit– IV **Business Finance & Accounts**	4a. Determine product cost. 4b. Analyze for breakeven of business proposal. 4c. Maintain Business finance and accounts.	**Business Finance & Accounts** **4.1 Business Finance** • Cost of Project • Sources of Finance • Assessment of working capital • Product costing • Profitability • Break Even Analysis • Financial Ratios and Significance 4.2 **Business Account** Accounting Principles, Methodology • Book Keeping • Financial Statements • Concept of Audit, • Trial Balance

		Balance Sheet
Unit - V **Business Plan & Project Report**	5a. Prepare Business proposal. 5b. Undertake project appraisal. 5c. Undertake cost benefit analysis. Cost benefits analysis.	**Business Plan & Project Report** 5.1 Business plan steps involved from concept to commissioning Activity Recourses, Time, Cost 5.2 **Project Report** 1) Meaning and Importance 2) Components of project report/profile(Give list) 5.3 **Project Appraisal** 1) Meaning and definition 2) Technical, Economic feasibility 3) Cost benefit Analysis.
Unit – VI **Enterprise Management And Modern Trends**	6a. Manage resources. 6b. Prepare plan for productivity. 6c. Assure Quality. 6d. Explore Govt facilities (Industrial zones and SEZ.) 6e. Explore E-Commerce avenues for business.	**Enterprise Management And Modern Trends** 6.1 Enterprise Management: - 1) Essential roles of Entrepreneur in managing enterprise 2) Product Cycle: Concept And Importance 3) Probable Causes Of Sickness 4) Quality Assurance, Importance of Quality, Importance of testing 5) Industrial zones and SEZ. 6.2 E-Commerce, Concept and process. 6.3 Global Entrepreneur: role and opportunities.
Unit – VII **INTRODUCTION**	7a.Use business related software's. 7b. Survey Software's used in Mall , industries. 7c. Identify Software's	**INTRODUCTION BUSSINESS** **RELATED SOFTWARES**

BUSSINESS **RELATED SOFTWARES**	used For accounting.	7.1 Software's used in Mall. 7.2 Software's used in Medical shops. 7.3 Software's used in industrial stores such as SAP, ERP. 7.4 Software's used for accounting such as FICO, FINNACLE

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Basic Concepts of Entrepreneur.	04	NA	NA	NA	NA
II	Information And Support Systems	05	NA	NA	NA	NA
III	Market Assessment	05	NA	NA	NA	NA
IV	Business Finance & Accounts	05	NA	NA	NA	NA
V	Business Plan & Project Report	05	NA	NA	NA	NA
VI	Enterprise Management And Modern Trends	04	NA	NA	NA	NA
VII	Introduction business related software's	04	NA	NA	NA	NA
	Total	**32**	NA	NA	NA	NA

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

S. No.	**Unit No.**	**Practical Exercises** (Outcomes in Psychomotor Domain)	**Approx. Hrs. required**

1	I	Literature survey of Financial Banks for Industries– MSFC/IDBI/MSSIDC/CIDBI/MSME/DIC/ ROLE OF DIFFERENT COMMERCIAL BANKS etc.	04
2	II	Administration of readymade tools like questionnaires, opinionative, Interview schedule for product identification purpose (decision making process)	04
3	III	Development of "Business Ideas". Take any product and develop the business idea for it.	04
4	IV	Visit to MCED/MITCON- going through the product related library.	04
5	VI	Preparation of Preliminary / Detailed project report in the formats recommended by MCED/MITCON Prepare project report and study its feasibility.	04
6	VI	At least one case study of successful entrepreneur.	04
7	---	Assess yourself-are you an entrepreneur?	04
Total			**28**

8. SUGGESTED STUDENTS ACTIVITIES

1. Prepare journals based on assignments.
2. Carry out Literature survey of Financial Banks for Industries.
3. Analyze the specifications, costs, quality and availability for various types of engineering components and find the business opportunity for it.
4. Interact with supplier/trader and discuss about business opportunities available in market.
5. Designing software for requirements to start business or similar type of issues. .
6. preparing project report for any product to be manufactured.
7. Search online PPT's, PDF's, video's on the design and software's for business.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

1. Group discussion among students.
2. Arrange visits to industries and show various industrial jobs.

3. Motivate students to use internet and collect name, addresses, catalogues, rates, specifications of institutes and industries working in the area of business promotions.
4. Arrange expert lecture on various opportunities in business.

10. SUGGESTED LEARNING RESOURCE

Sr.No.	Title of Book	Author	Publication
1	Entrepreneurship Development	----	NITTTR, Bhopal
2	The Seven Business Crisis& How to Beat them	V.G.Patel	S.Chand and Co. New Delhi
3	A handbook of New Entrepreneurs	P.C.Jain	,Dhanpat Rai and Sons
4	Entrepreneurship development	E.Gorden, K. Natrajan	Charotar Publication House
5	New Initiatives in Entrepreneurship Education And training	Gautam Jain, Debmuni Gupta	Tata Mc- Graw Hill
6	Entrepreneurship Theory and Practice	J.S.Saini,B.S.Rathore	Tata Mc- Graw Hill
7	Enterpreneurship Development and management	A.K.Singh	Laxmi Publications
8	The Beer mat Entrepreneur	South on D F	Pearson Education limited

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

Computers for Practical's with internet facility
1. Software's used in Mall.
2. Software's used in Medical shops.
3. Software's used in industrial stores such as SAP, ERP.
4. Software's used for accounting such as FICO, FINNACLE.

12. LEARNING WEBSITE & SOFTWARE

i. http://www. product-list. php
ii. http://www.SAP.com/products/faro-software
iii. http://www.ERP.com
iv. http://www.fico.com
v. http://finnacle.com
vi. Visit www.ediindia.org.
vii. http://www.project reports.com

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

CO. NO.	Course Outcome	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PSO 1	PSO 2	No. of hours allocated in curriculum
CO 1	Apply business/enterprise principals and characteristics.	3	3	-	-	-	-	2	-	3	-	2	6
CO 2	Design information and supporting system related to start a business.	3	3	-	-	-	-	3	-	3	-	-	8
CO 3	Estimate and record financial requirements.	3	3	-	-	-	-	3	-	3	-	2	6
CO 4	Develop detailed project report.	3	3	-	-	-	-	-	-	3	2	-	6
CO 5	Use various software related to business.	3	3	-	-	-	-	-	-	3	3	-	6

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Prof. A. W. Nemade	Lecturer in Mechanical Engineering, Govt. Polytechnic,Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **COMPUTER SECURITY AND CYBER LAWS (CSCL)**

COURSE CODE **6P501**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering	Sixth

1. RATIONALE

Computer security diversified course intend to address security in computer system design. This course will introduce fundamentals of computer and network security, Cyber laws. Students should able to use and acquire skills and preventions methods for computer security in future.

2. COMPETENCY

The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competency:
"Use security measures for Computer and Network system."

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (PR)	PA (TW)	150
4	-	2	06	80	20	#25	25	
Duration of the Examination (Hrs)				3	1	2	--	

Legends : L-Lecture**; T**-Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, PR- Practical Examination,OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- Classify the risks faced by Computer Systems and the nature of common Information hazards.
- Identify the potential threats to confidentiality, integrity and availability of Computer Systems.
- Apply security principles to secure Operating Systems and applications.
- Recognize the system related security.
- Apply IT act and cyber law.
- Use the web security techniques.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit I Introduction to computer security and security trends.	1. Explain security terms. 2. Describe the risk associated with security. 3. Identify the different attacks.	1.1 Definition of Computer Security, Need for security, Security basics: Confidentiality, Integrity, Availability, Accountability, Non-repetition. Example of Security, Challenges for security, Model for Security. 1.2 Risk and Threat Analysis: Assets, Vulnerability, Threats, Risks, Counter measures. 1.3 Threat to Security: Viruses and Worms, Intruders, Insiders, Criminal organizations, Terrorists, Information warfare Avenues of attack, steps in attack 1.4 Security attacks: Active and Passive attacks, Denial of service, backdoors and trapdoors, sniffing, spoofing, man in the middle, replay, TCP/IP Hacking, encryption attacks. 1.5 Malware: Viruses, Logic bombs.
Unit II Identification, Authentication and Operational Security	1. State the role of people in security. 2. Classify the access control. 3. Explain biometrics features used in security.	2.1 User name and password, Managing passwords, choosing password. 2.2 Role of people in Security: 2.2.1 Password selection, 2.2.2 Piggybacking, 2.2.3Shoulder surfing,

		2.2.4 Dumpster diving, 2.2.5 Installing unauthorized software/hardware, Access by Nonemployees, 2.3 Security awareness, Individual User responsibilities 2.4 Access controls: Definition, principle, policies: DAC, MAC, RBAC. 2.5 Biometrics: finger prints, hand prints, Retina, patterns, voice patterns, signature and writing patterns, keystrokes
Unit III **Cryptography**	1. Explain the cryptographic techniques. 2. Apply various cryptographic techniques.	3.1 Introduction: Cryptography, Cryptanalysis, And Cryptology, Substitution techniques: Caesar's cipher, mono-alphabetic and polyalphabetic, one-time pad. 3.2 Transposition techniques – Rail fence technique, simple columnar, Steganography. 3.3 Hashing – concept 3.4 Symmetric and asymmetric cryptography: Introduction to Symmetric encryption, DES (Data encryption Standard) algorithm, Asymmetric key cryptography: Digital Signature.
Unit IV **System security and Intrusion Detection**	1. Explain the need of firewalls. 2. Describe the virtual private networks. 3. Study email security standards. 4. Explain IP security architecture.	4.1 Firewalls: Need for Firewall, limitations, and characteristics. Types of Firewall: Hardware, Software, Packet filter, Proxy Server, Hybrid, Application gateways, circuit level gateway, Implementing Firewall. 4.2 Virtual Private Network work, Kerberos – concept, security topologies: security zones, DMZ, Internet, Intranet, and VLAN. 4.3 Intrusion Detection: Intrusion detection systems (IDS), host based IDS, network based IDS, Honey pots. 4.4 Email security: Email security standards: Working principle of SMTP, PEM, PGP, S/MIME. 4.5 IP security: overview, architecture, IPSec Configuration, IPSec Security.
Unit V **Act and Cyber law**	1. Describe the knowledge about data recovery. 2.Explain hacking 3.Define cracking 4. State the bug.	5.1 Introduction to Deleted File Recovery Formatted Partition Recovery, Data Recovery Tools, Data Recovery Procedures and Ethics. 5.2 Introduction to Cyber Crimes – Hacking, Cracking, Viruses, Virus Attacks, Pornography, Software Piracy, Intellectual property, Legal System of Information Technology, Mail Bombs, Bug Exploits,

		Cyber Crime Investigation 5.3 Introduction Cyber Laws- Introduction to IT act 2000 and IT act 2008, Introduction to the cyber laws.
Unit VI Application and Web Security	1. Explain Web Security 2. Apply Application level security on web browser 3.Describe the SSL 4. Explain active directory	6.1 Web Security Considerations.1 Web security threats.2 Web traffic security approaches. 6.2 Secure Socket Layer and Transport Layer Security. 6.2.1. Overview of SSL Protocol Stack (diagram and explanation only) 6.3 HTTPS 6.3.1 Connection initiation. 6.3.2 Connection closure. 6.4 Basic Concept of Secure Electronic Transactions 6.5 SSL versus SET 6.6 D Secure Protocol Application hardening, application patches, web servers, active directory.

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
I	**Introduction to computer security and security trends.**	**14**	**4**	**6**	**6**	**16**
II	**Identification, Authentication and Operational Security**	**14**	**4**	**4**	**6**	**14**
III	**Cryptography**	**12**	**3**	**5**	**6**	**14**
IV	**System security and Intrusion Detection**	**10**	**3**	**5**	**6**	**14**
V	**IT Act and Cyber law**	**8**	**3**	**4**	**5**	**12**
VI	**Application and Web Security**	**6**	**3**	**3**	**4**	**10**
	Total	**48**	**26**	**32**	**22**	**80**

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	I	Prepare Case study security provided with windows operating system(User authentication)	02
2	II	Recovery the password of windows machines using password recover utility (John the ripper) or any other utility	04
3	IV	Tracing the path of an website/ web server using tracert utility	04
4	III	Install open source Latest version of Cryptool software and Encrypt and decrypt the message using Simple Transposition – Permutation(Cryptool)	04
5	III	Encrypt and decrypt the message using Caesar Cipher With Variable Key(Cryptool)	04
6	III	Encrypt and decrypt the message using 3 X 3 Hill Cipher(Cryptool)	02
7	V	Create Digital Signature document using Cryptool	04
8	IV	Installation and working of Open source Firewall –Free BSD/iptables Firewall	04
9	V	Prepare Case study application related security	02
10	VI	Prepare Case study web related security	02
Total			**32**

8. SUGGESTED STUDENTS ACTIVITIES

1. Students will prepare file for the above mentioned Practical
2. Prepare presentation and deliver seminar on various topics covered like cryptography, system security, and web security.
3. Students are expected to develop minimum one program of particular topic as an example to exhibit real life application.

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9. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Cryptography and Network Security	Atul Kahate	Tata McGraw Hill
2.	Computer Security Principles and Practices	William Stallings, Lawrie Brown	Pearson Education
3.	Computer Security	Dieter Gollman	Wiley india education

10. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment	Brief specification
1.	Desk top computer system, laptops	Latest configuration.
2.	Cryptool	Latest Version

11. LEARNING WEBSITE & SOFTWARE

1 .http://www.pgpi.org/doc/pgpintro
2 http://www.emailtrackerpro.com
3 http://www.kmint21.com

12. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

CO. NO.	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	No. of hours allocated in curriculum
CO1	Classify the risks faced by Computer Systems and the nature of common Information hazards.	1	1	0	0	0	0	0	0	0	0	1	1	14
CO2	Identify the potential threats to confidentiality, integrity and availability of Computer Systems.	0	0	0	0	1	1	0	0	0	0	1	1	14
CO3	Apply security principles to secure Operating Systems and applications.	0	0	0	0	0	1	0	0	0	1	0	1	12
CO4	Recognize the system related security.	0	0	0	0	0	1	0	1	0	0	0	1	10
CO5	Apply IT act and cyber law.	0	0	0	0	0	1	0	0	0	1	0	1	8
CO6	Use the web security techniques	0	1	1	0	0	0	0	0	0	0	0	1	6

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	R.S.Sindge	Lecturer in Information Technology, Govt. Polytechnic,Latur

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- PROJECT

COURSE CODE 6S502

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering / Information Technology	Sixth

1. RATIONALE

One of the basic aim of "Project " is to develop the ability of "learning to Learn " on his own and work in team. Project course provides opportunities for students to keep pace with future changes in technology and in the acquisition of knowledge and skills as and when needed. The course of the "Project" is designed with an aim to all these requirements of the students which will include planning of the Programme, which must be completed within the time allocated. The Project should never have a single solution and process of arriving at a particular solution, the student must be required to make number of decisions after study information as he has gathered from experiments, surveys, analysis etc.

The programme aims at developing in the student, knowledge and skills to match the current and projected needs of industry/ user systems, social awareness and professional attitudes. In relation to the course and topics to be taught, the student will have to constantly update himself and keep pace with the changing technologies and the current and projected needs of user systems.

2. COMPETENCY

After learning this course student will be able to

"Apply the knowledge of various courses to solve real life problems of society and to develop team work, leadership and entrepreneurship skills to make students professionally competent"

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (OR)	PA (TW)	150
00	-	04	04	00	00	#50	100	
Duration of the Examination (Hrs)				--	--	02	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Conduct literature survey for project selection.
2. Design problem statement according the need of Project.
3. Implement the project using modules
4. Test the project as per the requirement.
5. Write report in prescribed formats.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit – I Information Gathering and Literature Survey.		1.1. Detailed Survey of any three Project topics which are a recent trend in the field of information technology and computing technology and Selection of Project Option and Framing the Problem to solve as a Project for the group of 3 to 4 students. Option A: Industry Sponsored Project Option B: Application Project Option C: Study Based Project 1.2. Project must be based on knowledge acquired within three years of Diploma. Students must be aware with languages, packages hardware, he/ she is using in his/her project.
Unit -II Project Design		2.1. This is Second phase in which students will actually start collecting detail information about their project.

		That is project selection formalities must be completed before registering for project course. 1. Group must visit concern persons in the field to collect the system requirement. A practical design and development is to be achieved. 2. They must adopt standard procedures, rules, regulation used in the real system and no imaginary model should be developed. 3. Group can collect information about any other package, software currently under development on same subject or already developed and group should study what facilities the available software provide and what are its drawbacks. 4. If any such software is implemented / installed at some industry students must visit and collect on site information. 5. Taking into consideration all requirements, design total system in top down fashion. 6. Design must be modular and there must be clear distribution of task among group members.
Unit III: Project Development		3.1 In Third Phase students are expected to utilize their time for actual coding, testing, of project. 1. Independent module development is necessary. 2. Enough time must be provided in time-table for project development 3. There must be continuous assessment of project development. 4. Prototype model may be developed and tested. 5. Taking into consideration shortcoming and suggestions final Software/Hardware should be

		developed by the end of sixth semester
Unit IV: **Project Testing**		4.1. Testing of problem statement using generated test data (using mathematical models, Function testing principles) selection and appropriate use of testing tools, testing of UML diagram's reliability. (recommended submission date:- two weeks before term end)
Unit V: **Project Report**		5.1. Each group should prepare project report containing at least 35 pages as per the format prescribed by department. Student should submit the Project report in the form of hard bound journal duly signed by the Guide, Head of Department and Principal. 5.2. Project Report Must Include: 1. Title page of the project 2. Acknowledgement Page 3. Certificate page of college (certificate must be included for a project if it is a sponsored project form industry or organization) 4. Abstract of the project (One Page) 5. Introduction of Project (two to three pages) 6. Feasibility analysis of Project (as per point no. 4 in Project selection). 7. Scope of the project 8. Project design. 9. Algorithms. 10. DFDs /E-R Diagrams/Flowchart, wherever applicable. 11. User manual 12. Limitations/Future development. 13. Costing. 14. Bibliography. 15. Project source code with entire set of accessories such as database, drivers etc. in form of CD.

		16. Data sheets of only uncommon, (main Integrated Circuits) Main I/C e.g. Speech synthesiser IC and not of common I/C like 8085. There is no need of any explanation of common I/C and their interfacing.

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No.	Unit Title	Teaching / Practical Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
I	Information Gathering and Literature Survey.	**08**	**NOT APPLICABLE**			
II	Project Design	**12**				
III	Project Implementation	**30**				
IV	Testing	**06**				
V	Project Report	**08**				

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	1	Information Gathering and Literature Survey.	**08**
2	2	Project Design	**12**
3	3	Project Implementation	**30**
4	4	Testing	**06**
5	5	Project Report	**08**
		Total	**64**

8. SUGGESTED STUDENTS ACTIVITIES

- Form the group of 4/5 student for a project activity.
- Allot the guide (faculty) for each group.
- Decide the topic of project
- Conduct survey/experimentation
- Report writing and presentation

I) SUGGESTED AREAS FOR THE SEMINAR:

AREA OF COMPUTER ENGINEERING / INFORMATION TECHNOLOGY	1. Image Processing 2. Cloud Computing 3. Networking 4. Software Engineering 5. Internet of Thing 6. Computer, Information, Web & Network Security 7. Computer Vision 8. Machine Learning 9. Data Warehousing & Mining 10. Soft Computing 11. Artificial Intelligence 12. Parallel Computing 13. Semantic Web Mining 14. Optimization Technique 15. Mobile Computing 16. Recent Technology / Latest Trends in technology

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

- The project topic/ title should not repeated by group.
- Guide should be Senior or experienced faculty
- The project topic should selected such that, it should complete in a semester.

Seminar Report Format

1. Seminar report shall be in the print form on A-4 size white bond paper.
2. Typing shall be in Times New Roman with spacing of 1.5 using one side of paper.
3. Margins: Left = 37.5 mm Right, Top and Bottom = 25mm.
4. Front page: Titles - TNR 18 bold, other – TNR 14 bold. With Institute Logo.
5. Inner Pages: Titles –TNR – 14 Bold, other TNR 12.
6. Page Nos: Should appear on the right hand top corner of each page starting after index page.
7. Tables to be preferable in the Text format only.
8. Sketches to be drawn on separate sheet / pages in black ink.
9. The Last content in the index to be of references. Acknowledgement to be added in the report.
10. Binding: Spiral binding is preferred for the seminar report. The number of copies are to be prepared by the student are 3 nos. (Student + Guide + Department copy)

10. SUGGESTED LEARNING RESOURCE

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment	Brief specification
1.	Desktop PC	Computer Systems with minimum i-3 intel pentium processor (or equivalent) and 1 GB RAM.
2.	LCD Projector	

12. LEARNING WEBSITE & SOFTWARE

1. **http://www.opensource.org**
2. **http://www.linux.org/lessons**
3. **http://www.php.net**

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

S No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Conduct literature survey for project selection.	-	3	-	-	-	-	-	3	2	-	3	-
2	Design problem statement according the need of Project.	-	2	-	-	-	-	-	3	2	-	3	-
3	Implement the project using modules.	-		3	2				3	2	-	-	3
4	Test the project as per the requirement.	-		-	-	-	-	2	3	2	-	-	3
5	Write report in prescribed formats.	-	2	-	-	-	-		3	2	-	-	3

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	P B Lahoti	Head of the Department, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **ADVANCED JAVA PROGRAMMING (AJP)**

COURSE CODE **6S504**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering and Information Technology	SIXTH SEMESTER

1. RATIONALE

Advanced Java Programming is diversified level course which provides skills for developing powerful GUI based friendly user interface, server side programming with database. It is used to develop dynamic web site and client server application.

2. COMPETENCY STATEMENT (S)

This course will be able to

"Develop network and web based software projects."

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PT	ESE (PR)	PA	
03	00	04	07	80	20	# 25	25	150
Duration of the Examination (Hrs)				3	1	2	-	

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** - Practical; **C** – Credit, **ESE** - End Semester Examination; **PT** - Progressive Test; **PA** - Progressive Assessment **OR**-Oral examination

4. COURSE OUTCOMES

I. Design and develop powerful GUI using AWT and swing.

II. Develop dynamic application using event handling.

III. Create Server side programming using servlet.

IV. Design and develop application for data transfer using .net package

V. Develop dynamic web page or web site using jsp.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics and Sub-topics
UNIT-I AWT and Swing	1a Create different AWT window and apply appropriate layouts to it. 1b Design frame using AWT controls using different components. 1c Create frame with menu bar, menu, Dialog and file dialog Boxes. 1d Design an application using swing classes. 1e Select best package for designing GUI application.	1.1 Window: Frame, panel, container, canvas. Layout Managers 1.2 AWT Components: Buttons, Check Boxes, Checkbox Group, Choice Controls, Labels, Lists, scroll Bars, Text Field, and Text Area. 1.3 Menu Bars and Menu Dialog Boxes File Dialog. 1.4 Swing classes such as JApplet, JFrame, All Component classes.
UNIT-II Event Handling	2a Use event handling mechanism for designing iterative GUI. 2b Select appropriate listener for a component. 2c Apply event handling for GUI designed using swing classes.	2.1 Event handling mechanism, Delegation event model 2.2 Event listener's interfaces and different event classes. 2.3 Event handling for each component. 2.4 Event handling in swing class
UNIT-III Networking	3a Identify various methods of server and client socket. 3b Select classes and interfaces to develop client and server socket program.	3.1 Basics Socket overview, client/server, reserved sockets, proxy servers, internet addressing. 3.2 Java & the .net package. The

	3c Use methods to identify IP address of a machine. 3d create TCP client and TCP server 3e Develop program for processing request from client. 3f Develop program using datagram packets.	networking classes & interfaces. 3.3 Internet addresses Factory methods, instance method. 3.4 URL, Format, URL connection. 3.5 Creating TCP Client, Creating TCP Server, Reading and Writing from TCP Sockets. Accepting and Processing request from TCP Client. 3.6 Data grams, Data gram packets, Data gram server
UNIT-IV Servlet	4a Develop simple server side page using servlet 4b Design servlet program to read data from html page and write data to html using http servlet class. 4c Develop servlet program to store and retrieve data into database.	4.1 Life cycle of Servlet. 4.2 Servlet API, javax.servlet package (All interfaces and classes). 4.3 Simple Servlet program using generic servlet class. 4.4 javax.servlet.http package (All interfaces and classes) 4.5 Reading and writing data in Servlet using http servlet class. 4.6 Database connectivity in servlet.
UNIT-V Introduction to JSP	5a Select appropriate web Server page language. 5b Develop JSP pages for given application. 5c Use session management in JSP. 5d Use exception	5.1. Introduction to JSP, need of JSP. Comparison between ASP & JSP. 5.2. JSP Architecture, Different tags of JSP, How run JSP page. 5.3. Simple JSP program, passing data to JSP page through HTML page.

	handling in JSP page designing. 5e Design a JSP page to connect to database.	5.4. Scripting in JSP, Session handling, Handling exception in JSP, Database connectivity in JSP.

6. SUGGESTED SPECIFICATION TABLE WITH HOURS AND MARKS (Theory)

Unit No.	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
1	AWT and Swing	14	07	06	12	25
2	Event Handling	10	03	06	06	15
3	Networking	08	04	04	04	12
4	Servlet	08	04	04	04	12
5	Introduction to JSP	08	04	06	06	16
	Total	48	22	26	32	80

7. SUGGESTED LIST OF PRACTICALS/Exercises

Sr.No.	Unit No.	Practical/Exercises	App. Hours Required
1	1	Create Window using frame class of awt/swing	04
2		Create Applet window using swing class	
3		Create GUI application using all controls of AWT	04
4		Create GUI application using all controls of swing classes	04
5		Apply Gridlayout and Border Layout for given GUI application	04
6		Create application with menubar and display dialog box	04
7	2	Create GUI application using event handling	04
8	3	Read and write data from TCP sockets	04
9		Accept and process request from TCP client	04
10	4	Create any registration /application	04

		form using servlet	
11		Store and retrieve data into the database through servlet	04
12	5	Create simple Jsp program to pass data from html to JSP page.	04
13		Create application to manage session in JSP & also handle exception occurred in page.	04
14		Create application for database connectivity in JSP.	04
15		Develop a mini project for given application	08
		Total	64

8. SUGGESTED LIST OF STUDENT ACTIVITIES

1. Survey on currently used JDK and Java IDE.
2. Installation of JDKS and Java IDE
3. Intallation local server Apache Tomcat.
4. Design creative GUI window.
5. Develop a GUI window for online notice board.
6. Create LAN chatting program.
7. Design progrm to exchang data using datagram packets
8. Create Server side database management system.
9. Design simple website using JSP
10. Design website for institute using JSP and databse connectivity

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-

b. Q & A technique.

c. Demonstration

d. Seminars

e. Activity based learning

10. SUGGESTED LEARNING RESOURCES

Sr. No.	Author	Title	Publisher
01	Patrick Naughton, Herbert Schildt	Complete reference for java	Tata McGraw Hill

02	E. Balaguruswami.	Programming with java	BPB
03	Keyur Shah	Java2 Programming	Tata McGraw Hill
04	John R.Hubbard	Programming with Java	Tata McGraw Hill
05	Patrick Naughton,	Complete reference for JSP	Tata McGraw Hill

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment/Software	Brief specification
1	Desktop Computer	i5 processor or higher,4gb RAM
2	JDKs or IDEs	jdk1.7 or higher version, NetBeans , Eclipse

12. LIST OF SOFTWARE / LEARNING WEBSITES

a. **Java Applets**

http://docs.oracle.com/javase/tutorial/deployment/applet/index.html

b. **Introduction to GUI Programming**

http://math.hws.edu/javanotes/c6/index.html

c. **Creating a GUI using AWT**

http://www.tutorialspoint.com/awt/

d. **Creating GUI using Java Swing**

https://docs.oracle.com/javase/tutorial/uiswing/

e. **JDBC Database Access**

https://docs.oracle.com/javase/tutorial/jdbc/

https://www.tutorialspoint.com/jdbc/index.htm

https://www.tutorialspoint.com/jdbc/jdbc_tutorial.pdf

f. Servlet Technologies

http://www.oracle.com/technetwork/java/index-jsp-135475.html

g. Java Server Pages

http://www.oracle.com/technetwork/java/javaee/jsp/index.html

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
CO 1	Design and develop powerful GUI using AWT and swing	-	-	3	3	-	-	-	-	-	3	-	-
CO 2	Develop dynamic application using event handling.	-	2	3	2	-	-	-	-	-	2	2	-
CO 3	Create Server side programming using servlet.	-	1	3	1	-	-	-	-	-	1	1	-
CO 4	Design and develop application for data transfer using .net package	-	1	2	1	-	-	-	-	-	2	1	-
CO 5	Develop dynamic web page or web site using JSP.	-	1	2	1	-	-	-	-	-	2	1	1

Course Curriculum Design Committee

Sr No	**Name of the faculty members**	**Designation and Institute**
1	Mrs V.B.Kundlikar	Lecturer In Information Technology
2	Mrs P.P.Deshapande	Lecturer In Information Technology
3	Mr.J.P.Joshi	Lecturer In Information Technology

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- SOFTWARE TESTING

COURSE CODE 6S505

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering & Information Technology	Sixth

1. RATIONALE

Software testing is diversified level course, helps in testing the software application or product against user requirements for the assurance of bug free software. It aims to plan and write good test coverage according to its specifications. This course includes characteristics of tester, qualities of software and types of testing.

2. COMPETENCY

Students will be able to

"Create and execute automated software test plans and test cases to uncover errors for assuring the quality of the software"

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (PR)	PA (TW)	150
3	-	2	5	80	20	#25	25	
Duration of the Examination (Hrs)				3	1	--	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Identify the qualities of software tester.
2. Select testing specifications for quality assurance.
3. Apply Black Box testing and its types.
4. Apply White Box testing and its types
5. Identify testing types.
6. Design the test plan for given application.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit - I Fundamentals of Testing	1a. Concept of bug, its cost 1b. Role of Software tester 1c. Qualities of software tester	1.1 What is a bug? Why do bugs occur? Cost of Bugs. 1.2 Role of a Software Tester. 1.3 Qualities of Software Tester 1.4 Software Project staff.
Unit - II The Realities of Software Testing & Examining the specification.	2a Describe software testing terms 2b Concept of testing and quality assurance 2c Specification of Black box & White box testing 2d High level reviews	2.1 Testing Axioms 2.2 Software Testing terms and define Precision & Accuracy, Verification & Validation 2.3 Quality & Reliability 2.4 Testing & Quality Assurance. 2.5 Examining the Specification of Black Box & White box Testing, Static & Dynamic Testing 2.6 Performing High Level & low level review of the specification of test technology.
Unit - III Black Box Testing	3a. Explain black box testing 3b. Types of black box testing 3c. Data testing	3.1 Concept of dynamic black box testing 3.2 Test-to-pass and Test-to-fail 3.3 Equivalence partitioning 3.4 Data testing: Boundary conditions, Sub-boundary condition, default., empty, wrong, incorrect & garbage data
Unit - IV White Box Testing	4a. Explain white box testing 4b. Types of white box testing 4c. Explain coding standards and guidelines 4d. Explain generic code review	4.1 Concept of White box testing 4.2 Formal reviews: Peer reviews, Walkthroughs, Inspections 4.3 Coding standards and guidelines 4.4 Generic code review checklist
Unit - V	5a. Various testing levels	5.1 Testing levels: Unit/Component

Testing levels & types	5b. Types of software testing	Testing, Module Testing, Integration Testing, System Testing, Acceptance Testing 5.2 Types of Testing: Smoke Testing, Interface Testing, Usability Testing, Alpha Testing, Beta Testing, Stress Testing, Security Testing, Acceptance Testing
Unit VI. Automated Testing , Test Tools and Test Cases Writing	6a. Benefits of automation & tools 6b. List of Testing tools 6c. Writing test cases 6d. Overview of test case planning	6.1 The benefits of Automation & Tools 6.2 List of Testing tools 6.3 Test Tools: Viewers and Monitors Programmed Macros, Stubs, and Stress & Load Tools. 6.4 Software Test Automation: Macro Recording & Playback, Programmed Macros, Fully Programmable, Automated testing tools 6.5 Writing Test Cases: The goals of Test Case Planning, Test Case Planning overview, Test Design, Test Cases. Test Procedures.

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
1	Fundamentals of Testing	08	4	5	4	13
2	The Realities of Software Testing & Examining the specification.	08	4	5	4	13
3	Black Box Testing	08	4	4	5	13
4	White Box Testing	10	4	4	5	13
5	Testing Levels & Types	08	4	5	6	15
6	Automated Testing , Test Tools and Test Cases Writing	06	4	4	5	13
		48	24	27	29	80

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	01	Introduction to Software Testing	2
2	03	Implement black box data testing for given form	2
3	06	Introduction to Software Testing Tools	2
4	06	Write test case to login a specific web page.	2
5	06	Write test case to update 10 records into given table of excel file.	4
6	06	Write test cases to select the number of students who have scored more than 60 in any one subject (or all subjects)	2
7	06	Write test cases for total number of objects present / available on the page	2
8	06	Write and test cases to get the number of list items in a list / combo box	4
9	06	Write test cases to check number of items present on a desktop	4
10	06	Write test cases for any application e.g. Railway reservation System, etc	2
11	06	Write test cases to demonstrate use of control statements	2
12	06	Write test cases to demonstrate use of loop statements	2
13	06	Implement automation testing using winrunner for any windows application	2
		Total	32

8. SUGGESTED STUDENTS ACTIVITIES

Other than class room and laboratory activities following are the suggested guided co-curricular students activities which need to be undertaken to facilitate the attainment of various course outcomes of this course. The students are required to maintain portfolio of their experiences which he/ she will submit at the end of the term.

a. Internet Survey of various testing tools.

b. Test case and test plan management

c. Bug reporting and management

d. Presentations on advanced topics in software testing. Topics include: mutation testing, database testing, performance/load testing, and security testing, and automated test generation tools.

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-
b. Q & A technique.
c. Designing test cases
d. Guiding students for writing test plans.
e. Activity based learning
f. Assign mini projects

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Software Testing	Ron Patton	SAMS Tech Media
2.	Software Testing	Ron Patton	Pearson 2nd Edition
3	Software Testing: Principles & Practicals	Srinivasan Desikan, Gopalswamy Ramesh	Pearson Education

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

Hardware : Desktop Computer P-IV processor or higher
Software : Microsoft 2003 /any higher version , Winrunner, Test Director

12. LEARNING WEBSITE & SOFTWARE

a. http://seleniumhq.org/

b. http://sourceforge.net/projects/sahi/

c. http://testng.org/doc/index.html

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Identify the qualities of software tester.	-	3	-	-	-	-	-	-	-	-	-	-
2	Select testing specifications for quality assurance.	-	3	2	2	-	-	-	-	-	2	-	-
3	Apply Black Box testing and its types.	-	3	2	2	-	-	-	-	-	2	-	-
4	Apply White Box testing and its types.	-	3	-	3	-	-	-	-	-	3	-	-
5	Identify testing types.	-	2	2	2	-	-	-	-	-	2	-	-
6	Design the test plan for given application.	-	1	1	1	-	-	-	-	-	1	-	1

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Prachi P. Deshpande	Lecturer in Information Technology, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- ADVANCED DATABASE MANAGEMENT SYSTEM

COURSE CODE 6P502

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering & Information Technology	Sixth

1. RATIONALE

Advanced database management system is a diversified level course aims at designing of database for business, scientific and engineering application. At the end of this course the students will be able to develop simple and advanced PL/SQL code blocks also able to design relational database for industrial and educational projects.

2. COMPETENCY

Students will be able to:

"Design a relational database system with appropriate functionality to process the data and with constraints to maintain data integrity and avoid data redundancy.

Execute Advance SQL queries related to transaction processing."

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (OR)	PA (TW)	150
3	-	2	05	80	20	#25	25	
Duration of the Examination (Hrs)				3	1	--	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Design object oriented Data Model.
2. Types of transactions and implementation of Atomicity and durability.
3. Design of parallel database systems.
4. Design distributed transaction model.
5. Methods of recovery systems.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit - I Object Oriented Database	1a. New Applications of database system 1b. Design object oriented data model 1c. Explain object oriented languages	1.1 New database application 1.2 The object oriented data model 1.2.1 object structure 1.2.2 object classes 1.2.3 Inheritance 1.2.4 Object identity 1.2.5 Object containment 1.3 Object oriented languages 1.4 Persistent programming languages 1.5 The ODMG C++ object definition language
Unit - II Transactions	2a Describe transaction concepts 2b States of transaction 2c Explain concurrent execution of transaction 2d Explain Serializability and recoverability	2.1 Transaction concepts 2.2 Transaction state 2.3 Implementation of atomicity & durability 2.4 Concurrent execution 2.5 Serializability 2.6 Recoverability
Unit - III Parallel Database	3a. Overview of parallel database 3b. Explain I/O parallelism 3c. Describe Interquery parallelism 3d. Describe Intraquery parallelism 3e. Describe Intraoperation parallelism	3.1 Introduction 3.2 I/O parallelism 3.3 Interquery parallelism 3.4 Intraquery parallelism 3.5 Intraoperation parallelism 3.6 Interopeartion parallelism 3.7 Design of parallel system

	3f. Describe Interoperation parallelism 3g. Design parallel system	
Unit - IV Distributed Database	4a. Overview of distributed data storage 4b. Explain distributed query processing 4c. Describe distributed transaction model 4d. Explain concurrency control 4e. Concept of deadlock handling 4f. Explain Multidatabase systems	4.1 Distributed data storage 4.2 Distributed query processing 4.3 Distributed transaction model 4.4 Commit protocols 4.5 Coordinator selection 4.6 Concurrency control 4.7 Deadlock handling 4.8 Multidatabase systems
Unit - V Recovery System	5a. Overview of recovery systems 5b. Explain log based recovery 5c. Describe shadow paging 5d. Describe advanced recovery technique	5.1 Failure classification 5.2 Storage structure 5.3 Recovery & Atomicity 5.4 Log based recovery 5.5 Shadow paging 5.6 Recovery with concurrent transactions 5.7 Advanced recovery technique

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
1	Object oriented database	12	8	4	8	20
2	Transactions	12	8	4	10	22
3	Parallel database	10	4	4	4	12
4	Distributed database	08	4	4	6	14
5	Recovery system	06	4	4	4	12
	Total	48	28	20	32	80

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	01	Implementation of Object Oriented database – Extended entity relationship	2
2	03	Implementation of parallel database	4
3	03	Implementation of parallel join and parallel sort	4
4	06	Implementation of triggers and assertion for bank database.	2
5	06	Construction of knowledge database	4
6	05	Study and working of WEKA tool	2
7	04	Query processing – Implementation of efficient query optimizer	4
8	04	Designing XML schema for company database.	2
9	03	Implement Distributed database for bookstore.	4
10	03	Deadlock detection algorithm for distributed database using wait for graph.	4
		Total	32

8. SUGGESTED STUDENTS ACTIVITIES

Other than class room and laboratory activities following are the suggested guided co-curricular student's activities which need to be undertaken to facilitate the attainment of various course outcomes of this course. The students are required to maintain portfolio of their experiences which he/ she will submit at the end of the term.

a. Creating object oriented database
b. Design a parallel database model for any real time database system.
c. Discuss Advanced recovery techniques

9. Mini project: Create any distributed database system

10. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

a. Improved Lecture methods-
b. Q & A technique.
c. Designing real time object oriented data model.
d. Guiding students for designing real time parallel database system.
e. Observe students and monitor the performance of students.
f. Activity based learning.

g. Assign mini projects.

11. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Database system concepts	Henry Korth	MGH
2.	SQL / PL-SQL	Ivan Bayross	BPB
3	An Introduction to Database Systems	C. J. Date	Pearson Education
4	Oracle – The complete reference	Oracle Press	TMH

12. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

Hardware : Desktop Computer P-IV processor or higher
Software : Microsoft 2003 /any higher version , Oracle, SQL Server,MySQl

13. LEARNING WEBSITE & SOFTWARE

a. Ms-Access Tutorial : http://www.quackit.com/microsoft_access/tutorial/
b. SQL Basic Concepts: http://www.w3schools.com/sql/
c. SQL Tutorial : http://beginner-sql-tutorial.com/sql.htm
d. DBMS:http://nptel.iitm.ac.in/video.php?subjectId=106106093

14. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Design object oriented Data Model.	-	3	3	3	-	-	-	-	-	2	-	-
2	Types of transactions and implementation of Atomicity and durability.	-	3	3	3	-	-	-	-	-	-	-	-
3	Design of parallel database systems.	-	3	2	3	-	-	-	-	-	-	-	-
4	Design distributed transaction model.	-	3	3	2	-	-	-	-	-	1	-	-
5	Methods of recovery systems.	-	3	-	-	-	-	-	-	-	3	-	-

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Prachi P. Deshpande	Lecturer in Information Technology, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE: GEOGRAPHICAL INFORMATION SYSTEM (GIS)

COURSE CODE: 6P503

Diploma programme in which course is offered	Semester in which course is offered
INFORMATION TECHNOLOGY	**SIXTHSEMESTER**

1. RATIONALE

Geographic Information System (GIS) is applied level course deals with the analysis and management of geographic information. This course offers an introduction to methods of managing and processing geographic information. Emphasis will be placed on the nature of geographic information, data models and structures for geographic information, geographic data input, data manipulation and data storage, spatial analytic and modeling techniques, and error analysis.

2. LIST OF COMPETENCIES

The student will be able to:

"Analyze and process geographic information"

3. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	ESE	PT	ESE (TW)	OR	
03	00	02	05	80	20	25	#25	150
Duration of the Examination (Hrs)				3	1	2	--	

Legends: L-Lecture; **T** – Tutorial/Teacher Guided Theory Practice; **P** -Practical; **C** – Credit, **ESE**-End Semester Examination; **PT**- Progressive Test; **PA**- Progressive Assessment **OR**-Oral examination.

4. COURSE OUTCOMES

I. Identify components and operation of geographic information system.

II. Apply transformation on geographic data.

III. Use of different data models and structures for geographic information

IV. Demonstrate GIS processing and visualization of GIS data.

V. Use of software to handle geographic data, data manipulation and data storage

VI. Apply GIS technology for given area

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics and Sub-topics
UNIT-I Introduction to GIS	1a Demonstrate understanding and competency of GIS theory. 1b Fundamental knowledge of coordinate system. 1c Geographic data's components.	1.1 Introduction, Definition of GIS, Evolution of GIS, components of GIS, 1.2 Geographically referenced data, Geographic, projected and planer coordinate system 1.3 GIS operation, Future of GIS
Unit - II Data Input and Geometric transformation	2a Recognizing and identifying spatial and non-spatial data. 2b Competency of conversion of GIS data	2.1 Spatial & Non-spatial Data, Data information, data type, data sources, characteristics of spatial and non-spatial data २.२ existing GIS data, Metadata, Conversion of existing data, Creating new data Geometric transformation
UNIT-3 Geographic Data Management and Models	3a Models of GIS data 3b Demonstrate understanding and competency Geographic projection 3c Recognizing and identifying Raster and Vector data model	3.1 Models of GIS, Geographical Data Models, Map as a Model 3.2 Spatial Referencing System 3.3 Map Projections, Commonly Used Map Projections, Types of map, Grid system 3.4 Cartographic Symbolization 3.5 Conceptual Models, Raster and Vector data models.
UNIT-4 GIS Data Processing, Analysis and	4a Competency of GIS data processing 4b Demonstrate visualization of geographic data.	4.1 Raster based GIS data processing; Vector based GIS data processing 4.2 Visualization of geographic information, 4.3 principles of cartographic design in GIS

Visualization	4c Analysis of Vector/ Raster data	४.४ Vector data analysis, Raster data analysis
UNIT-5 Data Processing System	5a Understanding of GIS Software 5b Understanding of GIS Spatial data infrastructure	5.1 GIS software, GIS open source software 5.2 GIS Architecture and functionality 5.3 Spatial data infrastructure (SDI) 5.4 Spatial data capture and representation, spatial data presentation and storage spatial query and analysis 5.5 GIS and data management system.
UNIT-6 Applications of GIS and Remote Sensing Fundamentals	६a Understanding of GIS uses and application	6.1 Changes in Technology related to GIS, Trends in GIS, GIS users 6.2 Urban and Municipal Applications, Other Applications 6.3 Remote Sensing - Basic Principles.

6. SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R	U	A	Total
I	Introduction to GIS	06	04	04	00	08
II	Data Input and Geometric transformation	08	04	08	04	16
III	Geographic Data Management and Models	10	08	08	04	20
IV	GIS Data Processing, Analysis and Visualization	10	04	08	04	16
V	Data Processing System	08	04	04	04	12
VI	Applications of GIS and Remote Sensing Fundamentals:	06	04	04	00	08
Total		48	20	26	34	80

Legends: R = Remembrance; U = Understanding; A = Application and above levels (Revised Bloom's Taxonomy)

7. SUGGESTED LIST OF EXERCISES/PRACTICAL/EXPERIMENTS

Sr.no.	Unit No.	Practical Exercises	Total Hrs.
1	1	Import data to generate coordinate system.	02
2	1	Create topology to Generate data (points, line, polygons).	02
3	2	Perform Geo-referencing and image registration	02
4	2	Fetch GIS data by Querying	02
5	3	Explore GIS software features, Import/ Export data in open source GIS software	02
6	3	Perform shape and coverage file, import of data, feature class, geodatabase, data frames, displaying qualitative/quantitative features, labelling features in ArcGIS	02
7	4	Perform Geo-referencing activities- Coordinating system, datum conversion, map projection, storing and viewing projection information in ArcGIS.	04
8	4	Perform activities on Vector data 1. creating new features, 2. Editing functions, 3. digitization, 4. errors and creation of topology	04
9	5	Perform analysis on Spatial data 1. Query by location/ attribute, 2. Buffer, overlay analysis, 3. Interpolation methods.	04
10	5	Perform operation on Non-Spatial data 1. table manipulation, 2. table relation, 3. creation of graphs and reports.	04
11	6	Perform Map design and map composition	04
		Total	32

8. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

Following is the list of proposed student activities like:

1. Explore various open source GIS software
2. Three definitions of GIS taken from books, journals, and/or the World Wide Web. Each definition should include the source
3. Read the “History of GIS”, prepare a one-page summary
4. Comparing Projections: Advantages and Disadvantages
5. Organization of an event to promote use bicycle in maintenance of physical self

9. SPECIAL INSTRUCTIONAL STRATEGIES

These are sample strategies, which a teacher can use to facilitate the attainment of courseoutcomes.

a. Improved Lecture methods-

b. Question& Answer technique.

c. Demonstration

d. Seminars

e. Activity based learning

10. SUGGESTED LEARNING RESOURCES

Sr.No	Author	Title of Books	Publication
1	Kang-Tsung Chang	Introduction to Geographic Information Systems	Tata Mcgraw Hill
2	Burrough and R. A. Mcdonnel	Principles of geographical information systems"	Oxford University Press.
3	Otto Huisman And Rolf A. de	Principles of geographical information systems"An introductory textbook	ITC
4	C.P.Lo, Albert K. W.	Concept and techniques of Geographic Information Systems	PHI, Second Edition, 2007

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED:

S. No.	Name of equipment	Brief specification
1	GIS open source software	GIS software

12. LIST OF LEARNING WEBSITES

1. http://www.ncgia.ucsb.edu/giscc/

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

Sr.No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
CO1	Understanding of geographic information	2	1	-	-	-	-	-	-	-	-	-	-
CO2	Learn methods of managing and processing geographic information.	2	3	3	-	-	-	-	-	-	-	2	-
CO3	Use of different data models and structures for geographic information	3	3	2	-	-	-	-	-	-	-	2	-
CO4	Demonstrate the ability of geographic data input, data manipulation and data storage	-	3	3	-	-	-	-	-	-	-	-	-
CO5	Spatial analytic and modelling techniques, and error analysis	-	3	2	1	-	-	-	-	-	-	-	1
CO6	Learn application of GIS	3	3	-	-	-	-	-	-	-	-	-	-

Course Curriculum Design Committee

Sr No	**Name of the faculty members**	**Designation and Institute**
1	Mr P. B. Lahoti	Lecturer InComputer Engineering
2	Mr. P. S. Hiwale	Lecturer In Computer Engineering

Member Secretory(PBOS) (Chairman PBOS)

COURSE TITLE **OBJECT ORIENTED TECHNOLOGY USING UNIFIED MODELING DESIGN (UML)**

COURSE CODE **6P504**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering	Forth

1. RATIONALE

Object Oriented Technology is a diversified level course intends to create confidence in students of Computer Engineering for an Object oriented approach to software development. It is based on modeling objects from the real world and then using the model to build a language independent design. This subject will be useful for student to understand concepts of object Oriented Programming Systems & to model these concepts using UML for any application.

2. COMPETENCY

The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competency:

" **Design the Software development models using UML**"

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (OR)	PA (TW)	150
3	-	2	05	80	20	25#	25	
Duration of the Examination (Hrs)				3	1	2	--	

Legends : L-Lecture**; T-**Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C-** Credits**; ESE-** End Semester Examination**; PT – Progressive Test, PA-** Progressive Assessment, PR- Practical Examination,OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

The theory should be taught and practical should be carried out in such a manner that students are able to acquire different learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- Recognize and Interpret the importance of Object Oriented concepts
- Prepare an Object Model for a given Problem statement
- Demonstrate and Select required design tools.
- Design the concepts of Class diagram, Object diagram, Interaction diagram, State chart Diagram, Use case Diagram, Sequence Diagram for any give system
- Design UML Behavioural Modelling diagrams for any given system

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit – I Introduction to Modeling	1a. Describe various types of Modeling techniques 1b. Explain Four principles of Modeling	1.1 Brief overview of OMT model by Rambaugh 1.2 Booch methodology, Use case driven approach (OOSE) by Jacobson 1.3 Overview of CRC card method by Cunningham 1.4 Importance of Modeling, Four principles of Modeling
Unit– II Object Modelling	2a. Concepts of Object Classes 2b. Explain Generalization, Inheritance, Aggregation, Association	2.1 Objects and Classes,Object Diagram,Attributes 2.2 Operation,Methods 2.3 Links, Associations, Advanced Concepts 2.4 Multiplicity Link Attributes, Association as a class, Aggregation 2.5 Generalization & Inheritance, Group Constructs 2.6 Aggregation Vs Association and Generalization

		2.7 Recurssive Aggregation, Propagation of Operation 2.8 Abstract classes, Multiple Inheritance, Metadata
Unit– III Overview of UML	3a. Describe UML 3b. Explain Conceptual Model of UML 3c. Discuss architectural Meta Model 3d. Explain Unified Software Development Life Cycle	3.1 Overview of UML 3.2 Scope of UML 3.3 Conceptual Model Of UML 3.4 Architectural Meta Model 3.5 Unified Software Development Life Cycle 3.6 Introduction to UML Diagram
Unit– IV Structural Modelling & Use Case	4a. Draw Class diagrams 4b. Dram Advanced class diagram 4c. Explain Packages, Instances 4d. Draw Object diagram 4e. Draw Use case Diagram	4.1 Class Diagram & Advanced Class Diagram 4.2 Advanced Classes and Relations 4.3 Interfaces, Types & Roles 4.4 Packages, Instances, Object Diagram 4.5 Use Case Diagram
Unit– V UML Behavioural Modelling	5a Explain and Draw Interaction diagram & its type 5b Explain and Draw State Chart Diagram 5c Explain and Draw Activity Diagram 5d Explain and Draw Component Diagram 5d Explain and Draw Deployment Diagram	5.1 Interaction Diagram 5.1.1 Sequence Diagram 5.1.2 Collaboration Diagram 5.2 State Chart Diagram 5.3 Activity Diagram 5.4 Component Diagram 5.5 Deployment Diagram

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit No	Title Of Unit	Teaching Hours	Distribution Of Theory Marks			
			R level	U Level	A Level	TOTAL
I	**Introduction to Modeling**	06	2	4	4	10
II	**Object Modeling**	08	2	4	8	14
III	**Overview of UML**	08	2	4	8	14
IV	**Structural Modeling & Use Case**	14	4	6	12	24
V	**UML Behavioural Modelling**	12	4	6	10	20
	Total	**48**	**14**	**24**	**42**	**80**

Legends: *R – Remember, U – Understand, A – Apply and above (Bloom's revised Taxonomy)*

7. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1.	I	Introduction to Object Oriented Technology.	02
2.	I	Gather design requirements for any particular system.(System should be chosen by students and next carried out for rest practices)	04
3.	II	Introduction to UML tools and select any one tool to design diagrams.	02
4.	II	Design total schema of chosen system	04
5.	II	Draw Object diagram Using tool like EdrawMAx	02
6.	II	Draw Class diagram & Advanced Class Diagram Using tool like EdrawMAx	04

7.	II	Draw Use Case diagram Using tool like EdrawMAx	02
8.	III	Draw Sequence diagram Using tool like EdrawMAx	02
9.	III	Draw Collaboration diagram Using tool like EdrawMAx	02
10.	III	Draw State Chart diagram Using tool like EdrawMAx	02
11.	IV	Draw Activity diagram Using tool like EdrawMAx	02
12	IV	Draw Component diagram Using tool like EdrawMAx	02
13	VI	Draw Deployment diagram Using tool like EdrawMAx	02
Total			32

8. SUGGESTED STUDENTS ACTIVITIES

i. Prepare power point presentation for different UML diagrams their terms and concepts.
ii. Practice to draw various UML diagrams for various systems.
iii.Prepare charts of symbols of UML Tools

9. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

These are sample strategies, which a teacher can use to facilitate the attainment of course outcomes.

i.Demonstrate practical thoroughly before the students perform.
ii.Assign different types of Micro-projects
iii.Guide students in preparing Micro-projects.

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
S. No.	**Title of Book**	**Author**	**Publication**
1.	Object Oriented Modeling & Design	Rambaugh Blaha	PHI

2.	The UML User Guide	Booch, Jacobson, Rambaugh	Addison Weley
3.	Practical OOD with UML	Mark Paiestly	PHI
4.	UML in Shell	Sinon Alhain	PHI

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

Sr.NO.	Name of the Equipment	Specification
1.	Computer System with latest configuration and memory	
2.	Multimedia Projector	

12. LEARNING WEBSITE & SOFTWARE

a. www.nptel.com
b. *www.uml.org/*
c. *https://www.tutorialspoint.com/uml/*
d. *https://www.youtube.com/watch?v=OkC7HKtiZC0*

Software's:

i. **EDraw max**
ii. **StarUML**
iii. **UMLet**

13. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	**Recognize and Interpret the importance of Object Oriented concepts**	**0**	**3**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**2**	**0**	**0**

2	**Prepare an Object Model for a given Problem statement**	**0**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
3	**Demonstrate and Select required design tools.**	**0**	**1**	**0**	**2**	**0**	**0**	**0**	**1**	**1**	**2**	**0**	**0**
4	**Describe And design the concepts of Class diagram, Object diagram, Interaction diagram, State chart Diagram, Use case Diagram, Sequence Diagram for any give system**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**3**	**3**	**0**	**0**	**0**
5	**Describe And design UML Behavioural Modelling diagrams for any give system**	**0**	**0**	**0**	**3**	**0**	**0**	**0**	**3**	**3**	**3**	**0**	**0**

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	Ms.Prajakta.S Sadafule	Lecturer in Computer Engineering, Govt. Polytechnic,Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **(IMPLANT)VOCATIONAL TRAINING(VT)**

COURSE CODE **6S503**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Computer Engineering / Information Technology	Sixth

1. RATIONALE

Computer Engineering & Information Technology technician program is mainly integrated with practical experiences. A software developer & tester are responsible gathering requirement, planning, designing, coding, testing & deploying the software in various areas of software industry. While working in the industry a technician is employed for planning, preparation, supervision, and maintaining quality of sofrware/ web sites/ networking.. In plant training program will help in enhancing the knowledge and skills of the software developer & tester.

2. COMPETENCY

After learning this course student will be able to

"Establish or relate theoretical knowledge with practical site situations to enhance career and professional skills"

3. TEACHING AND EXAMNATION SCHEME

Teaching Scheme (Hours/ Credits)			Total Credits (L+T+P)	Examination Scheme (Marks)				
				Theory		Practical		Total
L	T	P	C	ESE	PT	ESE (OR)	PA (TW)	100
00	-	04	04	00	00	@50	50	
Duration of the Examination (Hrs)				--	--	02	--	

Legends : L-Lecture**; T**-Tutorial/Teacher Guided Theory Practice **; P-** Practical**; C**- Credits**; ESE**- End Semester Examination**; PT – Progressive Test, PA**- Progressive Assessment, OR – Oral Examination, TW - Term Work, # External, @ Internal

4. COURSE OUTCOMES

At the end of studying this course students will be able to: -

1. Identify the area like development, h/w maintenance, networking in industry.
2. Identify the problem statement and process to resolve the problem
3. Select appropriate tools/software.
4. Maintain daily dairy to note the observations at work place on daily basis.
5. Prepare a detailed report based on the learning experiences during vocational training

5. DETAILED COURSE CONTENTS

Following are the general guidelines for implementation of Vocational training

Final year students of Computer Engineering & Information Technology program are expected to work individually for vocational training. Every student shall work parallel with a regular employed person of the permitted industry as a trainee in an industry for at least one week as decided by the department authorities under the guidance of faculty members. (Preferable, to be undertaken during previous semester break i.e at the end of V Semester exam for 4 weeks duration).

Further vocational Training work is to be continued weekly and shall be the part of time table for completion of different activities in the further semester as per the curriculum.

Finally, the student shall prepare the report of his vocational training under the guidance of the teaching staff members (Maximum 35 pages) which may consists of requirement, flow diagrams, process/steps, s/w & h/w requirements, test cases (if any), logs to be maintained for maintenance, simple designs, processes, applications, managements, costing aspects. Student should deliver a seminar on his experiences during in plant training.

Preferable Period : Vocational Training is to be undertaken during previous semester break i.e in vacation after Fifth Semester examination or in vacation before start of Sixth semester for 4 weeks duration)

6. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

S. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
1	A	**Term work** 1. Identify the industry. 2. Take concerns and depute the student along with faculty members. 3. Maintain the record of all visits and work done by student during training on daily basis	**32* Hrs**- Min) Semester Break Activity. 32 Hours in sixth semester.
2.	B- I	Review of literature survey and Analysis of data collected during training.	**08**
3	B-II	Preparing of rough draft along with collected information, facts & findings.	**08**
4	B-III	Group discussion in presence of guide Give presentation - ppts / models / charts / drawings etc.	**08**
5	B-IV	Prepare Final report with all attachments. (Spiral Binding of the vocational training work and term work completion.)	**08**
Total Hours.			**32* + 32 = 64 hrs**

7. SUGGESTED STUDENTS ACTIVITIES

I. Aspects to be considered for Vocational training / report writing of it.

- To solve the minor industrial problems.
- Develop the Entrepreneurial skills.
- Develop ability to work in a team.
- To enhance the presentation skills
- Project reports preparations & cost analysis,
- To be familiar with financial sources.

II. SUGGESTED AREAS FOR THE SEMINAR:

AREA OF COMPUTER ENGINEERING /	1. Image Processing

INFORMATION TECHNOLOGY	2. Cloud Computing 3. Networking 4. Software Engineering 5. Internet of Thing 6. Computer, Information, Web & Network Security 7. Computer Vision 8. Machine Learning 9. Data Warehousing & Mining 10. Soft Computing 11. Artificial Intelligence 12. Parallel Computing 13. Semantic Web Mining 14. Optimization Technique 15. Mobile Computing 16. Recent Technology / Latest Trends in tecnology

8. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

1 Consider Local / Institute problem or problem related to society for providing technical solution.

2 Visit the site.

3 Take permission of concerned authority.

4 Follow Instructions.

5 Write daily dairy regularly at site.

6 Prepare sketches on dairy / on plain pages.

7 Collect drawings and leaflets.

8 Group discussions.

9 Prepare report.

10 Prepare power point presentation for final assessment of vocational training

Vocational Training Report Format

1. Vocational Training report shall be in the print form on A-4 size white bond paper.
2. Typing shall be in Times New Roman with spacing of 1.5 using one side of paper.
3. Margins: Left = 37.5 mm Right, Top and Bottom = 25mm.
4. Front page: Titles - TNR 18 bold, other – TNR 14 bold. With Institute Logo.
5. Inner Pages: Titles –TNR – 14 Bold, other TNR 12.
6. Page Nos: Should appear on the right hand top corner of each page starting after index page.
7. Tables to be preferable in the Text format only.
8. Sketches to be drawn on separate sheet / pages in black ink.
9. The Last content in the index to be of references. Acknowledgement to be added in the report.

   Binding: Spiral binding is preferred for the seminar report. The number of copies are to be prepared by the student are 3 nos. (Student + Guide + Department copy)

9. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment	Brief specification
1.	Desktop PC	Computer Systems with minimum i-3 intel pentium processor (or equivalent) and 1 GB RAM.
2.	LCD Projector	

A) DAILY DAIRY FORMAT

GOVERNMENT POLYTECHNIC, AURANGABAD

Civil Engineering Department

VOCATIONAL TRAINING DAILY DAIRY

Period of Vocational training (4 Weeks) : From : to:

Address of Industry / Site:----------

DAY NO : Date:

OBSERVATIONS OF THE DAY

Signature of Student **Signature of Engineer In-charge**

Signature of Guide **Signature of Head of Dept.**

10. MAPPING OF PROGRAMME OUTCOMES (POs) AND PROGRAMME SPECIFIC OUTCOMES (PSOs) WITH COURSE OUTCOMES (COs)

S No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Identify the area like development, h/w maintenance, networking in industry.	--	3	--	3	--	--	--	---	--	--	--	2
2	Identify the problem statement and process to resolve the problem	--	1	--	---	--	--	--	---	---	--	--	2
3	Select appropriate tools/software.	---	--	3	3	---	---	--	1	--	--	1	
4	Maintain daily dairy to note the observations at work place on daily basis.	--	3	--	--	--	--	--	2	--	--	2	2
5	Prepare a detailed report based on the learning experiences during vocational training	--	3	3	---	--	---	---	---	--	--	--	2

Course Curriculum Design Committee

Sr No	Name of the faculty members	Designation and Institute
1	P B Lahoti	Head of the Department, Govt. Polytechnic, Aurangabad
2	V B Kundlikar	Lecturer in Information Technology

(Member Secretary PBOS) (Chairman PBOS)