INFORMATION TECHNOLOGY

Government Polytechnic Aurangabad

(An Autonomous Institute of Government of Maharashtra)

Curriculum Document 2017-18

Diploma in Information Technology

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

Sr No.	Content		Page No.
1	Government Polytechnic Aurangabad		i
1.1	Vision		i
1.2	Mission		i
2	Information Technology Department		ii
2.1	Vision		ii
2.2	Mission		ii
3	Scope		iii
4	Outcome Base Education		viii
4.1	Introduction		viii
4.2	Philosophy		x
4.3	Approach		x
4.4	Flowchart		xii
5	Skill Identification/ Job Function		xiii
6	PEO		xiv
7	PO & PSO		xiv
8	Mapping of Mission and Programme Educational Objectives (PEO'S)		xvi
9	Mapping of Programme Educational Objectives (PEO'S) and Programme Outcomes (PO'S)		xvi
10	Mapping of Programme Outcome and Courses		xvii
11	Program Structure		xix
12	Sample Path (10th Pass)		xxv
13	Semester Wise Course List		xxvi
14	Award Winning Course		xxix
	Course Content		
	Course Code	**Course Name**	
15	**Semester I**		**1-50**
15.1	6G101	Basic Mathematics	1-6
15.2	6G103	Engineering Physics	7-13
15.3	6S201	Fundamentals of Computer & Internet Technology	14-20
15.4	6G203	Basics Computer Systems	21-27
15.5	6G301	English	28-33
15.6	6G303	Development of Life Skill	34-41
15.7	6G304	Environmental Science	42-50
16	**Semester II**		**51-99**
16.1	6G102	Engineering Mathematics (EMT)	51-55
16.2	6G104	Engineering Chemistry (ECH)	56-63
16.3	6G202	Workshop Practice(WP)	64-71
16.4	6S202	Elements of Electronic & Electrical (EEE)	72-79
16.5	6S204	C Programming	80-87

16.6	6S205	Static Web Page Designing Lab (SWPDL)	88-93
16.7	6G302	Communication Skills (CMS)	94-99
17	**Semester III**		**100-141**
17.1	6S203	Digital Electronics	100-107
17.2	6S206	Multi Media Techniques (MMT)	108-114
17.3	6S208	Object oriented programming using C++ (OOP)	115-122
17.4	6T401	Information Communication Techniques (ICT)	123-129
17.5	6S401	Relational Database Management Systems (RDBMS)	130-136
17.6	6S405	Software Engineering (SE)	137-141
18	**Semester IV**		**142-207**
18.1	6S207	Data Structures (DS)	142-148
18.2	6T301	Digital Memory system (DMS)	149-156
18.3	6S402	Software Development Tool (SDT)	157-163
18.4	6S403	JAVA Programming (JP)	164-171
18.5	6S404	Operating Systems (OS)	172-177
18.6	6S406	PHP programming	178-186
18.7	6S407	Ruby	187-193
18.8	6S408	python	194-201
18.9	6S409	Android Programming	202-207
19	**Semester V**		**208-277**
19.1	6S305	Industrial Organization Management (IOM)	208-215
19.2	6T403	Open Source Technology Laboratory (OSTL)	216-221
19.3	6T404	Information Security(IS)	222-227
19.4	6T405	Mobile Communication (MOC)	228-235
19.5	6S501	Seminar (SMR)	236-242
19.6	6T501	Object Oriented Modelling And Designing (OOMD)	243-249
19.7	6T406/6P406	Data Warehousing And Mining (DWM)	250-256
19.8	6T407/6P407	Cloud computing	257-263
19.9	6T408	Internet of things	264-270
19.10	6T409	Network And Web Application Security (NWAS)	271-277
20	**Semester VI**		**278-344**
20.1	6G306	Entrepreneurship Development (EDP)	278-285
20.2	6T302	Enterprise Resource planning (ERP)	286-290
20.3	6T402	Network Management & Administration (NMA)	291-297
20.4	6S502	Project Work (PRJ)	298-305
20.5	6S503	Vocational Training (VT)	306-312
20.6	6S504	Advanced JAVA Programming (AJP)	313-319
20.7	6S505	Software Testing (ST)	320-325
20.8	6T502/6P502	Advanced Database Management Systems (ADBMS)	326-331
20.9	6T503/6P503	Geographical Information System (GIS)	332-337
20.10	6T504	Computer Graphics(CG)	338-342

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 Information Technology

Vision

"A center of excellence to develop competent IT professional in the domain of IT & IT enabled Services (ITeS)and pursue entrepreneurship along with digitization of society".

Mission

- *To inculcate concepts, skills & capabilities in Information Technology diploma graduates to design and develop computational systems for diversified business application.*
- *To develop values, ethics, life skills & leadership skills required for successful employment / self-employment / enterprise in multicultural & multidisciplinary teams lead towards the growth of society.*

SCOPE

DIPLOMA IN INFORMATION TECHNOLOGY 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 Information Technology 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 Information Technology 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 DIPLOMA GRADUATE IN INFORMATION TECHNOLOGY

- 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.
- Analyse and design systems.
- Administrate and Manage Networks.
- Programming Skills.
- Web based application skills.
- Web server administration skills.
- Entrepreneurial skills.
- Lifelong 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 outcome-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 Technology 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.

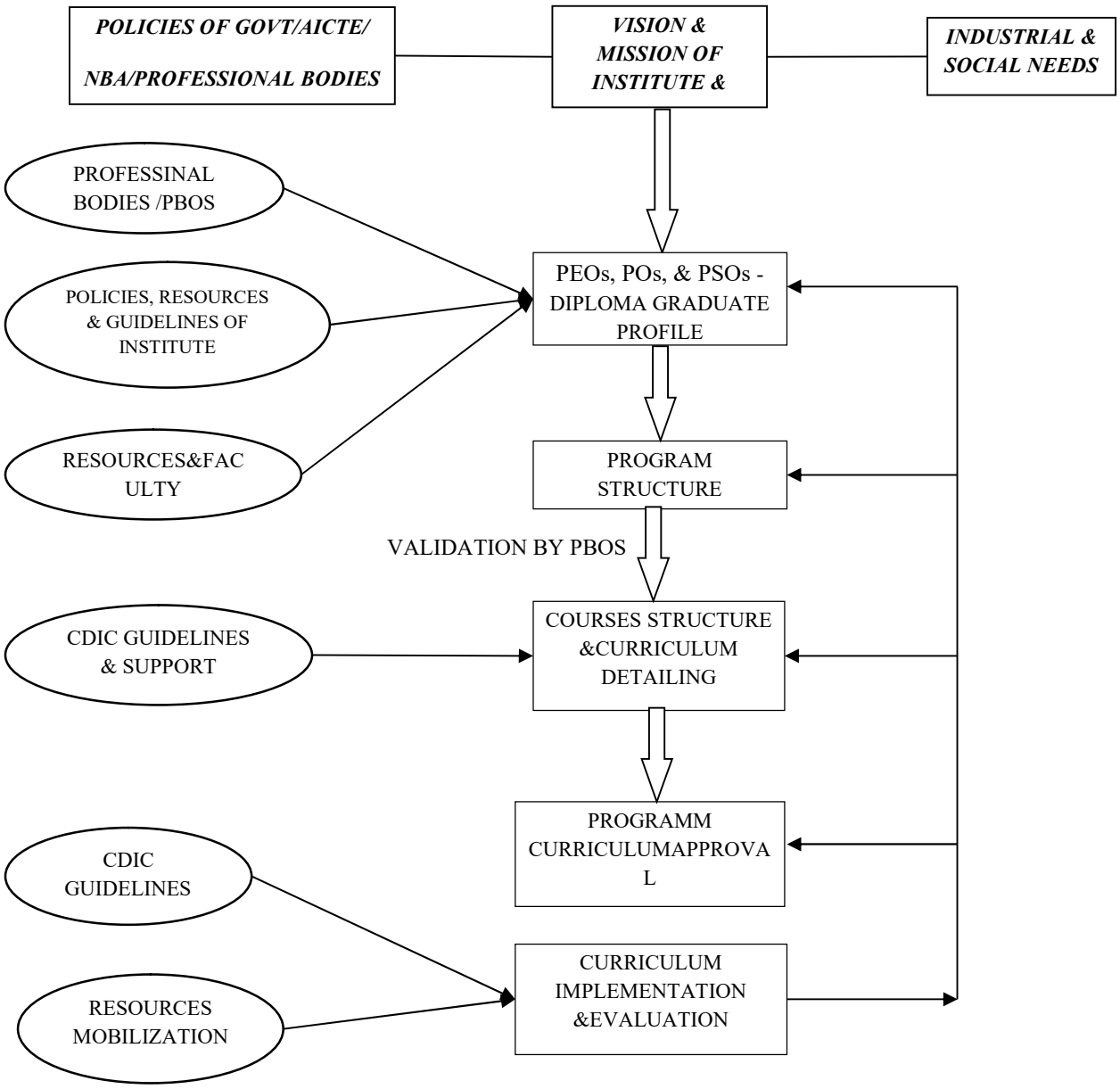
Approach to Curriculum Design and Development for Sixth Revision of Curriculum based upon above stages has been elaborated and depicted schematically as below.

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. Web application 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 design algorithm, implement programs and develop softwares for pursing career in industry, academia and allied industry.
2. To integrate capabilities of diploma graduates in technologies used particularly in sectors of communication, distributing computing and testing which are relevant to IT industry.
3. To familiarize with new trends in Information Technology and ready for life-long learning.

Programme Outcomes (POs)

A Diploma in Information Technology 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 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 a creative solution 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. **IT enabled service sector:** An ability to use and apply current technical concepts and practices in the core information technologies of data management, programming, networking, and web systems and technologies.
2. **Asst. programmer & Software Tester:** Ability to apply the fundamentals of information and computing technologies to identify, analyse, design, develop, test, debug and obtain solutions to complex engineering problems of IT industry.

MAPPING OF MISSION AND PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

Mapping	Mission		Justification
	M1	M2	
PEO1	3	1	• PEO1 is achieved through core engineering courses of Information technology that helps to attain mission 1 efficiently. • PEO1 partially helps to achieve mission 2 as that contains core courses and ability to do new innovations.
PEO2	3	2	• PEO2 efficiently helps to achieve mission 1 for developing business application through allied courses in Diploma In IT. • PEO2 helps to achieve mission 2 that improve capabilities of diploma graduates in the field of communication.
PEO3	2	3	• In every minute there is new upcoming technologies and updations in the field of Information Technology, so PEO3 helps in achieving missions of IT Program.

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 Courses
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 progr. Using C++ 3. Software Engineering 4. Information Communication Techniques 5. Multimedia techniques 6. Operating System 7. Java Programming 8. Software Development Tools 9. Elective-I
3	**PO3**	1. Java Programming 2. Software Development Tools 3. Elective-I 4. Advanced Java Prog. 5. Software Testing 6. OOMD 7. RDBMS
4	**PO4**	1. Java Programming 2. Software Development Tools 3. Elective-I

		4. Advanced Java Prog. 5. Software Testing 6. OOMD 7. RDBMS
5	**PO5**	1. EDP 2. EVS 3. Vocation Training 4. Project
6	**PO6**	1. EDP 2. EVS 3. Vocation Training 4. Project
7	**PO7**	1. IOM 2. ERP 3. IS
8	**PO8**	1. Vocation Training 2. Project 3. EDP 4. ERP
9	**PO9**	1. Vocation Training 2. Project 3. EDP 4. ERP
10	**PO10**	1. All Courses of level IV &V 2. Elective-II 3. Elective-III

PROGRAMME STRUCTURE

SR NO	LEVELS	COMPULSORY COURSES	OPTIONAL COURSES	CREDITS			MARKING SCHEME		
				COMPULSORY	OPTIONAL	TOTAL	COMPULSORY COURSES	OPTIONAL COURSES	TOTAL
1	Foundation	4	Nil	18	--	18	500	--	500
2	Basic Technology	11	Nil	49	--	49	1150	--	1150
3	Allied	07	02/15	29	04	33	725	--	725
4	Applied	13	02/08	52	10	62	1325	275	1600
5	Diversified	03	01/03	17	05	22	775	150	925
TOTAL		**38**	**05/26**	**175**	**19**	**194**	**4475**	**425**	**4900**

Scheme at a glance:

Total number of courses offered : 62

Number of Compulsory courses : 38

Number of Optional course : 05 out of 37

Total courses to be opted : 43

Total Marks : 4900

LEVEL- I: (FOUNDATION LEVEL COURSES)

Sr No	COURSE CODE	COURSE TITLE	TEACHING SCHEME					EXAMINATION SCHEME					
			TH	PR	TU	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**	**04**	**02**	**18**		**400**		**100**		**--**	**500**

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	PR	TU	CR	TERM	PT	TH	PR	TW	OR	TOTAL
01	**6G202**	Workshop Practice	00	03	0	03	II	--	--	--	50		50
02	**6G203**	Basics of computer System	00	02	0	02	I	--	--	@25	25	--	50
03	**6S201**	Fundamental Computer and Internet Technology	01	04	00	05	I	--	--	@50	50	--	100
04	**6S202**	Elements of Electronics& Electrical (EEE)	4	02	--	06	II	20	80	--	25	@25	150
05	**6S203**	Digital Electronics	03	02	0	05	III	20	80	@25	25	--	150
06	**6S204**	C Programming	03	04	0	07	II	20	80	#25	25	--	150
07	**6S205**	Static Webpage Designing Lab (SWDL)	-	02	0	02	II	--	--	@50	50	--	100
08	**6S206**	Multi Media Techniques (MMT)	01	04	--	05	III	--	--	#50	50		100
9	**6S207**	Data Structures (DS)	03	04	0	07	IV	20	80	@25	25	--	150
10	**6S208**	Object oriented programming using C++ (OOP)	03	04	0	07	III	20	80	#25	25	--	150
			18	31	00	49		100	400	275	350	25	1150
TOTAL			18	31	00	49		**500**		**650**			

Scheme at a glance:

Total number of courses offered : 10

Number of compulsory courses : 10

Number of optional courses : Nil

Total courses to be opted : 10

Total Credits : 49

Total Marks : 1150

LEVEL - III: (ALLIED LEVEL COURSES)

Sr No	COURSE CODE	COURSE TITLE	TEACHING SCHEME					EXAMINATION SCHEME					
			TH	PR	TU	CR	TERM	PT	TH	PR	TW	OR	TOTAL
01	**6G301**	English (ENG)	2	2	0	4	I	20	80	--	25	--	125
02	**6G302**	Communication Skills (CMS)	1	2	0	3	II	--	--	--	50	@25	75
03	**6G303**	Development of Life skills (DLS)	00	02	00	02	I	--	--	--	25	@25	50
04	**6G304**	Environmental Science (EVS)	0	02	0	02	I	--	--	--	50	--	50
05	**6G305**	Industrial Organization Management (IOM)	3	02	00	05	V	20	80	--	25		125
06	**6G306**	Entrepreneurship Development (EDP)	02	02	0	04	VI	--	--	--	50		50
07	**6T301**	Digital Memory system (DMS)	3	02	--	05	IV	20	80	@25	25	--	150
08	**6T302**	Enterprise Resource planning (ERP)	04	00	00	04	VI	20	80	00	00	00	100
09	**6G311 To 6G325**	NON-EXAM	--	02	--	2	II & III	--	--	--	--	--	--
10	**6G311 To 6G325**	NON-EXAM	--	02	--	2	II & III	--	--	--	--	--	--
								80	320	25	250	50	
		TOTAL	**15**	**18**	**00**	**33**		**400**		**325**			**725**

Scheme at a glance:

Total number of courses offered : 23

Number of compulsory courses : 08

Number of optional courses : 02 out of 15

Total courses to be opted : 10 out of 23

Total Credits : 33

Total Marks : 725

LEVEL-IV: (APPLIED LEVEL COURSES)

Sr No	COURSE CODE	COURSE TITLE	TEACHINGSCHEME					EXAMINATION SCHEME					
			TH	PR	TU	CR	TERM	PT	TH	PR	TW	OR	TOTAL
01	**6S401**	Relational Database Management Systems (RDBMS)	03	4	--	07	III	20	80	#25	25	--	150
02	**6S402**	Software Development Tool (SDT)	00	04	--	04	IV	--	--	#50	75	--	125
03	**6S403**	JAVA Programming (JP)	03	4	--	7	IV	20	80	#25	25	--	150
04	**6S404**	Operating Systems (OS)	04	2	--	6	IV	20	80	--	25	@25	150
05	**6S405**	Software Engineering (SE)	03	--	01	4	III	20	80	--	25	--	125
06	**Elective –I (Group-A)**												
	6S406	PHP programming	1	04	--	05	IV	--	--	#50	75	--	125
	6S407	Ruby	1	04	--	05	IV	--	--	#50	75	--	125
	6S408	Python	1	04	--	05	IV	--	--	#50	75	--	125
	6S409	Android Programming	1	04	--	05	IV	--	--	#50	75	--	125
07	**6T401**	Information Communication Techniques (ICT)	03	02	--	05	III	20	80	@25	25	--	150
08	**6T402**	Network Management & Administration (NMA)	1	2	--	3	VI	--	--	--	25	@25	50
09	**6T403**	Open Source Technology Laboratory (OSTL)	01	4	--	5	V	--	--	#50	75	--	125
10	**6T404**	Information Security(IS)	03	2	--	05	V	20	80	--	25	#25	150
11	**6T405**	Mobile Communication (MOC)	04	2	--	06	V	20	80	--	25	#25	150
12	**Elective –II (Group-B)**												
	6T406/ 6P406	Data Warehousing And Mining (DWM)	3	--	2	5	V	20	80	--	25	@25	150
	6T407/ 6P407	Cloud computing	3	--	2	5	V	20	80	--	25	@25	150
	6T408	Internet of things	3	--	2	5	V	20	80	--	25	@25	150
	6T409	Network And Web Application Security (NWAS)	3	--	2	5	V	20	80	--	25	@25	150
								160	640	225	450	125	
		TOTAL	**29**	**30**	**03**	**62**		**800**			**800**		**1600**

Scheme at glance:

Total number of courses offered : 18

Number of compulsory courses : 10

Number of optional courses : 02 out of 08

Total courses to be opted : 12 out of 18

Total Credits : 62

Total Marks : 1600

LEVEL-V: (DIVERSIFIED LEVEL COURSES)

Sr No	COURSE CODE	COURSE TITLE	TEACHING SCHEME					EXAMINATION SCHEME					
			TH	PR	TU	CR	TERM	PT	TH	PR	TW	OR	TOTAL
01	**6S501**	Seminar (SMR)	--	2	-	2	V	--	--	--	50	#25	75
02	**6S502**	Project Work (PRJ)	--	4	-	4	VI	--	--	--	100	#50	150
03	**6S503**	Vocational Training (VT)	0	4	-	4	V	--	--	--	50	@50	100
04	**6S504**	Advanced JAVA Programming (AJP)	03	04	-	07	VI	20	80	#25	25	--	150
05	**6S505**	Software Testing (ST)	03	02	-	05	VI	20	80	#25	25	--	150
06	**6T501**	Object Oriented Modeling And Designing (OOMD)	03	2	-	05	V	20	80	#25	25	--	150
07	**Elective- III (Group C)**												
	6T502/ 6P502	Advanced Database Management Systems (ADBMS)	3	2	-	5	VI	20	80	--	25	#25	150
	6T503/ 6P503	Geographical Information System (GIS)	3	2	-	5	VI	20	80	--	25	#25	150
	6T504	Computer Graphics(CG)	3	2	-	5	VI	20	80	--	25	#25	150
								80	320	75	300	150	
		TOTAL	**12**	**20**	**0**	**32**		**400**		**525**			**925**

Scheme at glance:

Total number of courses offered : 07

Number of compulsory courses : 06

Number of optional courses : 01 out of 03

Total courses to be opted : 07 out of 10

Total Credits : 32

Total Marks : 925

SAMPLE PATH (10TH PASS)

Year-I		Year-II		Year-III	
Odd	**Even**	**Odd**	**Even**	**Odd**	**Even**
6G101(BMT) Basic Mathematics (3+1+0)	**6G102(EMT)** Engineering Mathematics (3+1+0)	**6S203(DE)** Digital Electronics (3+0+2)	**6S207(DS)** Data Structure (3+0+4)	**6G305(IOM)** Industrial Organization & Management (3+0+2)	**6G306(EDP)** Entrepreneurship Development (2+0+2)
6G103(EPH) Engineering Physics (3+0+2)	**6G104(ECH)** Engineering Chemistry (3+0+2)	**6S206(MMT)** Multimedia Techniques (1+0+4)	**6T301(DMS)** Digital Memory System (3+0+2)	**6T403(OSTL)** Open Source Technology Lab (1+0+4)	**6T302(ERP)** Enterprise Resource Planning (4+0+0).
6G203 (BCS) Basic of Computer System (0+0+2)	**6G202(WSP)** Workshop Practice (0+0+3)	**6S208(OOP)** Object Oriented Programming using C++ (3+0+4)	**6S402(SDT)** S/W Development Tools (0+0+4)	**6T404(IS)** Information Security (3+0+2)	**6T402(NMA)** Network Management and Administration (1+0+2)
6S201(FCIT) Fundamental of Computer and Internet Technology (01+0+4)	**6S202(EEE)** Elements of Electronics & Electrical Engineering (04+0+02)	**6T401(ICT)** Information Communication Techniques (3+0+2)	**6S403(JP)** Java Programming (3+0+4)	**6T405(MoC)** Mobile Communication (4+0+2)	**6S502(PW)** Project Work (0+0+4)
6G301(ENG) English (2+0+2)	**6S204(CP)** C Programming (3+0+4)	**6S401(RDBMS)** Relational Database system (3+0+4)	**6S404(OS)** Operating System (4+0+2)	**6S501(SMR)** Seminar (0+0+2)	**6S504(AJP)** Advanced Java Programming (3+0+4)
6G303(DLS) Development of Life Skills (0+0+2)	**6S205 (SWPDL)** Static web page designing Lab (0+0+2)	**6S405(SE)** Software Engineering (3+1+0)		**6T501(OOMD)** Object oriented modelling and Designing (3+0+2)	**6S505(ST)** Software Testing (3+0+2)
6G304(EVS) Environmental Science (0+0+2)	**6G302(CMS)** Communication Skill (1+0+2)				
			E-I(1+0+4)	**E-II (3+2+0)**	**E-III (3+0+2)**
			6S406 PHP Programming	**6T406/6P406 (DWM)** Data Warehousing and mining	**6T502/6P502 (ADBMS)** Advanced Database Management System
			6S407 Ruby		
			6S408 Python	**6T407/6P407 (CC)** Cloud Computing	**6T503/6P503 (GIS)** Geographical Information System
			6S409 Android Programming	**6T408(IoT)** Internet of things	**6T504(CG)** Computer Graphics
	Any one From 6G311 to 6G325 Non exam credit course (00+02)	**Any one From 6G311 to 6G325** Non exam credit course (00+02)		**6T409(NWAS)** Network and web application Security	
					6S503(VT) Vocational Training ***(0+4)***
24	**32**	**35**	**34**	**33**	**36**
TOTAL CREDITS = 194					

SEMESTER-I (FIRST)

Sr. No.	COURSE CODE	COURSE TITLE	TEACHING SCHEME				EXAMINATION SCHEME					
			TH	TU	PR	CR	PT	TH	PR	TW	OR	TOTAL
1	6G101	Basic Mathematics (BMT)	03	01		04	20	80	--	--	--	100
2	6G103	Engineering Physics (EPH)	03	0	02	05	20	80	@25	25	--	150
3	6G203	Basics of computer System	00	0	02	02	--	--	@25	25	--	50
4	6S201	Fundamental Computer and Internet Technology	01	00	04	05	--	--	@50	50	--	100
5	6G301	English (ENG)	02	00	02	4	20	80	--	25	--	125
6	6G303	Development of Life skills (DLS)	00	00	02	02	--	--	--	25	@25	50
7	6G304	Environmental Science (EVS)	00	0	02	02	--	--	--	50	--	50
		TOTAL	**09**	**01**	**14**	**24**	**60**	**240**	**100**	**200**	**25**	**625**

SEMESTER-II (SECOND)

Sr. No.	COURSE CODE	COURSE TITLE	TEACHING SCHEME				EXAMINATION SCHEME					
			TH	TU	PR	CR	PT	TH	PR	TW	OR	TOTAL
1	6G102	Engineering Mathematics (EMT)	03	01		04	20	80	--	--	--	100
2	6G104	Engineering Chemistry (ECH)	03	00	02	05	20	80	@25	25	--	150
3	6G202	Workshop Practice(WP)	00	00	03	03	--	--	--	50		50
4	6S202	Elements of Electronic & Electrical (EEE)	04	--	02	06	20	80	--	25	@25	150
5	6S204	C Programming	03	00	04	07	20	80	#25	25	--	150
6	6S205	Static Web Page Designing Lab (SWPDL)	-	00	02	02	--	--	@50	50	--	100
7	6G302	Communication Skills (CMS)	01	00	02	03	--	--	--	50	@25	75
8	6G311 To 6G325	NON-EXAM	--		02	02	--	--	--	--	--	--
		TOTAL	**14**	**01**	**17**	**32**	**80**	**320**	**100**	**225**	**50**	**775**

SEMESTER-III (THIRD)

Sr. No.	COURSE CODE	COURSE TITLE	TEACHING SCHEME				EXAMINATION SCHEME					
			TH	TU	PR	CR	PT	TH	PR	TW	OR	TOTAL
1	6S203	Digital Electronics	03	00	02	05	20	80	@25	25	--	150
2	6S206	Multi Media Techniques (MMT)	01	--	04	05	--	--	#50	50		100
3	6S208	Object oriented programming using C++ (OOP)	03	0	04	07	20	80	#25	25	--	150
4	6T401	Information Communication Techniques (ICT)	03	0	02	05	20	80	@25	25	--	150
5	6S401	Relational Database Management Systems (RDBMS)	03	0	4	07	20	80	#25	25	--	150
6	6S405	Software Engineering (SE)	03	01	--	04	20	80	--	--	--	100
7	6G311 To 6G325	NON-EXAM	--		02	02	--	--	--	--	--	--
		TOTAL	**16**	**01**	**18**	**35**	**100**	**400**	**150**	**150**	**--**	**800**

SEMESTER-IV (FOURTH)

Sr. No.	COURSE CODE	COURSE TITLE	TEACHING SCHEME				EXAMINATION SCHEME					
			TH	TU	PR	CR	PT	TH	PR	TW	OR	TOTAL
1	6S207	Data Structures (DS)	03	00	04	07	20	80	@25	25	--	150
2	6T301	Digital Memory system (DMS)	03	00	02	05	20	80	@25	25	--	150
3	6S402	Software Development Tool (SDT)	00	00	04	04	--	--	#50	75	--	125
4	6S403	JAVA Programming (JP)	03	00	04	07	20	80	#25	25	--	150
5	6S404	Operating Systems (OS)	04	00	02	06	20	80	--	25	@25	150
6	**Elective –I (Group-A)**											
	6S406	PHP programming	1	--	04	05	--	--	#50	75	--	125
	6S407	Ruby	1	--	04	05	--	--	#50	75	--	125
	6S408	Python	1	--	04	05	--	--	#50	75	--	125
	6S409	Android Programming	1	--	04	05	--	--	#50	75	--	125
		TOTAL	**14**	**00**	**20**	**34**	**80**	**320**	**175**	**275**	**25**	**875**

SEMESTER-V (FIFTH)

Sr. No.	COURSE CODE	COURSE TITLE	TEACHING SCHEME				EXAMINATION SCHEME					
			TH	TU	PR	CR	PT	TH	PR	TW	OR	TOTAL
1	6S305	Industrial Organization Management (IOM)	3	00	02	05	20	80	--	25		125
2	6T403	Open Source Technology Laboratory (OSTL)	01	00	04	05	--	--	#50	75	--	125
3	6T404	Information Security(IS)	03	00	02	05	20	80	--	25	#25	150
4	6T405	Mobile Communication (MOC)	04	00	02	06	20	80	--	25	#25	150
5	6S501	Seminar (SMR)	--	00	02	02	--	--	--	50	#25	75
6	6T501	Object Oriented Modelling And Designing (OOMD)	03	00	02	05	20	80	#25	25	--	150
7	Elective –II (Group-B)											
	6T406/6P406	Data Warehousing And Mining (DWM)	03	02	-	05	20	80	--	25	@25	150
	6T407/6P407	Cloud computing	03	02	-	05	20	80	--	25	@25	150
	6T408	Internet of things	03	02	-	05	20	80	--	25	@25	150
	6T409	Network And Web Application Security (NWAS)	03	02	-	05	20	80	--	25	@25	150
		TOTAL	**17**	**02**	**14**	**33**	**100**	**400**	**75**	**250**	**100**	**925**

SEMESTER-VI (SIXTH)

Sr. No.	COURSE CODE	COURSE TITLE	TEACHING SCHEME				EXAMINATION SCHEME					
			TH	TU	PR	CR	PT	TH	PR	TW	OR	TOTAL
1	6G306	Entrepreneurship Development (EDP)	02	00	02	04	--	--	--	50	--	50
2	6T302	Enterprise Resource planning (ERP)	04	00	00	04	20	80	00	00	00	100
3	6T402	Network Management & Administration (NMA)	01	00	02	03	--	--	--	25	@25	50
4	6S502	Project Work (PRJ)	--	00	04	04	--	--	--	100	#50	150
5	6S503	VocationalTraining (VT)	00	00	02	02	--	--	--	50	@ 50	100
6	6S504	Advanced JAVA Programming (AJP)	03	00	04	07	20	80	#25	25	--	150
7	6S505	Software Testing (ST)	03	00	02	05	20	80	#25	25	--	150
8	Elective –III (Group-C)											
	6T502/6P502	Advanced Database Management Systems (ADBMS)	03	00	02	05	20	80	--	25	#25	150
	6T503/6P503	Geographical Information System (GIS)	03	00	02	05	20	80	--	25	#25	150
	6T504	Computer Graphics(CG)	03	00	02	05	20	80	--	25	#25	150
		TOTAL	**16**	**00**	**18**	**34**	**80**	**320**	**50**	**350**	**150**	**900**

Following is the list of courses for the award of diploma programme in Information Technology.

Sr. No.	Course Code	Course Name	Credit	Marks
1.	6T401	Information Communication Techniques	05	150
2	6S404	Operating Systems (OS)	06	150
3	6T404	Information Security	05	150
4	6T405	Mobile communication	06	150
5	6S502	Project Work (PRJ)	04	150
6	6S501	Seminar (SMR)	02	75
7	6S406-409	Elective-I	05	125
8	6T406-409	Elective-II	05	150
9	6T501	Object Oriented Modeling & Design (OOMD)	05	150
10	6S505	Software Testing (ST)	05	150
11	6S504	Advanced java Programming	07	150
12	6T502-504	Elective-III	05	150
Total			**62**	**1700**

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	Unit Title	Teaching	Distribution of Theory Marks

No.		Hours	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 & WordPad, Use of system tools like Disk Cleaner, Disk	4

		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	SatyaPrakashan, 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	HPscanner ,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.	**Text from the book & Vocabulary Building** 1.1.Man Versus Machine—

	1b.Write summary of the text 1c. Responding to the questions from the text 1d. Express ideas and views on learned topics	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 4b. Enrich vocabulary through reading and listening 4c. Follow correct pronunciations, intonations & accents in communication	4.1. Importance of effective listening 4.2.Barriers in listening and how 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 Summary	04
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

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	U Level	A Level	Total Marks
VI	Problem Solving Techniques and Creativity	4	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.

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

S. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
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
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

S. No.	Title of Book	Author	Publication
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 TUTORIALS

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 Vidyarthi gruh prakashan 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

---

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, electro valency 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 galvanizing, 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 Numerical 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- resource 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. 3e. Perform plumbing operations 3f. Maintain tools, equipment and machineries.	3.1 Plumbing hand tools pipe vice, pipe bending equipment, pipe wrenches, dies and their Specifications 3.2 Pipe fittings- bends, elbows, tees, 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 machineries. 6e. Perform bending operations 6f. Maintain tools, equipment and machineries.	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 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	Prepare utility job/ different working joints involving wood work	12

	& V	as per given drawing (in group of 4 to 5 students)	
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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
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 LED. 2f. Compare -1. Types of Rectifiers 2.Types of Filters	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
Unit– III	3a. Differentiate unipolar and bipolar devices.	3.1 Introduction to Unipolar and Bipolar devices

Bipolar junction Transistor & Field Effect Transistors (BJT & FET)	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.	3.2 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 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	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 (UPS),Protecting computer system against power transients,Earthing principles and pipe earthing

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	**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 electronic 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/electronic 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/electronic 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	1	-	2	-	-	-	-	-	-	-	-	-

	Transistor.												
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	5.1 Introduction and Features of Structures

	single structure 5b. Describe array of structure and pointer to structure. 5c. Describe union with its use 5d. Utilize memory effectively using Union	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	2

S. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
		problems.	
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
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

S. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
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 designing. 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:

1. 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, Paragraphs, 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>
<tr><td>13</td><td>5</td><td>Write a program to demonstrate the use of GET, POST, developing a Feedback form with the use of <form> and</td><td>02</td></tr>
</table>

S. No.	Unit No.	Practical Exercises (Outcomes in Psychomotor Domain)	Approx. Hrs. required
		<button> HTML tags.	
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 using Dreamweaver

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- **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

After learning this course student 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
03	-	02	05	80	20	25@	25	
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, 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. Identification and conversion of number system.
2. Select appropriate gates and theorem to solve Boolean algebra.
3. Apply K-map to simplify Boolean expression.
4. Design digital combinational circuit including arithmetic circuit (half adder, full adder)
5. Design digital combinational circuit using multiplexer and demultiplexer.
6. Compare and contrast combinational & sequential circuit.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics and Sub-Topics
Unit – I **Introduction to Digital Principles**	1a. Define Digital System. 1b. Write advantage and disadvantage of digital system. 1c. Comprehend number system & binary codes. 1d. Convert number system and its complement	1.1. Digital signal, Digital systems- Positive and Negative Logic, Advantages, Disadvantages and Applications of Digital Systems. 1.2. Number system: Binary Number System, Signed Binary Number, Octal Number system, Hexadecimal Number system, Hexadecimal Number System, Binary Arithmetic. 1.3. 1's Complement & 2's Complement 1.4. Codes: BCD, EBCDIC, ASCII Codes, Gay Codes, Excess 3 Code
Unit -II **Logic Gate & Boolean Algebra**	2a. List and explain working of Logic Gates 2b. Solve Boolean algebra 2c. Define and solve various Boolean theorems	2.1. Working principles and Truth of AND, OR, NOT, NOR, NAND, EX-OR, EX-NOR Gates 2.2. Boolean Algebra: Basic Boolean Operations, Laws of Boolean Algebra, De-Morgan's Theorems 2.3. Boolean Forms- Canonical OR Standard Form.
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 like Sum of product (SOP) & Product of Sum (POS) 3.2. K-map representation of logical

Implementation	expression using K-map for 3 variables. 3.c. Implementation and simplification. 3.d. Define Don't Care Condition.	functions minimization using 2, 3 & 4 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. Design half adder, full adder, half Subtractor &full Subtractor 4.b. Convert BCD code to Excess 3 Code. 4.c. Implement Decimal to BCD encoder and BCD to Decimal decoder.	4.1. Realization of Half Adder & Full Adder. 4.2. Realization of Half Subtractor & Full Subtractor. 4.3. Code Conversion- BCD to Excess 3 Code Conversion 4.4. Encoder, Decimal to BCD encoder, Decoder, BCD-to- Decimal decoder.
Unit V: **Combinational Logic using LSI & MSI Circuit**	5.a. Design 4:1 Multiplexer with its logical expression and block diagram. 5.b. Design 1:8 Demultiplexer with its truth table and block diagram.	5.1. Multiplexer – Block diagram, Truth table, Logical expression and logic diagram of Multiplexers (2:1, 4:1, 8:1and 16:1), Multiplexer Tree. 5.2. 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. 6.d. Explain Working of any type of Flip flop	6.1. Introduction to Sequential Logic Circuit – Difference between combinational and sequential circuit. 6.2. Introduction to 1-bit memory cell and flip flop. 6.3. Introduction, truth table & Logic Diagram of: SR Flip flop, Clocked S-R Flip Flop with Preset & Clear, J-K Flip flop, Race around Condition in JK Flip flop, Master Slave J-K Flip flop, D Type Flip flop, T Type Flip flop.

6. SUGGESTED SPECIFICATION TABLE FOR QUESTION PAPER DESIGN

Unit	Title of Unit	Teaching	Distribution of Theory Marks

			R level	U Level	A Level	TOTAL
I	Introduction to Digital Principles	08	02	04	06	12
II	Logic Gate & Boolean Algebra	07	04	04	04	12
III	Boolean Expression Implementation	09	04	04	06	14
IV	Combinational Logic	07	04	06	04	14
V	Combinational Logic using LSI & MSI Circuit	08	04	04	04	12
VI	Introduction to Sequential Logic Circuit	09	06	06	04	16
	Total	**48**	**24**	**28**	**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	1	Convert given Number system to another (HEX, OCTAL, DECIMAL, BINARY)	01
2	1	Calculate 2's and 1's Complements	01
3	2	To study and verify truth table of basic logic gates.	02
4	2	Realize OR, AND, NOT, EX-OR & EX-NOR using Universal gates.	04
5	2	Verification of Demorgan's theorem.	02
6	3	Simplify and design Boolean expression using basic logic gates	02
7	3	Simplify and design Boolean expression using Universal gates	02
8	3	Simplify the Boolean expression using Boolean algebra and verify.	02
9	4	Realize Decoder and Encoder circuit	02
10	4	Realize Decimal to BCD encoder & BCD to Decimal 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	Design & Realization of BCD to Excess 3 conversion.	02
14	5	Verification of Truth Table of 4:1 multiplexer & 1:4 demultiplexer	02
15	6	Build/Test function of S-R Flip flop.	02
16	6	Build/Test function of Master/Slave J-K Flip flop.	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. Observation of given Digital logic kit
3. Prepare charts of symbols of given Digital Circuit.
4. List and observe ICs for given Digital Circuit.
5. Students may be asked to make a list of following items used in Combinational Logic and Sequential logic Circuits.

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. Use online tutorials to guide students in searching information regarding Digital Electronics.

3. Demonstrate practical thoroughly before the students perform.
4. Show Flash/Video/Animation clippings for given Logic Circuits.
5. Observe continuously and monitor the performance of students in lab.
6. Assign different types of Mini-projects
7. 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)

Sr. No.	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	3	1	2	1	-	-	-	-	-	-	-	-

	algebra.												
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 students 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	MAYA	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)

Sr. 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 Information Technology, 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 inline functions. 2d Develop Simple Programs using class and objects, array of objects, friend functions,	2.1 Classes: Specifying a class Defining member functions Arrays within a class 2.2 Objects 2.2.1Creating objects 2.2.2 Memory allocation for objects 2.3 Static data and member function

	passing and returning objects. 2e Develop Simple Programs using class and objects, array of objects, friend functions, passing and returning objects	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 Polymorphism & Run Time Polymorphism	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 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

Sr. No.	Name of Book	Author	Publication
1.	Object Oriented	Balaguruswami,E.	Tata McGraw-Hill

	Programming with C++.		
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)

Sr. No.	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	-	3	1	-	-	-	-	-	-	-	-	-

	concepts												
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- INFORMATION COMMUNICATION TECHNIQUES (ICT)

COURSE CODE 6T401

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
INFORMATION TECHNOLOGY	FOURTHSEMESTER

1. RATIONALE

Information Communication Techniques is applied level course. It aims to apply different communication media and techniques for sharing information world wide web (WWW). This course covers traditional techniques of communication, modulation, multiplexing and significance of various network topologies& hardware protocol.

2. COMPETENCY

"Identify various network topologies, transmission media and use protocols for data communication."

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	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

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

1. Select communication model, transmission modes and modulation.
2. Use appropriate network topology and networks.
3. Select transmission media for effective communication.
4. Classify IP addressing scheme.

5. Use protocols and IEEE standards for data transmission.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics and Sub-Topics
Unit – I ICT Fundamentals	1a. Explain various concepts related to Information Technology 1b. Describe basic of communication 1c. Understand analog communication	1.1 Information Technology philosophy: Need of information technology, Logic of Information, Cybernetics, Definitions (Peirce, Shannon-Weaver, Bateson) 1.3 Communication models (brief): Analog Communication, Digital Communication, Data Communication 1.4 Structure of Communication 1.5 Transmission modes (Simplex, half duplex, Full duplex) 1.6 Synchronous and Asynchronous transmission 1.7 Serial and Parallel communication. 1.8 Need of Modulation 1.9 Amplitude modulation, Definition 1.10 Frequency modulation, Definition
Unit – II Data Networks	2a. Explain network Computing model 2b. Explain topologies and types of network 2c. Explain layered structure of communication	2.1 Models of Network Computing (Centralize Computing, distributed Computing, collaborative Computing) 2.2 Client Server Network and Peer to Peer Network 2.3 Network Topologies (Bus, Mesh, Star, Ring), 2.4 Various types of computer Network (LAN, MAN, WAN) 2.5 Types of switching network (Circuit and Packet) 2.6 Need of layered mechanism 2.7 OSI Model (brief description of each layer) 2.8 TCP/IP Model (brief description of each layer
Unit – III Physical View of ICT	3a. Describe multiplexing and its types 3b. Describe media and standards of transmission of signals	3.1 Multiplexing 3.1.1 Definition and need 3.1.2 Time Division Multiplexing 3.1.3 Frequency Division Multiplexing 3.1.4 Code Division Multiplexing 3.1.5 Orthogonal Frequency Division Multiplexing 3.2 Identification of various transmission media 3.2.1 Wired media (Coaxial, Twisted Paid cable and their connectors) 3.2.2 Wireless media (Microwave, Radio) 3.2.3 Application of wireless media in

		satellite Communication, block diagram, important Definitions. 3.3 Network Connecting devices (Switch, Router, Repeater, Bridges, Gateway)
Unit – IV Network Addressing	4a. Explain IPv4 addressing 4b. Explain IPv6 addressing 4c. Use of Ping and Trace route to troubleshoot network	4.1 IPv4 addressing 4.1.1 Need of IP address 4.1.2 IPv4 addressing scheme 4.1.3 Address space and notations 4.1.4 Mask, netid, hostid 4.1.5 Sub-netting and super-netting 4.1.6 Classful and classless notations 4.1.7 Network address translations 4.2 IPv6 addressing 4.2.1 Need for IPv6 migration 4.2.2 IPv6 addressing scheme 4.2.3 Hexadecimal column notation 4.2.4 Uni-cast addresses, multicast addresses, Reserved addresses and local addresses 4.3 Address mapping (logical to physical, physical to logical) 4.4 Ping and trace-route commands.
Unit - V Protocols and Data Transportation	5a. Explain UDP and TCP protocols 5b. Explain data traffic 5c. Explain domain Name System 5d. Explain Various TCP/IP Protocols	5.1 UDP and TCP protocols 5.1.1 Connectionless and connection-oriented communication 5.1.2 Reliable and Unreliable communication UDP and TCP protocols 5.2 Data traffic and congestion management 5.5 DNS 5.3.1 Domain, domain name, domain zone, root server 5.3.2 Domain types 5.3.3 Address resolution 5.3.4 Address mapping 5.4 Address, mapping address to names, recursive resolution, iterative resolution, caching) 5.5 Protocols (introduction only) 5.6 Data link layer protocols 5.6.1 ARP, RARP, ICMP protocols (only brief explanation) 5.7 Routing (brief explanation) 5.7.1 Routing table, Uni-cast routing protocols and multicast routing protocols) 5.8 SMTP, POP, IMAP 5.9 WWW and HTTP

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
1	ICT Fundamentals	08	4	4	4	12
2	Data Networks	09	4	6	6	16
3	Physical View of ICT	11	4	8	6	18
4	Network Addressing	08	4	5	6	15
5	Protocols and Data Transportation	12	4	5	10	19
	Total	48	20	28	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	I	Test and Simulate AM using hardware kit or software.	02
2	I	Test and Simulate FM using hardware kit or software.	02
3	II	Test and implement Client –Server model.	04
4	II	Test and implement BUS Topology	02
5	II	Test and implement STAR Topology	02
6	III	Configure and test working of switch and study of router configuration.	04
7	III	Configure small LAN using various network components	04
8	III	Prepare CAT-5, CAT-6 cable for network using crimping tool.	02
9	III	Identify and compare different transmission media based on characteristics.	02
10	IV	Demonstrate FTP, HTTP Protocols	02
11	IV	Perform and test basic networking commands. (ping, ipconfig, tracert, arp, tcpdump, whois, host,netsat, nslookup, ftp, telnet etc.)	02
12	IV	Locate MAC address of Computer and configure TCP/IP Protocols (Version 4 and version 6)	02
13	V	Identify and perform subneting of IP addresses of each class.	02
		Total	32

8. SUGGESTED STUDENTS ACTIVITIES

Following is the list of proposed student activities like:

a. Case Study LAN setup in the institute.
b. Understanding configuration of LAN and H/w and S/w required for the same
c. Understanding of Indian IT act

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
f. Application for practical will be assigned to the students by the subject faculty and students will work in a group of 3 maximum
g. Assignment can be given based on above topics.

9. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Data Communications and Networking	Behrouz Forouzan	TMH
2.	Computer Networks	Bhushan Trivedi	OXFORD
3.	Data communication and computer networks	ISRD group	TMH
4.	Computer Networks	Tannebaum Andrew S Wetherall David J	Pearson, New Delhi, 5thEdition, 2011

10. 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
7.	Modulation trainer kit	AM, FM modulation trainer kit
8.	Multiplexing trainer kit	Time, Frequency, code division Multiplexing trainer kit
9.	DCN trainer kit	-
10.	LAN trainer	-

11. 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

12. 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 communication model, transmission modes and Modulation.	-	3	1	-	1	-	-	-	-	1	3	-
2	Use appropriate network topology and networks.	-	3	2	-	2	-	-	-	-	-	2	-
3	Select transmission media for effective communication.	-	3	1	1	1	-	-	-	-	-	3	-
4	Classify IP addressing scheme.	-	3	1	-	-	-	1	-	-	-	3	-
5	Use protocols and IEEE standards for data transmission.	-	3	-	-	2	-	-	-	-	-	3	-

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- 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: DIGITAL MEMORY SYSTEM (DMS)

COURSE CODE: 6T301

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

1. RATIONALE

Digital Memory Systems is a basic level course consists of design, classification of a digital memory circuit. The recent trend of technology is towards efficient memory structures design and hence it becomes very crucial for the students to understand fundamental of memory designing. This Course will enable student to comprehend basic architecture of memory systems including processor architecture and its implementation.

2. LIST OF COMPETENCIES

The student will be able to:

"Design digital circuits based on architecture of memory and processor"

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)	TW	150
03	00	02	05	80	20	@25	25	
Duration of the Examination (Hrs)				3	1	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

I. Identify nomenclature and technology in the area of memory devices: ROM, RAM, PROM, PLD, FPGAs, etc.

II. Understand Organization of microprocessor based system.

III. Understand the architecture of 8085.

IV. Develop program on data transfer, Arithmetic, logical instruction.

V. Understand and realize the Interfacing of memory & various I/O devices with 8085 microprocessor And Timing diagram

VI. Understand 8085 interrupt.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics and Sub-topics
UNIT-1 Digital Memory System Basic	1.a Describe the various types of memory architecture. 1.b Differentiate between RAM & ROM 1.c Explain PLA 1.d Compare PLA with ROM 1.e Explain cache addressing	1.1. Memory classification 1.2. Random Access Memory (RAM), Static and Dynamic RAM 1.3. Read Only Memory (ROM), its Types, Design of 32×4 ROM 1.4. Programmable Logic Array (PLA), comparison with ROM, Simple PLA design. 1.5. PLD: Basic building blocks types of PLD, PAL and GAL. 1.6 Cache (Physical address model, Cache performance, cache addressing
UNIT-2 Introduction to Microprocessor	2.a Differentiate between Machine, Assembly & High-level language. 2.b State features of 8085 microprocessor 2.c Differentiate between 8085, 6800 & Z-80 microprocessor	2.1 Organization of microprocessor based system, memory, input & Output. 2.2 Machine Language, Assembly language & High level language. 2.3 Simple Assembly Language program 2.4 Type of buses 2.5 Features of 8 bit microprocessor such as 8085, 6800 & Z-80.
UNIT-3 8 & 16 bit Microprocessor Architecture	3a Draw functional diagram of 8085 3b Draw architecture of 8085 microprocessor 3c Explain Reset circuit 3d Explain generation of control Signal	3.1 Pin configuration of 8085, Functional Pin diagram of 8085 3.2 Architecture of 8085 microprocessor, Functional block diagram of 8085, reset Circuit. 3.3 Generation of control signals and demultiplexing of address/ data

	3e Explain the various blocks of 8086 processor architecture.	bus. 3.4 Feature of 8086 microprocessor, its architecture, Registers, PSW & Memory Segmentation of 8086 3.5 Assembly language program to find addition, subtraction, Multiplication and Division of two 8bit/ 16-bit numbers.
UNIT-4 Instruction Set of 8085	4.a State and explain types of instruction. 4.b Explain addressing mode of 8085	4.1 Instruction Classification, Instruction format, 1, 2, 3 byte instructions. 4.2 Addressing modes, data transfer, arithmetic, Logical, branch, I/O & machine control Instructions. 4.3 Assembly language program to convert given Hexadecimal number into BCD number 4.4
UNIT 5 Instruction Timing Diagram & Memory, I/O interfacing	5.a Draw timing diagram for given instruction. 5.b Explain memory interfacing. 5.c Differentiate absolute decoding and linear decoding 5.d Explain I/O mapped I/O & Memory mapped I/O	5.1 Instruction cycle, Machine cycle & T-State, 8085 Machine cycle and their timing, wait state generator. 5.2 Timing diagram for 8085 instructions. 5.3 Basic concepts of memory & I/O interfacing. 5.4 Absolute decoding and linear decoding. 5.5 I/O mapped I/O & Memory mapped I/O. 5.6 Interfacing of 8085 with RAM, ROM & EPROM
UNIT-6 Stack Subroutine & 8085 Interrupts	6.a Explain Stack related instruction 6.b Explain Subroutine, CALL and RET 6.c State types of Interrupt 6.d Explain EI, DI, RIM and SIM instructions	6.1 Use of stack by programmer, stack related instructions 6.2 Introduction of subroutines, CALL and RET instructions, Nested and Multiple ending Subroutines. 6.3 Delay Subroutines using registers, program based on subroutines. 6.4 Types of Interrupts, interrupt structure, vectored interrupt & their properties, RST 6.5 Instruction, EI, DI, RIM & SIM instruction

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

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R	U	A	Total
I	Digital Memory System Basic	06	4	4	0	08
II	Introduction to Microprocessor	08	4	4	0	08
III	8 bit & 16 bit Microprocessor Architecture	08	4	8	2	14
IV	Instruction Set of 8085	08	4	6	8	18
V	Instruction Timing Diagram & Memory, I/O interfacing	10	4	6	8	18
VI	Stack Subroutine & 8085 Interrupts	08	4	6	4	14
Total		48	24	34	22	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	I	Design PLA	02
2	I	Introduction to Microprocessor Trainer Kit and identify the different peripheral devices on it.	02
3	II	Introduction to 8085 simulator IDE (Simulator software) and understand the steps to simulate the program using it.	02
4	II	Write an Assembly language program to find addition and subtraction of two 8 bit numbers.	02
5	II	Write an Assembly language program to find Multiplication and division of two 8 bit numbers.	02
6	II	Assembly language program to find average of block of data containing N numbers.	02
7	III	Assembly language program to find addition and subtraction of two 16 bit numbers.	02
8	III	Write an Assembly language program to find Multiplication and division of two 16 bit numbers.	02
9	III	Assembly language program to determine whether the number is even or odd.	02
10	III	Assembly language program to arrange given array of 8 bit elements in ascending order.	02
11	III	Write an Assembly language program to find smallest and largest element in given array.	04
12	IV	To write an assembly language program using data transfer instructions.	02
13	IV	To write an assembly language program for to convert given Hexadecimal number into BCD number	02
14	VI	To demonstrate the assembly language programming for delays & subroutines.	02
15	VI	To write an assembly language program using CALL and RET instructions	02
			32

8. SUGGESTED LIST OF PROPOSED STUDENT ACTIVITIES

1. Students will prepare chart/poster for given topics
2. Develop programs related with unit wise topics in computer laboratory
3. Multimedia presentation of module developed by student

9. SPECIAL INSTRUCTIONAL STRATEGIES

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

1. The subject requires both theory and practical emphasis simultaneously, so that the student can understand the practical significance of the various application areas.

2. Students are assigned to prepare various comparative charts for register and counters
3. Students should be given enough exposure to variety of simulation software also should be given to students

10. 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. Ganorkar	Microprocessor Architecture, Programming and Applications with the 8085	Penram International publication (India)
3	Mandal, Soumitra Kumar	Digital Electronics, 1st Edition	McGraw Hill
4	Das, Lyla B.	The x86 microprocessor architecture, programming and interfacing 8086 to Pentium, 1st Edition	Pearson
5	Green ,D.C.	Digital Electronics, 5th Edition	Pearson Education

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED:

S. No.	Name of equipment	Brief specification
1	8085 Trainer kit	Digital Trainer kit for 8085
2	Simulator software for 8085	Simulator software for 8085 programming
3	Computer System	Computer system with minimum PIII processor and above 512MB RAM

12. LIST OF LEARNING WEBSITES

1. Microprocessor 8085 architectur- Tutorialspoint :Link
https://www.tutorialspoint.com/microprocessor/microprocessor_8085_architecture.htm
2. Intel 8085 Wikipedia https://en.wikipedia.org/wiki/Intel_8085
3. GNUSim8085 Download https://gnusim8085.github.io/download

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	Students will demonstrate the knowledge of: Types of memory architecture, RAM & ROM	1	2	-	-	-	-	-	1	-	-	2	-
CO2	Students will demonstrate the knowledge of Machine, Assembly &High level language, features of 8085	3	3	-	-	1	-	-	-	-	-	1	-
CO3	Students will be able to understand architecture of 8085 microprocessor	-	3	-	1	-	-	-	-	-	-	1	-
CO4	Students will demonstrate knowledge of Types of Instruction set , addressing mode of 8085	1	3	1	-	-	-	-	-	-	-	-	-
CO5	Students will demonstrate the knowledge of: Timing diagram, Instruction set, address decoding	2	2	3	-	-	-	-	-	-	-	1	-
CO6	Students will demonstrate the knowledge of: Subroutine, CALL and RET, Types of Interrupt, RIM SIM instruction	2	2	3	-	-	-	-	-	-	-	1	-

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

(Member Secretary PBOS) (Chairman PBOS)

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,

	using ADO.NET	Examining 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)

Sr. No.	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. Sadfule	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 1st, 2nd, 3rd. 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.	4.1 Main Memory: Background 4.2 Swapping, Contiguous Memory Allocation 4.3 Paging, Structure of the Page Table.

	4c. Calculate page fault for given problem. 4d. Identify free space management techniques.	4.4 Segmentation 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: 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 of Objects , 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 screen.	02
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 Edition	O'reilly Media , 2014
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 web 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. 2c Write a program on	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 Numbersrand method

	class array methods like delete sort length using do end.	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. 4b Develop a program on File I/O using File	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 open

	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	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	NOT APPLICABLE				
I	Variables, Constant, Arrays in Ruby	4					
III	Strings conditional branching statement, Regular expression and	4					

	Ranges hashes		
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- 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)	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: 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	3.a Develop an Event driven	3.1 Event driven Programming in

Advanced UI Programming and UI Design	programs on text edit and button clicked. 3.b. Develop simple UI layout. 3.c Describe GUI object in XML.	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 4.6 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	NOT APPLICABLE			
II	Android Activities and UI Design	4				
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 effect 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 atmiddle 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, organizeand 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 strategiesofmotivation. 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 Accidentand 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 4.3Direct Cost & Indirect Cost 4.4Sources 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 materialmanagement. 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. 6.3Solving simple network using CPM/ PERT 6.4Concept of Breakeven analysis.

		6.5Progress 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 aboutbusiness/organization and identify the nature of business and prepare organization structure.	04
2.	III	Identify and propose Safety requirements/ mechanism for anindustry.	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 c. Capital Generation & Management	04
		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)Marketsegmentation	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 company)	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 ofbunglow/ 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

SrNo.	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

SrNo.	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)

SR No	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
1	Identify the different secto and industry of given company name.	-	-	-	-	3	-	-	1	-	-	3	-
2	Plan, organize and Coordinat various activities in industry o 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 project	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,Aurang
2	K.S.Borde	Lecturer in Civil Engineering, Govt. Polytechnic,Aurangabad
3.	P.B.Lahoti	Lecturer in Computer Engineering, Govt. Polytechnic,Auranga

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE : OPEN SOURCE TECHNOLOGY LABORATORY(OSTL)

COURSE CODE : 6T403

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Information Technology	V

1. RATIONALE:

Open Source Technology Laboratory is an applied level course explores students towards use of open source software and its related technologies. As open source software allow to modify source code, it is easy to design and develop customize application. This course includes basic Linux Commands, shell scripting and AWK programming and configure LAMP server.

2. COMPETENCY:

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

"Develop web application with the help of open source software and technology."

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 components of Open Source Technology.
2. Develop shell script and AWK program in Linux.
3. Develop PHP program on apache server for a given problem.
4. Execute DDL & DML commands on MYSQL Server in Linux environment.
5. Insert documents into MongoDBdatabase in Linux environment.

5. DETAILED COURSE CONTENTS:

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit - I Open Source and Linux	1a. Identify open source technology. 1b. Modify user permission. 1c. Remove package using RPM utility. 1d. Set up LAMP server.	1.1 Open Source Definition, The distribution terms of open source software, open source technology, importance of Free and open source Software (FOSS). 1.2Browsing the Linux File system, Users, Groups and Permissions, Introductionand working vi editor, Install, Update, and remove software packages with RPM, editing configuration files. 1.3 LAMP (Linux,Apache,MySQL,PHP) Server Basics. 1.4 Introduction of zend framework.
Unit – II Shell Programming	2a. Use wild cards. 2b. Select login shell. 2c. Use AWK functions. 2d. Apply control structure.	2.1 Introduction to csh shell, ksh shell, Bourne shell and their functionality, Meta characters, wild cards, redirection, pipes, login shell, login scripts, AWK Programming and functions. 2.2 Commands- umask, touch, uname, crontab. 2.3 Control structure: if, test, for, while, case.
Unit - III Apache and PHP	3a. Set http services. 3b. Prepare PHP scripts. 3c. Format output using PHP scripts. 3d. Select operators for given applications.	3.1 Introduction to Web server, Installing Apache on Linux: http service. 3.2 PHP: Basics of PHP scripts, Variables, Data types, Operators and Expressions, Constants, Flow control functions, If statement, Loops, Arrays, Strings, Dates and Times, Forms.
Unit - IV MySQL Server and Application	4a. Set up MySQL server in Linux. 4b. Perform CRUD operation. 4c. Maintain dynamic web pages using PHP scripts.	4.1 MySQL Server: Configuring MYSQL Server, working with MySQL Databases, SQL Standards- CRUD Operation, and DATE and Time functions in MYSQL. 4.2 PHP-MySQL Application Development: Connecting to MySQL Application Development: Connecting to MySQL with PHP,Inserting data and Retrieving data with PHP, Developing PHP scripts for dynamic web page.
Unit-V Introduction of PostgreSQL and MongoDB.	5a. Compare PostgreSQL and MySQL. 5b. Select data from databases. 5c. Prepare documents for MongoDB operations.	5.1 Introduction and Installation of PostgreSQL in Linux Operating System. 5.2 Creating and Populating a Database, Database Import and Export in PostgreSQL. 5.4 Introduction to NoSQL and MongoDB Databases, Creating Document and Saving it to Collection.

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	Open Source and Linux	3	NOT APPLICABLE			
II	Shell Programming	4				
III	Apache and PHP	3				
IV	MySQL Server and Application	3				
V	Introduction of PostgreSQL and MongoDB.	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	1	Install Linux Operating System (CentOS/Fedora/Ubuntu)	4
2	1	Execute commands to create and granting permission users.	2
3	1	Operate different modes of vi-editor (input mode, command mode) to use functionality of vi-editor.	2
4	1	Install, Update and Remove utilities using RPM packages in Linux.	4
5	1	Install LAMP (Linux, Apache, MySQL, and PHP) Server in Linux.	4
6	2	Execute following commands for to redirect input, output-Input Redirection (0<), Output Redirection (1>) and Error Redirection (2>).	2
7	2	Write and execute Sum of column value using awk script.	2
8	2	Write and execute Filtering lines using awk split function.	2
9	2	Execute following commands to granting permission, system information and job scheduling task-umask, uname, crontab.	4
10	2	Write and execute Shell script to check whether the given number is prime or not.	2
11	3	Execute PHP program to find area of triangle.	2

12	3	Execute PHP program to print alphabet triangle. A ABA ABCBA ABCDCBA ABCDEDCBA	2
13	3	Execute PHP programto find the sum of elements in an array.	2
14	3	Execute PHP program to create a simple Registration form.	4
15	3	Execute PHP program to remove the duplicated values from an array.	2
16	4	Execute PHP program for user authentication (Login Page) using MySQL.	4
17	4	Execute PHP program to Store an image in MySQL.	4
18	4	Execute CRUD operations using PHP and MySQL.	4
19	5	Install PostgreSQL in Linux Operating System.	4
20	5	Install MongoDB in Linux Operating System.	4
21	5	Execute mongodbcommand to creating, update, delete documentsinto Collection.	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 Server (Web/ Application Server).
3	Develop web application using PHP-MongoDB database.
4	Develop Library Management System using PHP-PostgreSQL.
5	Develop Real-time Application using PHP-MySQL.

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

10. SUGGESTED LEARNING RESOURCE:

S.No.	Name of Book	Author	Publication
1	Learning PHP, MySQL, and JavaScript	Robin Nixon	O'REILLY
2	Linux : Complete Reference	Richard Pearson	Tata McGraw Hill
3	Beginning PHP and MySQL: From Novice To Professional	W. Jason Gilmore	APress
4	Beginning Linux Programming	Neil Mathew, Richard Stones	Wrox Publications
5	Unix Concepts and Applications	Sumitabha Das	McGraw-Hill Education
6	Red Hat Linux- A bible	Christophe Negus	Tech Media SAMS
7	PostgreSQL: Up and Running	Regina Obe and Leo Hsu	O'REILLY
8	MongoDB Basics	Peter Membrey , David Hows ,	APress

11. LIST OF MAJOR EQUIPMENTS AND MATERIALSREQUIRED:

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/
6. https://docs.mongodb.com/
7. https://www.postgresql.org/files/documentation/pdf/10/postgresql-10-A4.pdf
8. https://dev.mysql.com/doc/

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 components of Open Source Technology.	2	2	-	-	-	-	-	-	-	1	2	-
2	Develop shell script and AWK program in Linux.	2	1	2	-	-	-	-	-	-	1	1	2
3	Develop PHP program on apache server for a given problem.	2	2	2	-	-	-	-	-	-	1	2	-
4	Execute DDL & DML commands on MYSQL Server in Linux environment.	2	2	1	-	-	-	-	-	-	2	2	-
5	Insert documents into MongoDB database in Linux environment.	2	1	1	2	-	-	-	-	-	2	2	-

Course Curriculum Design Committee:

SrNo	**Name of the faculty members**	**Designation and Institute**
1	Jitendra Joshi	Lecturer in Information Technology, Govt. Polytechnic, Aurangabad
2	ShashikantBankar	Lecturer in Information Technology, Govt. Polytechnic, Aurangabad
3	Om Varma	Lecturer in Computer Engineering, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **INFORMATION SECURITY (IS)**

COURSE CODE- **6T404**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Information Technology	Fifth

1. RATIONALE

Information Security is an applied level course aims to understand the various threats to secure computing and the basic security design principles and techniques. This course will introduce basic cryptography, network security; risks faced by computers and networks, data recovery, operating system security also focuses on concepts and methods associated with planning managing and auditing security at all levels including networks. Students will learn to secure the system and internet world.

2. COMPETENCY

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

"Apply the security techniques for information protection."

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	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

1. Recognize importance of information security.
2. Select information security model.
3. Use encryption and decryption techniques.

4. Apply data recovery techniques and tools.
5. Identify cyber laws for cyber-crime.
6. Apply accepted security policies; procedures are necessary to secure Operating Systems and applications.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
UNIT-I Introduction to Information Security	1a.Describe the information security concept in detail.	1.1. Information, Need and Importance of Information, information classification, criteria for information classification 1.2. Security, need of security, Basics principles of information security 1.3. Three pillars of information security, data obfuscation, event classification.
UNIT-II Information security architecture and model	2a.Know the information security architecture. 2b.Explain the security models.	2.1. Information security and Risk Management, Security policies, guidelines, standards 2.2. Trusted computing base, Rings of Trust, Protection Mechanisms in a trusted Computing Base 2.3. System security assurance concepts, Trusted computer security Evaluation Criteria 2.4. Information Technology security Evaluation Criteria, Confidentiality and Integrity Models.
UNIT-III Cryptography	3a. Describe the different types of cipher. 3b.Know the application and techniques of Cryptography.	3.1. Introduction, Application of cryptography, Classical encryption Techniques, Symmetric cipher 3.2. Substitution cipher • Ceasor cipher • Playfair cipher • Hill cipher 3.3. Transposition cipher • Row transposition cipher • One Time Pad 3.4. Stenography, Digital Signatures, Authentication Protocols, Digital Signature Standards. 3.5. Public Key infrastructure- Basics,

		digital certificates, certificate authorities, registration authorities, steps for obtaining a digital certificate, steps for verifying authenticity and integrity of a certificate
UNIT-IV Data Recovery	4a.Explain the Recovery technique and tools in detail.	4.1.Introduction to Deleted File Recovery Formatted Partition Recovery 4.2. Data Recovery Tools, Data Recovery Procedures and Ethics.
UNIT-V Cyber Crime & Security	5a.Describe various cybercrimes. 5b.Get the knowledge of Hacking, Cracking and attacks. 5c. Explain the Cyber Law's.	5.1. 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 5.2 Introduction Cyber Laws- Introduction to IT act 2000 and IT act 2008, Introduction to the cyber laws
UNIT-VI Access, physical control and compliance standards	6a. Know the different access and access control. 6b. Describe the compliance standards.	6.1. Identification, Authorization , Authentication, Biometrics, Single Sign –on, Kerberos, Remote user access and Authentication 6.2.Physical access control, Physical access threats, providing physical security 6.3. Compliance standards: Implementing and Information Security Management System, ISO 27001, ISO 20000, BS 25999, PCI DSS, ITIL framework, COBIT framework.

7. **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 Information Security.	8	5	5	4	14
2	Information security architecture and model	8	5	5	4	14
3	Cryptography	8	4	5	5	14
4	Data Recovery	8	3	4	5	12
5	Cyber Crime & Security	8	3	4	5	12
6	Access, physical control and compliance standards	8	5	4	5	14
	Total	48	25	27	28	80

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

8. LIST OF PRACTICAL / LABORATORY EXPERIENCES/ TUTORIALS

Sr. No.	Unit	Title Practical/ Lab. Work/ Assignments/ Tutorials	Hours
1	01	Identify the security provided with windows operating system(User authentication)	02
2	02	Trace the path and identify security policies of different websites.	04
3	03	Tracing of email origin using eMailTracePro utility	04
4	03	Install open source Latest version of Cryptool software and Encrypt and decrypt the message using Simple Transposition(Cryptool)	04
5	03	Encrypt and decrypt the message using Caesar Cipher With Variable Key(Cryptool)	02
6	04	Recovery the password of windows machines using password recover utility (John the ripper) or any other utility.	04
7	04	Recover the data from formatted Pen drive and Hard Disk using Powerdata Recovery utility or any other utility	02

8	04	Installation of kali Linux and performed various commands.	04
9	05	Demonstrate the procedure of software piracy and Intellectual Property.	04
10	06	Use of different techniques for authentication like use of biometrics.	02
		Total	32

9. SUGGESTED STUDENTS ACTIVITIES

Following is the list of proposed student activities such as:

- Seminar (student would prepare seminar on security features adopted by some reputed companies/banks etc to protect their websites and data)
- Students would use power point presentations in above seminar and there would be group discussions on the strengths and weakness of the security features adopted by the concern company

10. SUGGESTED SPECIFIC INSTRUCTIONAL STRATERGIES

1. Guide students in preparing actual procedure of data recovery.
2. Guide students in implementing it in c/c++ programming language.
3. Assign different types of Micro-projects.

11. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Godbole Nina	Information System Security	John Wiley
2.	Mark Merkov& Jim Breithaupt	Information Security Principles and Practices	Pearson
3	V.K.Pachghare	Cryptography and Information Security	Prentice Hall India
4	Saurabh Sharma	Information Security and Cyber laws	Vikas Publishing House

12. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED :

S. No.	Name of equipment	Brief specification
1.	VIM (Vulnerability Management)	
2.	PSI (Free PC Security)	Latest Version
3	CSI (Security Patching)	

13. LEARNING WEBSITE & SOFTWARE

- Download MD5 Application www.md5summer.org/download.html
- Download Wire shark Tools https://www.wireshark.org/tools/
- SecTools.Org: Top 125 Network Security Tools http://sectools.org/
- SHA-256 hash calculator http://www.xorbin.com/tools/sha256-hash-calculator
- Firewall Analyzer http://www.manageengine.com/products/firewall/?gclid=CO_Zh4DwtcICFYUrjgodx1cA9g&gclsrc=aw.ds

14. 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	Recognize importance of RSA Algorithm and Asymmetric cryptography.	3	3	-	-	-	-	-	-	-	2	-	-
2	Explain Basic concept of Message Authentication Codes	3	3	-	-	-	-	-	-	-	-	-	-
3	Explain basic concept of Web Security.	1	3	-	-	-	-	-	-	-	1	3	-
4	Demonstrate use of digital signature.	-	1	1	2	-	-	1	1	-	2	2	-
5	Apply Application level security on web browser	-	2	1	1	1	-	-	1	-	2	1	-
6	Apply various parameters of antivirus and firewall security on network	-	3	-	-	-	-	-	-	-	2	-	-

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
3.	Prof. Om R. Varma	Lecturer in Information Technology, Govt.Polytechnic, Aurangabad
4.	Prof. Prajakta S.Sadafule	Lecturer in Computer Engineering, Govt.Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **MOBILE COMMUNICATION (MOC)**

COURSE CODE **6T405**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
INFORMATION TECHNOLOGY	FIFTH SEMESTER

1. RATIONALE

Mobile communication is applied level course that designed to operate, maintain and serve mobile cellular systems. As exponential growth in mobile communication, student needs to learn different technologies such as GSM, GPRS and CDMA with their variations and the 4G. This course includes basics of basics of cellular communication, overview of GSM and CDMA, Mobile handset Spread spectrum and recent technology of mobile communication systems.

2. COMPETENCY

- **"Maintain mobile communication 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	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

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

1. Identify different standards of mobile communication systems.
2. Identify Strategies for Handoff Detection.
3. Identify functionality of GSM architecture and CDPD architecture.
4. Identify functionality of GPRS architecture and services.
5. Identify the need of WAP protocol.
6. Perform WML script programming

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit – I Fundamental of Cellular Communication	1a. Describe cellular communication Standards -1G, 2G, 3G and 4G. 1b. Explain the Basic cellular concept and cellular system 1c. Explain macro, micro, Pico, Selective and umbrella cell. 1d. Explain frequency reuse planning 1e. Discuss the impact of Co-channel and adjacent channel interference 1f. Explain the fixed, dynamic channel assignment schemes. 1g. Differentiate cell splitting and cell sectoring.	1.1 Cellular communication Standards-1G, 2G ,3G and 4G 1.2 Basic cellular concept and cellular system 1.3 Type of Cell: macro, micro, Pico, Selective and umbrella cell. 1.4 Cluster concept and frequency reuse 1.5 Co-channel and adjacent channel interference 1.6 Channel assignment strategies 1.7 Enhancing coverage and capacity of cellular system: cell splitting and cell sectoring
Unit–II	2a. Differentiate hard and soft	2.1 Introduction of Handoff & its type

Handoff Management: Detection and Assignment	handoff. 2b.Explain inter-BS handoff and intersystem handoff. 2c.How is the need for handoff detected. 2d.Explain strategies for Handoff Detection. 2e.Describe four different channel assignment schemes. 2f.List the five different Link Transfer cases	Soft and Hard, inter-BS handoff and intersystem handoff. 2.2 Handoff Detection 2.3 Strategies for Handoff Detection (MCHO, NCHO, MAHO) 2.4 Channel Assignment: Nonprioritized scheme and Reserved channel scheme, Queuing priority scheme, Subrating scheme 2.5 Link Transfer type.
Unit–III Cellular Digital Packet Data and GSM Mobility Management	3a.Explain CDPD Architecture with its entities. 3b.Describe GSM Architecture with its major parts. 3c. Explain MS registration process. 3d. Describe the mobile call termination (delivery) procedure. 3e. Explain GSM security. 3f.Describe GSM data services. 3g.Explain GSM Location updates procedure. 3h. What is Mobility databases.	3.1 CDPD Architecture 3.2 GSM Architecture 3.3 Location tracking and call setup 3.4 GSM Security 3.5 Data Services: HSCSD, GPRS 3.6 GSM Location update: Basic Location Update Procedure & Basic Call Origination and Termination procedure. 3.7 Mobility Database.
Unit– IV Mobile Number Portability and GPRS	4a. What is number portability? 4b.Describe three types of number portability. 4c.Explain Mobile number portability mechanisms. (SRA1, SRA2, ACQ1, ACQ2). 4d.Describe GPRS Architecture. 4e.Enlist GPRS network nodes.	4.1Mobile Number portability: Fixed Network Number portability, Number portability for mobile network. 4.2 Mobile number portability mechanisms(SRA1,SRA2,ACQ1,ACQ2) 4.3 GPRS Architecture. 4.4 GPRS network nodes.

Unit-V Wireless Application Protocol (WAP)	5a. What is WAP Model. 5b.Explain WAP Gateway. 5c. Describe WAP Protocol stack.	5.1 WAP Model 5.2 WAP Gateway 5.3 WAP Protocols: (WDP, WTLS, WTP, WSP, WAE)
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 Fundamentals of WML, 6.3 Navigating Between Cards and Decks, Writing and Formatting Text. 6.4 Displaying Images, Tables in WML 6.5 Using Variables, Acquiring User Input 6.6 An Introduction to WML Script 6.7 WML Script Control Structures, Events 6.8 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
I	Fundamental of Cellular Communication	**10**	**4**	**4**	**4**	**12**
II	Handoff Management: Detection and Assignment	**12**	**4**	**6**	**4**	**14**
III	Cellular Digital Packet Data and GSM Mobility Management	**14**	**6**	**8**	**4**	**18**
IV	Mobile Number Portability and GPRS	**12**	**4**	**4**	**4**	**12**
V	Wireless Application Protocol (WAP)	**5**	**4**	**4**	**4**	**12**
VI	Wireless Markup Language & script	**11**	**4**	**4**	**4**	**12**

Total	64	26	30	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	Identify 4G Technology and Architecture.	02
2	III	Identify CDPD Architecture with its entities.	02
3	III	Identify GSM Architecture with its major parts and services.	02
4	IV	Identify GPRS Architecture with its network nodes.	02
5	VI	Design and develop program for navigating between cards and decks using WML.	02
6	VI	Design & Develop a program to format a text using WML.	02
7	VI	Design & Develop a program to display data in tabular format using WML.	02
8	VI	Design and develop program displaying images using WML**.**	02
9	VI	Design & Develop a program for user input using WML.	04
10	VI	Design & Develop a program to handle different events using WML**.**	04
11	VI	Design & Develop a program to convert currency using WML**.**	04
12	VI	Design & Develop a program to perform validation using WML script.	04
Total			**32**

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.	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.	Win Wap	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.learnerstv.com

c. www.wiley.india.com (PPTs available)

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 standards of mobile communication systems.	-	3	-	-	-	-	-	-	-	-	-	-
2	Identify Strategies for Handoff Detection.	-	3	3	1	-	-	-	-	-	3	-	-
3	Identify functionality of GSM architecture and CDPD architecture	-	3	-	-	-	-	-	-	-	-	-	-
4	Identify functionality of GPRS architecture and services.	-	3	-	-	-	-	-	-	-	-	-	-
5	Identify the need of WAP protocol.	-	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- 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- OBJECT ORIENTED MODELING DESIGN

COURSE CODE 6T501

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Information Technology	Fifth

1. RATIONALE

Object Oriented Modelling and Design is a diversified course that presents an Object oriented approach to software development. It is based on modelling 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

Students will be able to

Design UML diagrams for software development.

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	--	--	

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 Object Oriented concepts for designing.
2. Design Object Model for a given Problem statement.
3. Use tools for designing UML diagrams.
4. Develop structural modeling for given model.
5. Develop behavioral modeling for given model.

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 1.3 Use case driven approach (OOSE) by Jacobson 1.4 Overview of CRC card method by Cunningham 1.5 Importance of Modeling 1.6 Four principles of Modeling
Unit - II Object Modeling	2a Concepts of Object and Classes 2b Definition of links, attributes, association, multiplicity link, association as a class 2c Explain Generalization, Inheritance, aggregation, Association	2.1 Objects and Classes 2.1.1 Database schemas 2.1.2 Attributes 2.1.3 Operation 2.1.4 Methods 2.2 Links, Associations, Advanced Concepts 2.3 Multiplicity Link Attributes, Association as a class, Aggregation 2.4 Generalization & Inheritance, Group Constructs 2.5 Aggregation Vs Association and Generalization 2.6 Recursive Aggregation, Propagation of Operation 2.7 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. Design Class diagrams 4b. Design advanced class diagram 4c. Explain packages, instances 4d. Design object diagram 4e. Design 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 Design Interaction diagram & its type 5b. Explain and design State Chart Diagram 5c. Explain and design Activity Diagram 5d. Explain and design Component Diagram 5e. Explain and design 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
1	Introduction to modeling	10	8	4	8	20
2	Object modeling	10	8	4	10	22
3	Overview of UML	08	4	4	4	12
4	Structural modeling & use case	12	4	4	6	14
5	UML behavioral modeling	08	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	03	Installation of UML software.	02
2	03	Draw Object diagram Using EdrawMAx	02
3	03	Draw Class diagram & Advanced Class Diagram Using EdrawMAx	04
4	03	Draw Use Case diagram Using EdrawMAx	04
5	03	Draw Sequence diagram Using EdrawMAx	02
6	05	Draw Collaboration diagram Using EdrawMAx	04
7	03	Draw State Chart diagram Using EdrawMAx	04
8	03	Draw Activity diagram Using EdrawMAx	04
9	03	Draw Component diagram Using EdrawMAx	04
10	03	Draw Deployment diagram Using EdrawMAx	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. Design structural UML model.
b. Design behavioral UML model.
c. Design sequence diagram, collaboration diagram, interaction diagram, component diagram for following system: 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. Guiding students for designing real time UML model.
d. Observe students and monitor the performance of students.
e. Design state chart diagram for different systems.
f. Assign mini projects.

10. SUGGESTED LEARNING RESOURCE

S.No.	Name 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 :

Hardware: Desktop Computer P-IV processor or higher
Software: Microsoft 2003 /any higher version, EdrawMax, RationalRose

12. LEARNING WEBSITE & SOFTWARE

a. EdrawMAx
b. Smartstar
c. UML architect 3.0
d. RationalRose

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	Interpret the meaning of Object Oriented concepts.	-	3	-	-	-	-	-	-	-	-	3	-
2	Prepare an Object Model for a given Problem statement	-	3	3	-	-	-	-	-	-	-	2	-
3	Usage of any one design tool for UML	-	3	3	-	-	-	-	-	-	-	3	-
4	Describe And design the concepts of Class diagram, Object diagram	-	3	3	3	-	-	-	-	-	-	3	-
5	Prepare Interaction diagram, State chart Diagram, Use case Diagram, Sequence Diagram.	-	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- **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 @ (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	5.1 Introduction to Hadoop Distributed File System and Google File System. 5.2 Architecture of HDFS, 5.3 Comparison with Traditional Technology with

	Platform as a Service with it's advantages 5.c Design the case study to create and single node cluster using Hadoop.	distributed file system 5.4 What is Big Data? 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	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	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- INTERNET OF THINGS

COURSE CODE 6T408

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
INFORMATION TECHNOLOGY	FIFTH

1. RATIONALE

Internet of Things is applied level elective course. In today's hi-tech world of information technology, most of the things are available on internet and most of the systems are going to be automated. This can be done with Internet of things. Student will be able to deploy s/w projects and smart applications with help of internet of things(IoT) for automation.

2. COMPETENCY

Student will be able to

"Identify the need of IoT and encouragefor developing and deployingsmart application based on IoT."

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	
03	02	00	05	80	20	@ 25	25	150
Duration of the Examination (Hrs)				3	2	--	--	

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

I. Identify applications based on web of thing and internet of things.

II. Use IoT architecture and reference model.

III. Select appropriate networks and protocols of IoT.

IV. Identify security issues and threads in IoT.

V. Designnew models for smart applications**.**

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes	Topics and Sub-topics
UNIT-I **Introduction to IoT**	1a Identify applications based on web of thing internet of things. 1b Identify barriers in IoT.	1.1 IoT Definition and Characteristics. Web of Things V/s Internet of Things: - Two pillars of the web, architecture standardization for WoT, Platform middleware for IoT, Unified multitier WoT architecture, WoT portals and Business Intelligence. 1.2 IoT components, different Trends in Information and Communication Technology 1.3 Implications for IoT, Barrier and Concern for IoT
UNIT-II **IoT Architecture**	2a Use IoT architecture. 2b Select reference model for appropriate application. 2c Use IoT reference architecture for application.	2.1 IoT Architecture: Building architecture, Main design principles and needed capabilities, an IoT architectural overview. 2.2 IoT Reference Model: IoT domain model, Information model, Functional model, Communication Model, Security Model. 2.3 IoT Reference Architecture: Deployment and Operational

		view.
UNIT-III **M2M and IoT Technology Fundamentals**	3a Identify network required for IoT. 3b Identify OS and data used in IoT. 3c Select appropriate protocol for IoT application.	3.1 M2M and IoT Technology Fundamentals: Gateway, Local and wide area networking, Managing IoT 3.2 Data consideration for M2M data, M2M and IoT analytics, Knowledge Management. 3.3 OS Requirement of IoT Environment: RiOT, mbed, Contiki, typical components of an OS for low end IoT devices. 3.4 Recent Protocol for IoT: Power line Communication, IPv6 over Low Power WPAN, Routing protocol for low Power and lossy network RPL, ZigBee Smart energy 2.0, ESPI M2M architecture, MQ telemetry transport.
UNIT-IV **Security IoT**	4a Identify security issues in IoT. 4b Identify interoperability issues in IoT.	4.1 Security Issues and Challenges.Spectrum of security consideration, privacy consideration. 4.2 InteroperabilityIssues, Regularity, Legal and Right Issues. 4.3 A policy based framework for security and Privacy in IOT.
UNIT-V **IoT smart Application**	5a Identify need of IoT. 5b Design new models for smart application.	5.1. Agriculture, Smart cities, Smart Energy and Smart Grid 5.2. Smart Mobility and Transport, Smart Homes.

		5.3. Smart Building and Infrastructure, Smart Health cares.

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 IoT	10	6	6	4	16
II	IoT Architecture	10	6	6	4	16
III	M2M and IoT Technology Fundamentals	12	6	8	6	20
IV	Security IoT	08	6	4	4	14
V	IoT smart Application	08	4	6	4	14
	Total	48	28	30	22	80

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

7. SUGGESTED EXERCISES/PRACTICALS

S. No.	Unit No.	Tutorial list (Outcomes in Psychomotor Domain)	Approx. Hrs. required
1.	1	Identify application based on web of things and describe one of them.	02
2.		Search and prepare a report on new trends used in information and communication technology	02
3.	02	Identify applications with different IoT models.	04
4.	3	Download any one open source OS used for IOT. Describe its functioning.	04
5.		Identify different protocols used in IoT	02
6.	4	Explore working of IoT framework for given application	04

7.		Identify security issues in IoT.	02
8.	5	Prepare a report on IoT application to automate for handicap.	04
9.		Prepare a report on IoT application to automate for hospital's critical care unit.	04
10.		Prepare a report on IoT application for smart city.	04
		Total	32

8. SUGGESTED STUDENT ACTIVITIES

Following is the list of proposed student activities like:

1. Describe gateway-as-a-service deployment in IoT toolkit.
2. Explain application framework and embedded software agents for IoT toolkit.
3. Explain working of Raspberry Pi. 9. Connect Raspberry Pi with your existing system components. 10. Give overview of Zetta
4. Make chart/poster for each model
5. Create any circuitry project using Arduino.
6. How do you connect and display your Raspberry Pi on a Monitor Or TV?
7. Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory

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

S.No.	Title of Book	Author	Publication
1.	Internet of Things: Converging Technologies for smart Environments and Integrated Ecosystems	Dr.OvidiuVermesan, Dr. Peter Friess	River Publication

2.	From Machine to Machine to the Internet of Things: Introduction to a new Age of Intelligence	Jan Hollar, VlasiosTsiasis Mulligan, Stefan Avesand, StamisKarnouskos, David Boyle, 1st Edition	Academic Press 2014.
3.	"Internet of Things (A Hands-on-Approach)"	Vijay Madisetti and ArshdeepBahga,	1 st Edition, VPT, 2014

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	Raspberry pi/Arduino	Latest version

12. LIST OF SOFTWARE / LEARNING WEBSITES

1. https://github.com/connectIOT/iottoolkit
2. https://www.arduino.cc/
3. http://www.zettajs.org/
4. Contiki (Open source IoT operating system)
5. Arduino (open source IoT project)
6. IoT Toolkit (smart object API gateway service reference implementation)
7. Zetta (Based on Node.js, Zetta can create IoT servers that link to various devices and sensors)

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
CO1	Differentiate between web of thing and internet of things	-	3	-	-	-	-	-	-	-	3	-	-
CO2	Describe IoT architecture and reference model.	-	3	-	-	-	-	-	-	-	3	-	-
CO3	Identify required networks and analyse various protocols of IoT.	-	3	-	2	-	-	-	-	-	2	3	-
CO4	Identify and analyze security issues and threads in IoT.	-	3	-	-	-	-	-	-	-	3	-	-
CO5	Identify and design new models for IoT smart applications.	-	-	-	3	-	3	-	-	-	-	-	3

Course Curriculum Design Committee

Sr No	**Name of the faculty members**	**Designation and Institute**
1	MrsV.B.Kundlikar	Lecturer In Information Technology
2	MrsP.P.Deshapande	Lecturer In Information Technology
3	Mr. S.M.Bankar	Lecturer In Computer Engineering

Member Secretory(PBOS) Chairman(PBOS)

COURSE TITLE- **NETWORK AND WEB APPLICATION SECURITY (NWAS)**

COURSE CODE- **6T409**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Information Technology	Fifth

1. RATIONALE

Network and web application security is applied level course, emphasizes on security of network and webapplications.Insecure use of web and network access makes people vulnerable to attack. Using significant security mechanisms we can secure network and web application. It covers the underlying concepts and techniques recently being used in the industry.

2. COMPETENCY

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

"Apply Security techniques for securing network and web Applications."

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	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. Use network defense tools.
2. Select security mechanism for system security.
3. Select security techniques for web Security.
4. Identify Vulnerabilities in network.
5. Identify threats and Vulnerabilities in web applications.

5. DETAILED COURSE CONTENTS

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
UNIT-I Security issues and Network defense tools in N/W Security	1a.Apply the different network defense tools.	1.1. Security issues:TCP,DNS,ROUTING 1.2. DefenseTools:Firewalls,VPN,Intrusion Detection, Kerberos 1.3. E-Mail Security: Security of email transmission, malicious code, spam, mail encryption.
UNIT-II System Security	2a. Describe the IDS. 2b. Apply the different types of security at different applications.	2.1. Intruders, Intrusion detection systems (IDS).Host based IDS, network based IDS 2.2. Password Management, vulnerability of password, Password selection strategies, components of a good password 2.3. Operating system security: Operating system updates, Hot fix, patch, service pack.
UNIT-III Cybercrime: Mobile and wireless security	3a. Describe mobile and wireless security	3.1. Introduction, types of mobile computers, credit card frauds in mobile and wireless computing era ,types and Techniques of credit card frauds ,trends in mobility, attacks against 3G mobile network . 3.2. Attacks on mobile/cell phones • Mobile phone theft • Mobile Viruses • Mishing • Vishing • Smishing • Hacking Bluetooth 3.3. Phishing:how phishing work? 3.4. Methods and techniques of phishing 3.5. Types of Phishing Scams

UNIT-IV Security of Electronic Commerce	4a.Describe the security in e-commerce.	4.1Introduction. 4.2 'Electronic Commerce' Paradigm • What is e-commerce? • Internet Domain in e-business • Advantages of e-commerce. • The model and Internetdomain for Electronic Business/e-commerce. 4.3Strategic issues in EDI Security? 4.4 Security issues and concerns in the electronic commerce. Ensuring Security in electronics commerce
UNIT-V Privacy Aspects of Web Services	5a..Describe the privacy aspects of web services	5.1 Web services role, working, Privacy consideration in web services, Factor that cause web privacy violations, how website privacy works with p3p 5.2 privacy in the semantic web 5.3 privacy consideration in the use of context-Sensitive Technologies: use of Context sensitive technologies for tracking people, design issues for context sensitive application based on web services. 5.4 Security and privacy Aspect of Service Oriented Architectures.

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	Security issues and Network defense tools in N/W Security	8	5	5	6	16
2	System Security	10	6	6	6	18
3	Cybercrime: Mobile and wireless security	10	6	6	6	18
4	Security of Electronic	10	4	4	6	14

	Commerce					
5	Privacy Aspects of Web Services	10	4	4	6	14
	Total	48	25	25	30	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	Identify different types of threats security.	2
2	01	Identify different types of attack.	4
3	01	Apply Network Security fundamentals for Ethical Hacking, Social Engineering practices.	2
4	02	Apply E-Mail Security.	4
5	02	Create Virtual Private Network.	4
6	03	Authenticate user by using password and biometrics.	4
7	03	Detect intruders and protect system using different techniques.	2
8	03	Select security measuresforOperating System.	2
9	04	Set Firewalls.	4
10	05	Identify different types of security provided by Social Sites	2
11	05	Discover Vulnerabilities in web applications.	2
Total			32

8.SUGGESTEDSTUDENTS ACTIVITIES

Following is the list of proposed student activities such as:

- Seminar (student would prepare seminar on security features adopted by some reputed companies/banks etc to protect their websites and data)
- Students would use power point presentations in above seminar and there would be group discussions on the strengths and weakness of the security features adopted by the concern company

9.SUGGESTEDSPECIFIC INSTRUCTIONAL STRATERGIES

1. Guide students in preparing actual procedure of data recovery.
2. Guide students in implementing it in c/c++ programming language.
3. Demonstrate practical thoroughly before the students perform.
4. Assign different types of Micro-projects.
5. Guide students in preparing Micro-projects.

10.SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	Godbole Nina	Information System Security	John Wiley
2.	V.K.Pachghare	Cryptography and Information Security	Prentice Hall India
3.	Forouzon	Cryptography and Network Security	McGraw Hill

11.LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED:

S.No.	Name of equipment	Brief specification
1.	Kaspersky Anti-Virus.	New Version
2.	McAfee Antivirus Plus.	New Version
4	Norton Security.	New Version
5	F-Secure Anti-Virus	New Version
6	Avira Antivirus Pro	New Version
7	Panda Antivirus Pro.	New Version
8.	Trend Micro Antivirus + Security.	New Version
9.	Bull Guard Antivirus.	New Version

12. LEARNING WEBSITE & SOFTWARE:-

1. Download MD5 Application www.md5summer.org/download.html
2. Download Wireshark Tools https://www.wireshark.org/tools/

3. SecTools.Org: Top 125 Network Security Tools http://sectools.org/

4. SHA-256 hash calculator http://www.xorbin.com/tools/sha256-hash-calculator

5. Firewall Analyzerhttp://www.manageengine.com/products/firewall/?gclid= CO_Zh4DwtcICFYU rjgodx1cA9g&gclsrc=aw.ds **www.owasp.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 importance of RSA Algorithm and Asymmetric cryptography.	1	3	-	-	1	-	1	-	-	1	-	-
2	Explain Basic concept of Message Authentication Codes.	1	2	-	-	-	-	-	1	-	2	1	-
3	Express basic concept of Web Security.	1	1	1	-	-	-	-	-	-	1	-	-
4	Demonstrate use of digital signature.	-	1	1	1	1	-	1	1	-	1	-	-
5	Apply Application level security on web browser	-	3	2	-	-	-	-	2	-	2	2	-
6	Demonstrate various parameters of antivirus and firewall security on network	-	3	-	-	2	1	-	3	-	-	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. DipaliP.Sapkal	Lecturer in Information Technology,Govt.Polytechnic, Aurangabad
3.	Prof.PrajaktaS.Sadafule	Lecturer in Computer Engineering,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 : ENTERPRISE RESOURCE PLANNING

COURSE CODE : 6T302

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Information Technology	VI

1. RATIONALE:

Enterprise Resource Planningis an allied level course introducing foundation understanding of enterprise systems and how these systems fit into today's business operations. Enterprise Systems are now essential infrastructure to both large corporate entities, as well as to small-to-medium organization, as they remove the need to have a large number of separate individual computer-based applications. This course includes Basics of ERP, technology use in ERP, ERP module and present scenario of ERP in India.

2. COMPETENCY:

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

"Understand the role of ERP in manufacturing systems, and other supporting activity in manufacturing business."

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)	100
4	-	-	4	80	20	--	--	
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. List benefits and functions of ERP.
2. Analyze various modules of ERP.
3. Market survey of various ERP software (Like Oracle, SAP).
4. Observe ERP Life Cycle.
5. Distinguish ERP and e-business.

5. DETAILED COURSE CONTENTS:

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit - I Introduction to Enterprise Resource Planning	1a. Identify advantages of ERP. 1b. Identify benefits of ERP System. 1c. Collect business function and business processes. 1d. Use ERP for decision making.	1.1 Introduction: A brief history of ERP, Reasons for the growth of the ERP market, The advantages of ERP. 1.2 Enterprise- An Overview: Business functions and business processes, Integrated management information, The role of the Enterprise, Business modeling, and Integrated data model. 1.3 Benefits of ERP: Information integration, Reduction of lead-times, on-time shipment, Reduction in cycle time, improved resource utilization, Better customer satisfaction, Improved supplier performance, Increased flexibility, Reduced quality costs, Better analysis and planning capabilities, Improved information accuracy and decision making capability.
Unit – II ERP and Related Technologies	2a. Compare ERP Technologies. 2b. Use supply change management. 2c. Apply security to ERP software.	2.1 ERP Related Technologies: Business process re-engineering (BPR), Business intelligence (BI), Business analytics (BA). 2.2 Data Warehousing, Data Mining, On-line analytical processing (OLAP), Product-life cycle management(PLM), Supply chain management (SCM), Customer relationship management (CRM), Geographic information systems (GIS), Intranets and Extranets. 2.3ERP Security: Technological advancements
Unit - III ERP Marketplace and Functional Modules	3a. Survey ERP market. 3b. Identify business modules of an ERP packages.	3.1 ERP Marketplace and Marketplace Dynamics: Market overview, ERP market Tiers, Marketplace dynamics- on premise ERP and on-demand ERP, Industry-wise ERP market share, ERP: The Indian scenario. 3.2 Business Modules of an ERP Package: Functional modules of ERP software, Integration of ERP, Supply chain and customer relationship applications.
Unit - IV ERP Implementation	4a. Draw ERP implementation life cycle. 4b. Select ERP packages for given enterprise.	4.1 ERP Implementation Life Cycle: Objectives of ERP implementation, Different phases of ERP implementation, Why do many ERP implementationsfail.

		4.2 ERP Package Selection: Why many ERP package implementations fail, ERP package evaluation and selection, The selection process.
Unit - V ERP- Present	5a. Identify components of the E-Business supply chain. 5b. Identify best practices of ERP. 5c. Prepare list of ERP software.	5.1 ERP and E-Business: ERP and E-Business, E-Business: supply chain integration, The E-Business process model, Components of the E-Business supply chain, ERP/E-Business integration. 5.2The Internet explosion, Best practices Of ERP. 5.3 Future Directions and Tends in ERP: New markets, New Channels, Faster implementation methodologies, Easier customization tools, Reduction in implementation time. 5.4 ERP Case Studies: SAP, Oracle JD Edwards, Oracle Peoplesoft, QAD.

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 Enterprise Resource Planning	14	8	4	-	12
II	ERP and Related Technologies	12	8	4	4	16
III	ERP Marketplace and Functional Modules	14	4	8	4	16
IV	ERP Implementation	12	8	4	8	20
V	ERP- Present	12	4	8	4	16
	Total	64	32	28	20	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
NOT APPLICABLE			

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 Manufacturing Industry suggest appropriate ERP software.
2	For Service Industry suggest appropriate ERP modules.
3	Collect ERP software specification for educational institutes.
4	Prepare ERP modules for given situations in Manufacturing Industry.
5	Illustrate practical situations where ERP software is essential and not essential.

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 ERP.

10. SUGGESTED LEARNING RESOURCE:

S.No.	Name of Book	Author	Publication
1	Enterprise Resource Planning	Alexis Leon	Tata McGraw Hill.
2	ERP Concepts and Practice	Vinod Kumar Garg, N.K Venkitakrishna	PHI
3	ERP – A Managerial Perspective	S. Sadagopan,	Tata McGraw Hill
4	ERP Ware: ERP Implementation Framework	V.K. Garg, N .K. Venkita Krishnan	PHI
5	Enterprise Resource Planning	Ravi Shankar , S. Jaiswal	Galgotia.
6	Guide to Planning ERP Application	AnnettaClewwto and Dane Franklin,	McGRaw-Hill

11. LIST OF MAJOR EQUIPMENTS AND MATERIALSREQUIRED:

Sr.No.	Name of equipment	Brief specification
NOT APPLICABLE		

12. LEARNING WEBSITE &SOFTWARE:

1. http://www.netsuite.com/portal/resource/articles/erp/what-is-erp.shtml
2. http://www.uwosh.edu/faculty_staff/wresch/ERPNestle.htm
3. https://www.sciencedirect.com/science/article/pii/S2212017313002120
4. http://www.informit.com/articles/article.aspx?p=24014
5.https://www.researchgate.net/publication/241700177_Project_management_a_case_study_of_a_successful_ERP_implementation

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
1	List benefits and functions of ERP.	1	2	-	-	-	-	-	-	-	2	2	1
2	Analyze various modules of ERP	1	1	-	-	-	-	-	-	-	1	1	-
3	Market survey of various ERP software (Like Oracle, SAP)	1	-	-	-	-	-	-	-	-	1	1	1
4	Observe ERP Life Cycle.	1	2	-	-	-	-	-	-	-	1	2	-
5	Distinguish ERP and e-business.	1	3	-	1	-	-	-	-	-	2	2	2

Course Curriculum Design Committee:

SrNo	Name of the faculty members	Designation and Institute
1	JitendraP. Joshi	Lecturer in Information Technology, Govt. Polytechnic, Aurangabad
2	Om R. Varma	Lecturer in Information Technology, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)

COURSE TITLE- **NETWORK MANAGEMENT & ADMINISTRATION**

COURSE CODE **6T402**

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Information Technology	SIXTH

1. RATIONALE

Network Management & Administration is an applied level course to connect workstation to other computers for sharing peripherals such as printers, data, software, hardware. With the proper configuration of operating system on the server, the students will manage and administrate the network resources or devices such as printers, scanner, driver and also software like files, folders, directories, applications, programs. This subject covers the installation and configuration of network operating system.

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:

" Plan, install, configure, administer and manage network".

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)	OR	50
1	0	2	3	0	0	0	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, 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.

Students will be able to:-
1. Identify directory Services and Remote Access for computers over network.
2. Configure network and DNS.
3. Configure Network server(windows server 2008/2012/2013) operating system.
4. Configure various services of network on Windows server platform.

5. DETAILED COURSE CONTENTS

Unit	**Major Learning Outcomes (Cognitive Domain Only)**	**Topics And Sub-Topics**
Unit – I **Exploring Directory Services**	1.1 State & explain types of Network related jobs 1.2 Explain Directory Services 1.3 Explain Active Directory Architecture 1.4 Explain Virtual private network	1.1 Network Related Jobs – Network Administrator, Network Engineer, Network Architecture / Designer, Other Network Related Jobs. 1.2 Directory Services - Define Directory Services, Definition of Novelle Directory, Windows NT domains, 1.3 Active Directory Architecture – Object Types, Object Naming, Canonical Names, LDAP Notation, Globally unique identifiers,User Principle Names, Domain, Trees & Forests. 1.4 Virtual Private Network – VPN Protocols, Types of VPNs, VPN Clients,SSL VPNs.
Unit – II **Network Connection and Printing Services.**	2.1 Explain Dynamic Host Configuration (DHCP) 2.2 Explain Domain Name Service 2.3 Demonstrate Understanding of Network printing	2.1 Dynamic Host Configuration Protocol (DHCP) – DHCP Origins, Reverse Address Resolution Protocol (RARP), The Bootstrap Protocol (BOOTP), DHCP Objectives, IP Address Assignment, DHCP Architecture. 2.2 Introduction to Domain Name System(DNS) - DNS Objectives, Domain Naming, Top Level Domains, Second Level Domains, Sub

		domains, DNS Functions, Resource Records, DNS Name Resolution, Resolves, DNS Requests, Root Name Servers, Resolving a Domain Name, DNS Name Registration. 2.3 Understand Network Printing Concepts - Understand Network Printing Concepts, Locally connected print devices, Setting up local print devices, Shared print devices, Sharing Locally Attached Print Devices, Describe Windows Network Printing, Add Print Wizard.
Unit -III **Implementation of Network**	3.1 Demonstrate understanding of various networks need, Applications 3.2 Demonstrate Installation and configuration of Windows 2008 Server 3.3 Explain Domain controller	3.1 Designing Network – Accessing Network Needs, Applications, Users, Network Services, Security and Safety, Growth and Capacity Planning, Meeting Network Needs – Choosing Network Type, Choosing Network Structure, Choosing Servers. 3.2 Installing and Configuring Windows 2008 Server - Preparing for Installation, Creating windows 2008 server boot disk, Installing windows 2008 server, Configuring server/ client 3.3 Setting windows 2008 server - Creating Domain controller, Adding the DHCP and WINS roles, Adding file server and print server, Adding Web based Administration.
Unit - IV **Administering Windows 2008 Server (The Basics)**	4.1 Competency of account handling related to Server system. 4.2 Demonstrate group maintenance 4.3 Explain shares security 4.4 Demonstrate and understanding of server backup	4.1 Working With User Accounts - Adding a User, Modifying User Account, Deleting or Disabling a User Account. 4.2 Working With Windows 2008 Security Groups – Creating Group, Maintaining Group Membership. 4.3 Working with Shares – Understanding Share Security, Cresting Shares, Mapping Drives 4.4 Administering Printer Shares – Setting up Network Printer, 4.3 Working with Windows 2008Backup – Using Windows 2008 Servers Backup Software

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	**Exploring Directory Services and Remote Network Access.**	04	**Not Applicable**			
II	**Network Connection and Printing Services.**	04				
III	**Implementation of Network**	05				
IV	**Administering Windows 2008 Server (The Basics)**	03				
	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	Identify directory services for remote access of a system.	02
2	I	Identifying and recognizing network components.	02
3	I	Installing Active Directory.	02
4	I	Creating Active Directory Objects.	02
5	II	Installing Windows XP Professional within Windows 2008 domain.	02
6	II	i. Set up a Local Print Device. ii. Installing and Configuring a Network – Capable Print Device.	02

7	II	Create new Users & give the Permission	02
8	III	Installing Windows 2008 Server.	02
9	III	Installation of Linux operating systems.	02
10	III	Installation and configuration Samba server.	02
11	IV	Configure IPv4/IPv6 and advance TCP/IP settings.	02
12	IV	Install IIS server.	02
13	IV	Installing and Configuring DHCP Server.	02
14	IV	Perform Linux system administration commands such as Managing file system, Disk management utilities, mounts, umount, df, du, fdisk, su, useradd etc.	02
15	IV	Configure Linux using DHCP Server.	02
16	IV	Configuration of FTP Services/Mail Services/Web Server.	02
Total			**32**

8. SUGGESTED STUDENTS ACTIVITIES

i.Student should submit a term work in the form of journal containing at least 12 (Twelve) experiments and /or assignments conducted during the course from the List of Experiments.
ii .Each experiment / assignment has to be well documented
iii.Diagram, and Conclusion (as applicable).

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 using windows server version.

10. SUGGESTED LEARNING RESOURCE

S.No.	Name of Book	Author	Publication
1.	The Complete Reference Networking	Craig Zacker	Tata McGraw-Hill
2.	Networking A Beginner's Guide	Bruce Hallberg	Tata McGraw-Hill
3	Introduction to Networking	Richard A. McMohan,Sir	Tata McGraw-Hill
4	Networking + Certification Training Kit		Microsoft Press
5	Linux Lab: Hands on Linux	Dayanand Ambawade and Deven N.Shah	Wiley Dreamtch Pvt. Ltd

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.	Software	windows 2008 server

12. LEARNING WEBSITE & SOFTWARE

i. http://www.w3school.com

ii. 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)

SNo	Course Outcome	POs										PSOs	
		1	2	3	4	5	6	7	8	9	10	01	02
CO1	Compare different types of network.	2	1	-	-	-	-	-	-	-	-	2	-
CO2	Describe the different types of network directory services.	3	3	3	-	-	-	-	-	-	-	1	-
CO3	Ability to install and configure Windows 2003 Server.	-	3	3	3	-	-	-	-	-	-	1	-
CO4	Configure the networking resources and software from the server.	-	3	3	1	-	-	-	-	-	-	-	-

Course Curriculum Design Committee

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

(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- 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 / 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 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)

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 skillsfor 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. 3c Use methods to identify IP	3.1 Basics Socket overview, client/server, reserved sockets, proxy servers, internet addressing. 3.2 Java & the .net package. The networking classes & interfaces.

	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.	3.3 Internet addresses Factory methods, instance method. 3.4 URL, Format, URLconnection. 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-IVServlet	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 datainto 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 handling in JSP page	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. 5.4. Scripting in JSP, Session handling, Handling exception in

	designing. 5e Design a JSP page to connect to database.	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. SUGGESTEDLIST 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 form using servlet	04
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	-	-	3	3	-	-	-	-	-	3	-	-

	GUI using AWT and swing												
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	MrsV.B.Kundlikar	Lecturer In Information Technology
2	MrsP.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 **6T502/ 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: 6T503

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 2.2 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 Visualization	4a Competency of GIS data processing 4b Demonstrate visualization of geographic data. 4c Analysis of Vector/ Raster 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 4.4 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	6a 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 : COMPUTER GRAPHICS

COURSE CODE : 6T504

PROGRAMME & SEMESTER

Diploma Programme in which this course is offered	Semester in which offered
Information Technology	SIX

1. RATIONALE:

Computer Graphics is the Diversified Level course that makes a computer system interactive so as to effectively use computer resources and to control operation of the computer system. Computer Graphics is the study of techniques to improve communication between human and machine. Computer Graphics means pictures, graphics or scene drawn with the help of a computer system. Computer graphics is an extremely effective medium for communication between man and machine through pictures, charts and diagrams. Students will learn line, circle, polygon drawing algorithm, 2-D and 3-D transformation, windowing and clipping algorithm, curve generation and curve fractals.

2. COMPETENCY:

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

"**Use of basic facts, rules, identities to solve drawing, business graphs, architectural design problems"**

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	5	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 the different file formats of computer graphics files.
2. Use line drawing algorithm.
3. Perform 2-D and 3-D transformations.
4. Use Windowing and Clipping algorithm.
5. Select curve generation algorithm for given problem.

5. DETAILED COURSE CONTENTS:

Unit	Major Learning Outcomes (Cognitive Domain Only)	Topics And Sub-Topics
Unit - I Basics of Computer Graphics	1a. Use graphics mode and graphics functions. 1b. Prepare list of graphics Primitive operations. 1c. Select graphics file Formats. 1d. Sketch display devices.	1.1 Display devices. 1.2 Primitive operations. 1.3 The Display-file Interpreter. 1.4 Display files structure. 1.5 Graphics file formats. 1.6 Text mode graphics function. 1.7 Graphic mode and Graphics functions. 1.8 Graphics file formats- Basics, advantages, disadvantages- BMP, GIF, JPEG, TIFF, and PCX.
Unit – II Line, circle, and polygon	2a. Identify line drawing Algorithm. 2b. Use circle drawing Algorithm. 2c. Fill polygon using Polygon filling algorithm.	2.1 Basic concepts in line drawing, 2.2 Line drawing algorithms: DDA algorithms, Bresenham's algorithm, 2.3 Circle generating algorithms: DDA Circle drawing algorithm, Bresenham's Circle drawing algorithm, midpoint circle algorithm. 2.4 Polygons. Types of polygons, Polygon representation, Entering polygons, polygon filling: Flood fill, scan- Line Algorithm.
Unit - III Transformations	3a. Apply rotation to 2-D and 3-D object. 3b. Use Principles of Transformations.	3.1 Principles of Transformations, 2D transformation: scaling, Reflection, shearing, Rotation, 3.2 Translation, Rotation about an arbitrary Point. 3.3 3- D Transformation: scaling, 3.4 Rotation, translation, rotation about arbitrary axis
Unit - IV Windowing and Clipping	4a. Use line clipping Algorithm. 4b. Compare clipping Algorithm. 4c. Identify normalization Transformation.	4.1 Viewing transformation, 4.2 Normalization transformation, 4.3 Line clipping: Cohen-Sutherland, 4.4 Line clipping algorithm, 4.5 Midpoint subdivision algorithm, 4.6 Polygon clipping: Sutherland Hodgeman Polygon clipping algorithm.
Unit - V Curves and	5a. Identify curve generation Algorithm.	5.1 Curve generation- Arc generation using DDA algorithm, Interpolation,

Fractals	5b. Identify advantages of Graphics standards. 5c. Modify curve.	Approximation, B- Spline, Bezier curves. 5.2 Curves Fractals- Hilbert's Curve, Koch curve, Fractal lines, Fractal Surfaces. 5.3 Advantages of Graphics standards.

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	Basics of Computer Graphics	8	4	4	4	12
II	Line, circle, and polygon	12	4	6	8	18
III	Transformations	10	4	6	8	18
IV	Windowing and Clipping	10	4	6	6	16
V	Curves and Fractals.	8	4	6	6	16
	Total	**48**	**20**	**28**	**32**	**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	II	Execute the program for DDA algorithm for line drawing.	02
2	II	Execute the program to Draw a Line using Bresennham's algorithm.	02
3	II	Execute the program for DDA algorithm for drawing Circle.	02
4	II	Execute the program for Bresenham's algorithm for drawing Circle.	02
5	II	Execute the program for mid-point algorithm for drawing Circle.	02
6	II	Execute the program for Scan line conversion algorithm.	04
7	III	Execute the program for 2-D transformations, translation.	02
8	III	Execute the program for 2-D Transformations, Scaling, Rotation,	02
9	III	Execute the program 2 D transformations shearing and Translation program	02
10	III	Execute the program for rotation about an arbitrary point.	04

11	IV	Execute the program for Cohen- Sutherland algorithm for line clipping.	02
12	IV	Execute the program for midpoint subdivision algorithm.	02
13	IV	Execute the program for Sutherland- Hodgeman algorithm for polygon clipping	04
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	Students will prepare file for the above mentioned Practical
2	Prepare presentation and deliver seminar on various topics covered like Application of CG.
3	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.

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 Computer Graphics.

10. SUGGESTED LEARNING RESOURCE:

S.No.	Name of Book	Author	Publication
1	Mathematical elements for Computer Graphics.	David F.Rogers.	McGraw-Hill
2	Procedural Elements for Computer Graphics.	David F.Rogers.	McGraw-Hill
3	Principles of Interactive Computer Graphics	Newman and Sproull	Tata McGraw Hill

11. LIST OF MAJOR EQUIPMENTS AND MATERIALS REQUIRED:

Sr. No.	Name of equipment	Brief specification
1	Computer System	Computer System with latest configuration.
2	C Compiler	GCC

12. LEARNING WEBSITE &SOFTWARE:

1 www.insidecg.com
2 www.graphics.standard.edu
3 www.cmp.uea.ac.uk/research
4 www.computerarts.co.uk

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 the different file formats of computer graphics files.	2	2	-	-	-	-	-	-	-	1	1	1
2	Use line drawing algorithm.	1	2	1	1	-	-	-	-	-	-	1	-
3	Perform 2-D and 3-D transformations.	1	2	2	-	-	-	-	-	-	2	-	-
4	Use Windowing and Clipping algorithm.	-	1	1	-	-	-	-	-	-	1	1	-
5	Select curve generation algorithm for given problem.	-	1	2	-	-	-	-	-	-	-	1	-

Course Curriculum Design Committee:

Sr No	**Name of the faculty members**	**Designation and Institute**
1	Sindge R.S.	Lecturer in Information Technology, Govt. Polytechnic, Aurangabad
2	Jitendra Joshi	Lecturer in Computer Engineering, Govt. Polytechnic, Aurangabad

(Member Secretary PBOS) (Chairman PBOS)