DIPLOMA IN ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER ENGINEERING

F – SCHEME

IMPLEMENTED FROM 2020 - 2021

SESHASAYEE INSTITUTE OF TECHNOLOGY
(Autonomous)
TIRUCHIRAPPALLI – 620 010.

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1. PREFACE

The wave of liberalization and globalization has created an environment for free flow of information and technology through fast and efficient means the world over. This has lead to shrinking of world, bringing people from different cultures and environment together, giving rise to a global village. A shift has been taking place in India from closed economy to knowledge based and opens economy. In order to cope-up with the challenges of handling new technologies, materials and methods, we have to develop human resources having appropriate knowledge, professional skills and attitude. Technical education system is one of the significant components for human resource development. Polytechnics play an important role in meeting the requirements of trained technical manpower for industries and field organizations. The initiatives being taken to revise the curriculum as per the needs of the industry are laudable.

In order to meet the requirements of future technical manpower, constant efforts have to be made to identify new employment opportunities, carryout activity analysis and design need based curricula of diploma programmes. This curriculum document has been designed by identifying job potential and competency profile of diploma holders leading to identification of curriculum areas for the course. It is needless to emphasize that the real success of the diploma programme depends upon its effective implementation. This will require harnessing and effective utilization of resources. In addition to acquisition of appropriate physical resources, the availability of competent and qualified faculty is essential. It is time for the managers of technical education system to reorganize the system to accept the challenges of both quantitative and qualitative expansion of technical education.

There are various online training facilities created by the Government of India through MHRD for the benefit of both the Teaching and Student community. Facilities like Spoken-Tutorial, SWAYAM, NPTEL, e-Yantra must be exploited to its fullest extent to reap the benefits of interactive electronic media for teaching-learning process. It is hoped that polytechnics will carry out job market research on a continuous basis to identify the new skill requirements and develop innovative methods of course offering and thereby infuse dynamism in the system.

PRINCIPAL & CHAIRMAN

2. ACKNOWLEDGEMENTS

We gratefully acknowledge the assistance and guidance received from the following persons:

i) Commissioner and Principal Secretary, Directorate of Technical Education, Govt. of Tamil Nadu.

ii) Principal & Chairman, Seshasayee Institute of Technology, Trichy for initiating this project on designing of curriculum.

iii) **Dr.P.D.SHEBA KEZIA MALARCHELVI**, Professor and HEAD/CSE, JJ College of Engineering and Technology, Trichy, **Mr.Kabithapriyan Palanivel**, Senior Software Engineer, Mr.Cooper Group, Chennai. and **Dr.G.Vinothini**, Lecturer/Computer Engg, Government Polytechnic College Srirangam for their professional inputs and support in the design of this curriculum.

iv) All the faculty members of the Computer Engineering department for their sustained effort and support in the design of this curriculum and documentation.

Coordinator

3. DEPARTMENT VISION, MISSION ,PO and PEOs

THE VISION AND MISSION OF THE DEPARTMENT

VISION

To foster technically proficient, creative and self- governing diploma computer engineers to meet industrial and social requirements.

MISSION

- To provide quality and contemporary education through innovative teaching-learning process and effective resource utilization.
- To inculcate the spirit of self-confidence, team work professional ethics and environmental awareness.
- To reinforce the entrepreneurship skills by means of industry institution interaction.
- To ignite the students with the ideas of research and developments

PROGRAM EDUCATIONAL OBJECTIVES

The Program Educational Objectives (PEOs) of the department of CSE are given below:

1. Our graduates will apply the knowledge of computer engineering to plan and design solutions for real world challenges.
2. Our graduates will pursue higher degree, engage in research or practice careers in ICT domain.
3. Our graduates will widen their knowledge and expertise by lifelong learning and execute their career with social concern and professional ethics.

LIST OF PROGRAM OUTCOMES

1. **Basic and Discipline specific knowledge: Apply** knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.

2. **Problem analysis**: Identify and **analyse** well-defined engineering problems using codified standard methods.

3. **Design/ development of solutions: Design** solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

4. **Engineering Tools, Experimentation and Testing: Apply** modern engineering tools and appropriate technique to conduct standard tests and measurements.

5. **Engineering practices for society, sustainability and environment:** Apply appropriate technology in context of society, sustainability, environment and ethical practices.

6. **Project Management:** Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.

7. **Life-long learning:** Ability to analyse individual needs and engage in updating in the context of technological changes.

Program Specific Outcomes (PSOs)

PSO 1: Demonstrate, practice the concepts and working of hardware, software and networking of various kinds of computer architectures.

PSO 2: Design, debug and deploy software application using suitable hardware and software platform.

4. R E G U L A T I O N S

DIPLOMA COURSES IN ENGINEERING
(TERM PATTERN)
(Implemented from 2020- 2021)
F– SCHEME
(Common to all Programmes)

4.1. Description of the Course:

a. Full Time (3 years)

The Programme for the Full Time Diploma in Engineering shall extend over a period of three academic years, consisting of 6 terms* and the First Year is common to all Engineering Branches.

b. Sandwich (3½ years)

The Course for the Sandwich Diploma in Paper Technology shall extend over a period of three and half academic years, consisting of 7 terms* and the First Year is common to all Engineering Branches. The subjects of three years full time diploma course being regrouped for academic convenience.

During 4th and/or during 7th term the students undergo industrial training for six months. Industrial training examination will be conducted after completion of every 6 months of industrial training.

** Each term will have 16 weeks duration of study with 35 hrs. / Week for Regular Diploma Courses.*

4.2. Condition for Admission:

Condition for admission to the Diploma courses shall be required to have passed in The S.S.L.C Examination of the Board of Secondary Education, Tamil Nadu.

(Or)

The Anglo Indian High School Examination with eligibility for Higher Secondary Course in Tamil Nadu.

(Or)

The Matriculation Examination of Tamil Nadu.

(Or)

Any other Examinations recognized as equivalent to the above by the Board of Secondary Education, Tamil Nadu.

Note: In addition, at the time of admission the candidate will have to satisfy certain minimum requirements, which may be prescribed from time to time.

4.3. Admission to Second year (Lateral Entry):

A pass in HSC (academic) or (vocational) courses mentioned in the Higher Secondary Schools in Tamil Nadu affiliated to the Tamil Nadu Higher Secondary Board with eligibility for University Courses of study or equivalent examination & Should have studied the following courses.

A pass in 2 Years ITI with appropriate Trade or Equivalent examination.

Sl. No	Courses	H.Sc Academic	H.Sc Vocational		Industrial Training Institutes Courses
			Subjects Studied		
		Studied any three of the following subjects	Studied any three of the following subjects	Vocational subjects	
1.	All the Regular and Sandwich Diploma Courses	• Maths • Physics • Chemistry • Computer Science • Electronics • Information Technology • Biology • Informatics Practices • Bio Technology • Technical Vocational subject • Agriculture • Engineering Graphics • Business Studies • Entrepreneurship	• Maths • Physics • Chemistry • Computer Science • Electronics • Information Technology • Biology • Informatics Practices • Bio Technology • Technical Vocational subject • Agriculture • Engineering Graphics • Business Studies • Entrepreneurship	Related Vocational Subjects Theory& Practical	2 years course to be passed with appropriate Trade

- For the Diploma Programmes related with Engineering/Technology, the related / equivalent courses prescribed along with Practical's may also be taken for arriving the eligibility.

- Programmes will be allotted according to merit through counselling by the Principal as per communal reservation.
- Candidates who have studied Commerce Courses are not eligible for Engineering Diploma Programmes.

4.4. Age Limit:

No Age limit.

4.5. Medium of Instruction:

English

4.6. Eligibility for the Award of Diploma:

No candidate shall be eligible for the Diploma unless he/she has undergone the prescribed course of study for a period of not less than 3/3 ½ academic years (Full Time/Sandwich), affiliated to the State Board of Technical Education and Training, Tamil Nadu, when joined in First Year and 2/2 ½ years (Full Time/Sandwich), if joined under Lateral Entry scheme in the second year and passed the prescribed examination.

The minimum and maximum period for completion of Diploma Programmes are given below:

Diploma Programmes	Minimum Period	Maximum Period
Full Time	3 Years	6 Years
Full Time (Lateral Entry)	2 Years	5 Years
Sandwich	3½ Years	6½ Years
Sandwich (Lateral Entry)	2½ Years	5½ Years

This will come into effect from F Scheme onwards i.e. from the academic year 2020-2021.

4.7. Programmes of Study and Curriculum outline

The Programmes of study shall be in accordance with the syllabus prescribed from time to time, both in theory and practical courses.

The curriculum outline is given in Annexure – I.

4.8. Examinations:

Autonomous Examinations in all Programmes of all the terms under the scheme of examinations will be conducted at the end of each term.

The internal assessment marks for all the courses will be awarded on the basis of continuous assessment earned during the term concerned. For each course, 25 marks are allotted for internal assessment. Autonomous Examinations are conducted for 100 marks and reduced to 75.

The total marks for result are 75 + 25 = 100 Marks.

4.9. Continuous Internal Assessment:

A. For Theory Courses:

The Internal Assessment marks for a total of 25 marks, which are to be distributed as follows:

i) Course Attendance **5 Marks**

(Award of marks for subject attendance to each subject Theory/Practical will be as per the range given below)

80% - 83%	**1 Mark**
84% - 87%	**2 Marks**
88% - 91%	**3 Marks**
92% - 95%	**4 Marks**
96% - 100%	**5 Marks**

ii) Test # **10 Marks**

Two Tests each of 2 hours duration for a total of 50 marks are to be conducted. Average of these two test marks will be taken and the marks to be reduced to:

05 Marks

The Test – III is to be the Model Examination covering all the five units and the marks obtained will be reduced to:

05 Marks

Test	Units	When To Conduct	Marks	Duration
Test I	Unit – I & Half of Unit II	End of 6th week	50	2 Hrs
Test II	Remaining Half of Unit II & III	End of 12th week	50	2 Hrs
Test III	Model Examination: Covering all the 5 Units. (Autonomous Examinations-Question paper-pattern).	End of 16th week	100	3 Hrs

 # From the Academic Year 2020 – 2021 onwards.

Question Paper Pattern for the Periodical Test :(Test - I & Test- II) **Without Choice:**

Part A Type questions (Any 4 out of 6 questions): 4 Questions × 2 mark 08 marks

Part B Type questions (Any 4 out of 6 questions): 4 Questions × 3 marks 12 marks

Part C Type questions (Either or): 3 Questions × 10 marks 30 marks

Total **50 marks**

iii) Assignment **4 Marks**

For each subject Two Assignments are to be given each for 10 marks and the average marks scored should be reduced for 4 marks.

iv) Multiple Choice Questions **3 Marks**

For each subject one MCQ test has to be given each for 30 marks and the average marks scored should be reduced for 3 marks.

v) Seminar Presentation **3 Marks**

The students have to select the topics either from their subjects or general subjects which will help to improve their grasping capacity as well as their capacity to express the subject in hand. The students will be allowed to prepare

the material for the given topic using the library hour and they will be permitted to present seminar (For First and Second Year, the students will be permitted to present the seminar as a group not exceeding six members and each member of the group should participate in the presentation. For the Third Year, the students should present the seminar individually.) The seminar presentation is mandatory for all theory subjects and carries 3 marks for each theory subject. The respective subject faculty may suggest topics to the students and will evaluate the submitted materials and seminar presentation. (2 ½ marks for the material submitted in writing and 2 ½ marks for the seminar presentation). For each subject minimum of two seminars are to be given and the average marks scored should be reduced to 3 marks.

All Test Papers, Assignment Papers / Notebooks and the seminar presentation written material after getting the signature with date from the students must be kept in safe custody in the department for verification and audit. It should be preserved for one term after publication of Board Exam results and produced to the flying squad and the inspection team at the time of inspection/verification.

B. For Practical Subjects:

The Internal Assessment mark for a total of 25 marks which are to be distributed as follows:-

a)	**Attendance**	**:**	**5 Marks**
	(Award of marks same as theory subjects)		
b)	**Procedure/ observation and tabulation/**		
	Other Practical related Work	**:**	**10 Marks**
c)	**Record writing**	**:**	**10 Marks**
	TOTAL	**:**	**25 Marks**

- All the Experiments/Exercises indicated in the syllabus should be completed and the same to be given for final Board examinations.
- The observation note book / manual should be maintained for 10 marks. The observation note book / manual with sketches, circuits, programme, reading and calculation written by the students manually depends upon the practical subject

during practical classes should be evaluated properly during the practical class hours with date.

- The Record work for every completed exercise should be submitted in the subsequent practical classes and marks should be awarded for 10 marks for each exercise as per the above allocation.
- At the end of the term, the average marks of all the exercises should be calculated for 20 marks (including Observation and Record writing) and the marks awarded for attendance is to be added to arrive at the internal assessment mark for Practical. (20+5=25 marks)
- Only regular students, appearing first time have to submit the duly signed bonafide record note book/file during the Practical Board Examinations.

All the marks awarded for Assignments, Tests, Seminar presentation and Attendance should be entered periodically in the Personal Theory Log Book of the staff, who is handling the theory subject.

The marks awarded for Observation, Record work and Attendance should be entered periodically in the Personal Practical Log Book of the staff, who is handling the practical subject.

4.10. Communication Skill Practical, Computer Application Practical and Physical Education:

The Communication Skill Practical and Computer Application Practical with more emphasis are being introduced in First Year. Much Stress is given to increase the Communication skill and ICT skill of students. As per the recommendation of MHRD and under Fit India scheme, the Physical education is introduced to encourage students to remain healthy and fit by including physical activities and sports.

4.11. Project Work and Internship:

The students of all the Diploma Programme have to do a Project Work as part of the Curriculum and in partial fulfilment for the award of Diploma by the State Board of Technical Education and Training, Tamil Nadu. In order to encourage

students to do worthwhile and innovative projects, every year prizes are awarded for the best three projects i.e. institution wise, region wise and state wise. The Project work must be reviewed twice in the same term. The project work is approved during the V term by the properly constituted committee with guidelines.

a) Internal assessment mark for Project Work & Internship:

Project Review I	**…**	**10 marks**
Project Review II	**…**	**10 marks**
Attendance	**…**	**05 marks** (Award of marks same as theory subject pattern)
TOTAL	**…**	**25 MARKS**

Proper record should be maintained for the two Project Reviews and preserved for one term after the publication of Board Exams results. It should be produced to the flying squad and the inspection team at the time of inspection/verification.

b) Allocation of Marks for Project Work & Internship in Board Examinations:

Demonstration/Presentation	**25 marks**
Report	**25 marks**
Viva Voce	**30 marks**
Internship Report	**20 marks**
TOTAL	**100* MARKS**

**Examination will be conducted for 100 marks and will be converted to 75 marks.*

c) Internship Report:

The internship training for a period of two weeks shall be undergone by every candidate at the end of IV / V term during vacation. The certificate shall be produced along with the internship report for evaluation. The evaluation of internship training shall be done along with final year “Project Work & Internship”

for 20 marks. The internship shall be undertaken in any industry / Government or Private certified agencies which are in social sector / Govt. Skill Centres / Institutions / Schemes.

A neatly prepared PROJECT REPORT as per the format has to be submitted by individual student during the Project Work & Internship Board examination.

4.12. Scheme of Examinations:

The Scheme of examinations for courses is given in Curriculum outline

4.13. Criteria for Pass:

1. No candidate shall be eligible for the award of Diploma unless he/she has undergone the prescribed course of study successfully in an institution approved by AICTE and affiliated to the State Board of Technical Education & Training, Tamil Nadu and pass all the subjects prescribed in the curriculum.

2. A candidate shall be declared to have passed the examination in a course if he/she secures not less than ***40% in theory subjects and 50%in practical subjects*** out of the total prescribed maximum marks including both the Internal Assessment and the Autonomous Examinations marks put together, course to the condition that he/she secures at least a ***minimum of 40 marks out of 100 marks in the Autonomous Theory Examinations and a minimum of 50 marks out of 100 marks in the Autonomous Practical Examinations***.

4.14. Classification of successful candidates:

Classification of candidates who will pass out the final examinations from April 2023 onwards (Joined first year in 2020 -2021) will be done as specified below.

First Class with Superlative Distinction:

A candidate will be declared to have passed in ***First Class with Superlative Distinction*** if he/she secures not less than 75% of the marks in all the courses and passes all the terms in the first appearance itself and passes all courses within the stipulated period of study 2 / 3 / 3½ years [Full time (lateral entry)/Full Time/Sandwich] without any break in study.

First Class with Distinction:

A candidate will be declared to have passed in ***First Class with Distinction*** if he/she secures not less than 75% of the aggregate marks in all the terms put together and passes all the terms except the I and II term in the first appearance itself and passes all courses within the stipulated period of study 2 / 3 / 3½ years [Full time(lateral entry)/Full Time/Sandwich] without any break in study.

First Class:

A candidate will be declared to have passed in ***First Class*** if he/she secures not less than 60% of the aggregate marks in all the terms put together and passes all the courses within the stipulated period of study 2 / 3 / 3½ years [Full time(lateral entry)/Full Time/Sandwich] without any break in study.

Second Class:

All other successful candidates will be declared to have passed in ***Second Class***.

The above classifications are also applicable for the Sandwich students who pass out Final Examination from October 2023 /April 2024 onwards (both joined First Year in 2020 -2021).

4.15. Duration of a period in the Class Time Table:

The duration of each period of instruction is 1 hour and the total period of instruction hours excluding interval and lunch break in a day should be uniformly maintained as 7 hours corresponding to 7 periods of instruction (Theory & Practical).

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5. SALIENT FEATURES OF THE DIPLOMA PROGRAMME IN COMPUTER ENGINEERING

Name of the Programme	Diploma in Computer Engineering
Duration of the Programme	Three years (Six Terms)
Entry Qualification	Matriculation or equivalent as prescribed by State Board of Technical Education, Tamil Nadu
Intake	50 (or as approved by AICTE)
Pattern of the Programme	Term Pattern
Ratio between theory and practical	50:50 (Approximately)

6. EMPLOYMENT OPPORTUNITIES AND JOB/ACTIVITY PROFILE FOR

DIPLOMA HOLDERS IN COMPUTER ENGINEERING

(A) EMPLOYMENT OPPORTUNITIES

Diploma holders in computer engineering can find employment in following divisions:

(1) Service Division (IT enabled services, maintenance service and installation Computers)

(2) Assembly and Quality Control Division

(3) Techno Marketing (Corporate Handling, SME, Institutional Segment, Government Tender Business)

(4) Telecommunication Sector

(5) Teaching Organizations (Technical Institution, Vocational Institutions etc)

(6) Networking (LAN, WAN etc)

(7) Cloud industry

(8) Cyber security industry

(9) In Govt. Services like Railway, Law Enforcement Agencies

(10) Call Centers, KPO, BPO etc.

(11) Financial Institutions.

While in employment, the following areas of activity in different organizations (Industry and service sector) are visualized for diploma holders in Computer Engineering:

- Assembly and Installation of computer systems, peripherals and software
- Programming customer based applications including web page designing
- Software testing and Maintenance of computer systems
- Techno Marketing and pre sales
- Teaching and training at technical institutions
- Self employment – call centers, BPO, EPO and KPO etc.
- Network installation and maintenance

Various designations for diploma holders in Computer Engineering are given as follows:-

Wage Employment

(1) Service engineer/customer support engineer/maintenance engineer in installation, Maintenance and service of computer systems and networking

(2) Software tester in testing of software systems and mobile applications

(3) Assembly supervisor in manufacturing and production activity

(4) DTP operator, Technician

(5) Technical Consultant

(6) Web designer/developers

(7) Search Engine Optimization Professionals and Social Media Optimization Professionals

(8) Technical Assistant/ Junior engineer in quality control and testing activities of Computer systems manufacturing

(9) Junior marketing executive/sales engineer in marketing activities

(10) Technical assistant/ Instructor/Junior Programmer in R&D laboratories and Educational institutions to help in maintaining computers and networks

Self Employment

(1) Small scale unit doing third party service and maintenance of computer systems and networks

(2) Small scale vendor of computer cards, computer peripherals and electronic Components and devices

(3) Setting up of computer assembly unit (small scale)

(4) Setting up of training institute for computer assembly, maintenance and Networking

(5) As Web designer, web application developer.

7. COMPETENCY PROFILE

DIPLOMA HOLDERS IN COMPUTER ENGINEERING

Keeping the job opportunities, activity profile and domains of learning of diploma holders in Computer Engineering in view, the programme is aimed at developing following competency Profile in terms of knowledge and skills in the students:

1. Able to read and interpret drawings related to plant layout, equipment and components.
2. Understand the working of computers and peripherals and is able to install computer system including software loading
3. Able to assemble computers and change/ replace various parts and peripherals
4. Able to write computer programs in high level languages
5. Knowledge of data structure and programming techniques
6. Proficiency in operating computer systems and ability to use various application and Software/package
7. Understand the functioning and administration of various operating systems
8. Able to prepare specifications for computer systems, evaluating the specifications
   And Verifying computer system for given specifications
9. Understanding of databases and knowledge of database management system
10. Able to troubleshoot various faults in computer system and networks
11. Understand architecture of microprocessor, interfacing techniques (memory I/O And Interrupts).
12. Knowledge about computer system architecture and organization
13. Knowledge of principles of digital data transmission, communication methodologies, protocols and networking equipment used in data transmission and concept of network security.
14. Understand the basic concept of network technology, Local Area Network (LAN) and Wide Area Network (WAN) and establish Local Area Networks using wired and wireless technologies

15. Able to prepare layout and environmental specifications for site can supervise the installation and testing of computers systems
16. Proficient in developing a software and web sites
17. Understand system software and ability to use applications and open source software
18. Understand basic principles of management and manage the resources optimally.
19. Aware about the opportunity available for setting up one's own enterprise and its benefits
20. Reflect generic skills of thinking, problem solving, good communication, interpersonal skills and entrepreneurial qualities for effective functioning in the world of work.
21. Aware about technological advancements and forthcoming areas of development and current trends in the field of Computer Engineering and IT
22. Understand basic principles of Applied Sciences and Mathematics for developing scientific temper.
23. Understand basic principles of electrical and electronic Engineering
24. Understand basic principle of digital electronics
25. Able to design complex software as an individual and contribute as a team member.
26. Able to test software using various techniques.

8. DERIVING CURRICULUM AREAS FROM COMPETENCY PROFILE

Following curriculum areas have been derived from competency profile:

S.NO	Competency Profile	Subject Areas
1.	Able to read and interpret drawings related to plant layout, equipment and components	Engineering Graphics
2.	Understand the working of computers and peripherals and is able to install computer system including software loading	Computer Hardware and Servicing
3.	Able to assemble computers and change/ replace various parts and peripherals	Computer Hardware and Servicing
4.	Able to write computer programs in high level languages	C Programming Object oriented Programming with Java Open source software Python Programming Component based Technology
5.	Knowledge of data structure and programming techniques	Data Structures
6.	Proficiency in operating computer systems and ability to use various application and software/package	Operating System Linux Lab
7.	Understand the functioning and administration of various operating systems	Operating System
8.	Able to prepare specifications for computer systems, evaluating the specifications and verifying computer system for given specifications	Computer Hardware Servicing and Networks Lab
9.	Understanding of databases and knowledge of database management system	RDBMS
10.	Able to troubleshoot various faults in computer system and networks	Hardware and Networks Lab
11.	Understand architecture of microprocessor, interfacing techniques (memory I/O and interrupts).	Operating System Computer Hardware Servicing
12.	Knowledge of principles of digital data	Computer Networks and Security

	transmission, communication methodologies, protocols and networking equipment used in data transmission	
13.	Understand the basic concept of network technology, Local Area Network (LAN) and Wide Area Network (WAN) and establish Local Area Networks using wired and wireless technologies	Computer Networks and Security Computer Hardware Servicing and Networks lab Cloud Computing and IoT
14.	Able to prepare layout and environmental specifications for site can supervise the installation and testing of computers systems	Computer Hardware Servicing and Networks lab
15.	Proficient in developing a software and web sites	Component Based Technology Web Design and Programming
16.	Understand system software and ability to use applications and open source software	C Programming Object Oriented programming using Java Open source software Python Programming
17.	Understand basic principles of management and manage the resources optimally.	Entrepreneurship and Startup
18.	Aware about the opportunity available for setting up one's own enterprise and its benefits	Entrepreneurship and Startup
19.	Reflect generic skills of thinking, problem solving, good communication. interpersonal skills and entrepreneurial qualities for effective functioning in the world of work	Entrepreneurship and Startup Communication and life skill practice lab
20.	Aware about technological advancements and forthcoming areas of development and current trends in the field of Computer Engineering and IT	Cloud Computing and IoT
21.	Understand basic principles of Applied Sciences and Mathematics for developing scientific temper	Physics I & II Chemistry I & II Mathematics I, and II.
22.	Understand basic principles Electronic Engineering	Basics of Electrical and Electronics Engineering
23.	Understand the graphics, 2D animation and image manipulation	E-Publishing Lab

24.	Understand and able to work with Linux operating system and to program	Linux Lab
25.	Understand and aware about career development and Human values	Concurrent career development Universal human values

9. CURRICULUM OUTLINE

ANNEXURE I

SESHASAYEE INSTITUTE OF TECHNOLOGY (Autonomous), TRICHY-10
4: DIPLOMA IN COMPUTER ENGINEERING SYLLABUS
F-SCHEME
(To be implemented for the students admitted from the year 2020-21 onwards)
9. CURRICULUM OUTLINE

III TERM

Col No	SUBJECT CODE	SUBJECT	Credit	HOURSPERWEEK		
				THEORY	PRACTICAL	TOTAL
1	4F3201	BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING	5	5		5
2	4F3202	OPERATING SYSTEM	5	5		5
3	4F3203	C PROGRAMMING	6	6		6
4	4F3204	ELECTRICAL AND ELECTRONICS PRACTICAL	2		4	4
5	4F3205	LINUX PRACTICAL	2		4	4
6	4F3206	C PROGRAMMING PRACTICAL	2		4	4
7	4F3301	E PUBLISHING PRACTICAL	2		4	4
						32
		PHYSICAL EDUCATION				2
		LIBRARY				1
	Total		24	16	16	35

IV TERM

Col No	SUBJECT CODE	SUBJECT	Credit	HOURSPERWEEK		
				THEORY	PRACTICAL	TOTAL
1	4F4207	DATA STRUCTURES	5	5		5
2	4F4208	WEB DESIGN AND PROGRAMMING	5	5		5
3	4F4302	OBJECT ORIENTED PROGRAMMING WITH JAVA	5	5		5
4	4F4209	RELATIONAL DATABASE MANAGEMENT SYSTEMS	5	5		5
5	4F4210	WEB DESIGN AND PROGRAMMING PRACTICAL	2		4	4
6	4F4303	DATA STRUCTURE USING JAVA PRACTICAL	2		4	4
7	4F4211	RDBMS PRACTICAL	2		4	4
						32
		PHYSICAL EDUCATION				2
		LIBRARY				1
	TOTAL		31	20	12	35
8	4F0007	CONCURRENT CAREER DEVELOPMENT	5			

V TERM

Col No	SUBJECT CODE	SUBJECT	credit	HOURSPERWEEK		
				THEORY	PRACTICAL	TOTAL
1	4F5212	PYTHON PROGRAMMING	6	6		6
2	4F5304	CLOUD COMPUTING AND INTERNET OF THINGS	5	5		5
3		**ELECTIVE THEORY-I**	5	5		5
	4F5305.1	SOFTWARE ENGINEERING				
	4F5305.2	ARTIFICIAL INTELLIGENCE & DATA ANALYTICS				
	4F5305.3	MOBILE COMPUTING				
4	4F5213	PYTHON PROGRAMMING PRACTICAL	2		4	4
5	4F5306	CLOUD COMPUTING AND INTERNET OF THINGS PRACTICAL	2		4	4
6		**ELECTIVE PRACTICAL-I**	**2**		4	4
	4F5307.1	SOFTWARE ENGINEERING PRACTICAL				
	4F5307.2	DATA ANALYTICS USING PYTHON PRACTICAL				
	4F5307.3	MOBILE COMPUTING PRACTICAL				
7	4F5401	ENTREPRENEURSHIP AND STARTUP	3		4	4
						32
		PHYSICAL EDUCATION				2
		LIBRARY				1
	TOTAL		30	16	16	35
8	4F0006	UNIVERSAL HUMAN VALUES	5			

VI TERM

Col No	SUBJECT CODE	SUBJECT	Credit	HOURSPERWEEK		
				THEORY	PRACTICAL	TOTAL
1	4F6308	COMPUTER HARDWARE AND SERVICING	6	6		6
2	4F6214	COMPUTER NETWORKS AND SECURITY	6	6		6
3		**ELECTIVE THEORY-II**	**6**	5		5
	4F6309.1	COMPONENT BASED TECHNOLOGY				
	4F6309.2	MULTIMEDIA SYSTEMS				
	4F6309.3	DATA SCIENCE AND BIG DATA				
4	4F6310	HARDWARE SERVICING PRACTICAL	2		6	6
		ELECTIVE PRACTICAL-II	**2**		4	4
	4F6311.1	COMPONENT BASED TECHNOLOGY PRACTICAL				
	4F6311.2	MULTIMEDIA SYSTEMS PRACTICAL				
	4F6311.3	DATA SCIENCE AND BIG DATA PRACTICAL				
6	4F6402	PROJECT WORK AND INTERNSHIP	3		6	6
				17	16	33
		PHYSICAL EDUCATION				2
		LIBRARY				1
Total			25			36

10. SCHEME OF EXAMINATIONS

SESHASAYEE INSTITUTE OF TECHNOLOGY(Autonomous), TRICHY-10
4: DIPLOMA IN COMPUTER ENGINEERING SYLLABUS
F-SCHEME
(To be implemented for the students admitted from the year 2020-21 onwards)

10. SCHEME OF EXAMINATION

III TERM

SL. NO	COURSE CODE	COURSE	Examination Marks			Minimum for Pass	Duration
			Internal	External*	Total		
1	4F3201	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	25	100	100	40	3
2	4F3202	OPERATING SYSTEM	25	100	100	40	3
3	4F3203	C PROGRAMMING	25	100	100	40	3
4	4F3204	ELECTRICAL AND ELECTRONICS ENGINEERING PRACTICAL	25	100	100	50	3
5	4F3205	LINUX PRACTICAL	25	100	100	50	3
6	4F3206	C PROGRAMMING PRACTICAL	25	100	100	50	3
7	4F3301	E PUBLISHING PRACTICAL	25	100	100	50	3

IV TERM

SL. NO	COURSE CODE	COURSE	Examination Marks			Minimum for Pass	Duration
			Internal	External*	Total		
1	4F4207	DATA STRUCTURES	25	100	100	40	3
2	4F4208	WEB DESIGN AND PROGRAMMING	25	100	100	40	3
3	4F4302	OBJECT ORIENTED PROGRAMMING WITH JAVA	25	100	100	40	3
4	4F4209	RELATIONAL DATABASE MANAGEMENT SYSTEMS	25	100	100	40	3
5	4F4210	WEB DESIGN AND PROGRAMMING PRACTICAL	25	100	100	50	3
6	4F4303	DATA STRUCTURE USING JAVA PRACTICAL	25	100	100	50	3
7	4F4211	RDBMS PRACTICAL	25	100	100	50	3
8	4F0007	CONCURRENT CAREER DEVELOPMENT	25	100	100	40	3

V TERM

SL. NO	COURSE CODE	COURSE	Examination Marks			Minimum for Pass	Duration
			Internal	External*	Total		
1	**4F5212**	PYTHON PROGRAMMING	25	100	100	40	3
2	**4F5304**	CLOUD COMPUTING AND INTERNET OF THINGS	25	100	100	40	3
3		**ELECTIVE THEORY-I**					
	4F5305.1	SOFTWARE ENGINEERING	25	100	100	40	3
	4F5305.2	ARTIFICIAL INTELLIGENCE AND DATA ANALYTICS	25	100	100	40	3
	4F5305.3	MOBILE COMPUTING	25	100	100	40	3
4	**4F5213**	PYTHON PROGRAMMING PRACTICAL	25	100	100	50	3
5	**4F5306**	CLOUD COMPUTING AND INTERNET OF THINGS PRACTICAL	25	100	100	50	3
6		**ELECTIVE PRACTICAL-I**					
	4F5307.1	SOFTWARE ENGINEERING PRACTICAL	25	100	100	50	3
	4F5307.2	DATA ANALYTICS USING PYTHON PRACTICAL	25	100	100	50	3
	4F5307.3	MOBILE COMPUTING PRACTICAL	25	100	100	50	3
7	**4F5401**	ENTREPRENEURSHIP AND STARTUP	25	100	100	50	3
8	**4F0006**	UNIVERSAL HUMAN VALUES	25	100	100	40	3

VI TERM

SL. NO	COURSE CODE	COURSE	Examination Marks			Minimum for Pass	Duration
			Internal	External*	Total		
1	4F6308	COMPUTER HARDWARE AND SERVICING	25	100	100	40	3
2	4F6214	COMPUTER NETWORK AND SECURITY	25	100	100	40	3
3		**ELECTIVE THEORY-II**					
	4F6309.1	COMPONENT BASED TECHNOLOGY	25	100	100	40	3
	4F6309.2	MULTIMEDIA SYSTEMS	25	100	100	40	3
	4F6309.3	DATA SCIENCE AND BIG DATA	25	100	100	40	3
4	4F6310	COMPUTER HARDWARE AND NETWORKING PRACTICAL	25	100	100	50	3
5		**ELECTIVE PRACTICAL-II**					
	4F6311.1	COMPONENT BASED TECHNOLOGY PRACTICAL	25	100	100	50	3
	4F6311.2	MULTIMEDIA SYSTEMS PRACTICAL	25	100	100	50	3
	4F6311.3	DATA SCIENCE AND BIG DATA PRACTICAL	25	100	100	50	3
6	4F6402	PROJECT WORK AND INTERNSHIP	25	100	100	50	3

***External Marks are conducted for 100 Marks and converted to 75 Marks**

11. EQUIVALENT PAPERS

OF

E - SCHEME to F- SCHEME

SESHASAYEE INSTITUTE OF TECHNOLOGY(Autonomous), TRICHY-10

4: DIPLOMA IN COMPUTER ENGINEERING SYLLABUS

F-SCHEME

(To be implemented for the students admitted from the year 2020-21 onwards)

11. EQUIVALENT PAPERS OF E SCHEME TO F SCHEME
EQUIVALENT PAPERS

E-SCHEME		F-SCHEME	
III TERM			
SUB CODE	**COURSE**	**SUB CODE**	**COURSE**
4E3201	Basic of Electrical and Electronics	4F3201	Basics Of Electrical And Electronics Engineering
4E3202	Operating System	4F3202	Operating System
4E3203	Programming With C++		**NO RELAVENT PAPER**
4E3204	Basic of Electrical and Electronics Practical	4F3204	Electrical And Electronics Engineering Practical
4E3205	Linux Practical	4F3205	Linux Practical
4E3206	C++ Programming Practical		**NO RELAVENT PAPER**
4E3301	Multimedia Practical		**NO RELAVENT PAPER**
IV TERM			
4E4207	Data structure	4F4207	Data structures
4E4302	Object Oriented Programming With Java	4F4302	Object oriented programming with java
4E4208	Web Programming	4F4208	Web Design And Programming
4E4209	Data structure Practical		**NO RELAVENT PAPER**
4E4303	Java Programming Practical	4F4303	Data Structures Using Java Practical
4E4210	Web Programming Practical	4F4210	Web Design And Programming Practical
4E4401	Life and Employability Skill Practical		**NO RELAVENT PAPER**

V TERM			
4E5210	Relational Database Management Systems	4F4209	Relational Database Management Systems (IV Term)
4E5304	Open Source Software		**NO RELAVENT PAPER**
4E5305	Component Based Technology	4F6309.1	Component Based Technology (VI Term)
4E5211	Computer Network		**NO RELAVENT PAPER**
4E5212	Relational Database Management Systems Practical	4F4211	Relational Database Management Systems Practical (IV Term)
4E5306	Open Source Software Practical		**NO RELAVENT PAPER**
4E5307	Component Based Technology Practical	4F6311.1	Component Based Technology Practical (VI Term)
VI TERM			
4E6308	Computer Hardware and Servicing		**NO RELAVENT PAPER**
4E6309	Mobile Computing	4F5305.3	Mobile Computing (V Term as Elective)
4E6213	Software Engineering	4F5304.1	Software Engineering (V Term as Elective)
4E6310.1	**Elective:** 1.Cloud Computing		**NO RELAVENT PAPER**
4E6310.2	2.Enterprise programming With Java		**NO RELAVENT PAPER**
4E6311	Computer Servicing And Network Practical		**NO RELAVENT PAPER**
4E5312	Mobile computing Practical	4F5307.3	Mobile computing Practical (V Term as Elective)
4E6402	Project Work & Entrepreneurship	4F6402	**NO RELAVENT PAPER**

12. DETAILS OF ADDITION / DELETION OF SUBJECTS

III TERM

COURSES in E Scheme	COURSES in F Scheme	Remarks
Basic Of Electrical And Electronics	Basics Of Electrical And Electronics Engineering	Added SMPS And Basic Components In Unit 1.
Operating System	Operating System	Changed Unit 5 Added Computer Architecture
Programming With C++	C Programming	To Impart Basic Programming And Problem Solving Skill In C Programming Is Introduced Students Learn Oops Concepts In Java
Basic Of Electrical And Electronics Practical	Basics Of Electrical And Electronics Engineering Practical	No Changes
Linux Practical	Linux Practical	No Changes
C++ Programming Practical	C Programming Practical	To Impart Basic Programming And Problem Solving Skill In C Programming Is Introduced Students Learn Oops Concepts In Java
Multimedia Practical	E Publishing Practical	To Learn Advanced Editing Skills Using

IV TERM

COURSES in E Scheme	COURSES in F Scheme	Remarks
Data Structures	Data Structures	No change
Web Programming	Web Design And Programming	Added PHP as IV and V unit
Object Oriented Programming With Java	Object Oriented Programming With Java	No change
Data Structure Practical	Data Structures Using Java Practical	Data structure basic concept programming added
Java Programming Practical		
Web Programming Practical	Web Design And Programming Practical	Added PHP
Life And Employability Skill Practical	---	---
---	Concurrent Career Development	Added

V TERM

COURSES IN E SCHEME	COURSES in F Scheme	Remarks
RDBMS	Python Programming	
Open Source Software	Cloud Computing And Internet Of Things	
Component Based Technology	**Elective:** (A) Software Engineering	
Computer Network	(B)Artificial Intelligence And Data Analytics	
RDBMS Practical	(C)Mobile Computing	
Open Source Software Practical	Python Programming Practical	
Component Based Technology Practical	Cloud Computing And Internet Of Things Practical	
	Universal Human Values	

VI TERM

COURSES in E Scheme	COURSEs in F Scheme	Remarks
Computer Hardware And Servicing	Computer Hardware And Servicing	
Mobile Computing	Computer Network And Security	Added security techniques in unit 4 & 5
Software Engineering		
Elective: 1.Cloud Computing 2. Enterprise Programming With Java	**Elective:** (A)Component Based Technology (B)Multimedia Systems (C) Data Science And Big Data	
Computer Servicing And Network Practical	Computer Hardware And Networking Practical	Added Network practical
Mobile Computing Practical	Elective Practical - II	
Project Work & Entrepreneurship	Project Work And Internship	

13. HORIZONTAL AND VERTICAL ORGANISATION OF THE SUBJECTS

Sl. No.	COURSE	Distribution of credits in various TERMs					
		I	II	III	IV	V	VI
1.	Basics of Electrical and Electronics Engineering			5			
2	Operating System			5			
3	C Programming			6			
4	Basics of Electrical and Electronics Engineering Practical			2			
5	Linux Practical			2			
6	C Programming Practical			2			
7	E Publishing Practical			2			
8	Data structure				5		
9	Web design and web programming				5		
10	Object oriented programming with java				5		
11	Relational Database Management Systems				5		
12	Web design and Web programming practical				2		
13	Data structure using java practical				2		
14	Relational Database Management Systems practical				2		
15	Concurrent Career Development				5		
16	Python programming					6	
17	Cloud computing and Internet of things					5	
18	**Elective:** (a) Mobile computing					5	

19	(b)Artificial intelligence and Data analytics						
20	(c) Software engineering						
21	Python programming practical					2	
22	Cloud computing and internet of things practical					2	
23	Elective practical - I					2	
24	Entrepreneurship and startup					3	
25	Universal Human values					5	
26	Computer hardware and servicing						6
27	Computer network and security						6
28	**Elective:** (a)Component based technology						6
29	(b)Multimedia systems						
30	(c) Data science and big data						
31	Computer hardware and networking practical						2
32	Elective practical - II						2
33	Project work and internship						3
	TOTAL (credits)			**24**	**31**	**30**	**25**
	Total Credits = Frist year 60 credits + programme 110 credits						**170**

14. DETAILED SYLLABUS

14. DETAILED SYLLABUS

III – TERM

4F3201 - BASICS ELECTRICAL AND ELECTRONICS ENGINEERING

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F3201

Term : III

Course Name : Basics of Electrical and Electronics Engineering

TEACHING AND SCHEME OF EXAMINATION

No.of weeks per term: 16Weeks

COURSE	Instructions		Examination			
	Hours /Week	Hours /term	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Basics of Electrical and Electronics Engineering	5	80	25	100*	100	3Hrs

*Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

Unit	Topic	Hours
I	AC FUNDAMENTALS,BATTERIES AND UPS	13
II	TRANSFORMER AND SPECIAL MOTORS	12
III	SEMI CONDUCTOR DEVICES	16
IV	BOOLEAN ALGEBRA, LOGIC GATES AND COMBINATIONAL SYSTEMS	16
V	SEQUENTIAL LOGIC SYSTEM	16
Test and Model Exam		7
TOTAL		80

RATIONALE:

Diploma Engineers from all branches of engineering are expected to have some basic knowledge of electrical and electronics engineering. Also the technicians working in different engineering fields have to deal with various types of electrical equipments. Various types of electronic circuits are used in different electrical equipments. Hence it is necessary to study electric circuits, different types of electrical machines and electronic devices their principles and working characteristics. The basic concepts studied in this COURSE will be very useful for understanding of higher level COURSEs in further study.

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to

- Understand the AC fundamentals
- Understand the working principle of UPS
- Know about servo motors
- Familiarizewithsemiconductordevices,rectifiercircuits,transistorsanditsapplications
- Use Binary, Octal and Hexadecimal numbers
- Define logic gates
- Significance of Boolean algebra in digital circuits
- Understandtheworkingprinciplesofsequentialandcombinationallogiccircuits
- Define Flip-flops and describe behaviour of various flip flops
- Know about Synchronous and Asynchronous counters
- Know about the function of shift registers

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course outcome		BTL	Linked PO
4F3201 -CO1	Understand the basics of the AC, DC concepts. Understanding the working principle of Batteries, Switches Understanding the working principle of SMPS,UPS	R,U	
4F3201 -CO2	Understanding the working principle of Single Phase transformer Understand the working principle of Special Motors Need of electrical safety	U,R	
4F3201 -CO3	Understand the working principle of semiconductor	R,U,A	

	diode, zener diode and rectifiers Understand the working principles of Bipolar Junction Transistor , Converters		
4F3201 -CO4	Understand the working principle of the Number representation and Logic gates Understand the working principle of the Combinational logic and arithmetic circuits	U,A	
4F3201 -CO5	Understand the working principle of the various types of Flip flops counters, shift registers Understand the Basics of Microprocessor	U,A	

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DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**AC FUNDAMENTALS, BATTERIES AND UPS**	13
	1.1 AC Fundamental Difference between AC and DC-Advantages of AC over DC Waveform	4
	Of sinusoidal A.C. Cycle Generation of single phase A.C. by elementary alternator- Definition of cycle, frequency, time period, amplitude, peak value, average value and RMS value — Define peak factor and form factor-Concept of phase, phase difference and phase angle .Single phase and 3 phase(Definition)-Meaning of lagging and leading sine wave-Advantages of three phase over single Phase	3
	1.2 Batteries Classification of cells- Construction of Lead acid cell– Methods of charging –Care and Maintenance of Lead acid battery– Indications of a fully charge battery–Maintenance free batteries.	2
	1.3 UPS Need for UPS - Online and Offline UPS – Definition – Block Diagram –Explanation of each block– Merits and demerits of online and offline UPS–Need of heat sink-Specification and ratings– Maintenance of UPS including batteries.	2
	1.4 Switches Basics of switches used - Ratings of switches used for a system Installation – Ratings and types of wires used – necessity of MCB,ELCB.	2
	1.5 Basic components of Electronics & SMPS Definition of Resistors, Capacitors, Diodes, Transistors ,Inductors, Integrated Circuits , Microcontrollers – SMPS-SMPS terminology-SMPS basics – Need for SMPS	

II	**TRANSFORMER AND SPECIAL MOTORS** 2.1 Single Phase transformer Working Principle and Construction of transformer–Brief description of each part–Function and materials used–EMF equation of transformer(No derivation) — Voltage and current ratio of a transformer – Efficiency - Losses in a transformer - Autotransformer-Comparison with two winding transformer– Applications–Step up and Step down transformer(Definition only) 2.2.Special Motors Stepper Motor : Definition-Working principle-Types and applications –Servomotors: Definition-Working principle-Types and applications—Factors to be considered for selecting a motor for a particular application. 2.3. Electrical Safety: Electric shock–need for earthing – types of earthing ,fuses-need –types off uses	12 5 5 2
III	**SEMICONDUCTOR DEVICES** 3.1 Diodes PN Junction diode–Barrier Voltage, Depletion Region— Forward biased and Reverse biased Junction–Working principle–forward / Reverse characteristics of PN Junction diode-Applications of diode— Zener Diode: Construction-Characteristics (Forward and Reverse) – Avalanche and Zener breakdown-Applications of Zener diode. Light Emitting Diodes-operation, construction and characteristics .LDR: Principle of operation and Characteristics. Photo Diode–Principle of operation(concept only) 3.2 Rectifiers Definition – Need of Rectification – Circuit diagram, Operation, i/p	16 8 4

	and o/p Wave forms of Half wave – Full wave –Bridge rectifiers (with outfilters) –Uses of filters in rectifier circuit—Ripple factor, Efficiency and PIV (No derivation)–Comparison 3.3 Bipolar Junction Transistor Definition-Principle of NPN and PNP transistor-Symbol-Transistor Terminals-Operating principle (NPN transistor only)-Configurations of transistor. 3.4 Basics of Converters Inverters circuits and types	2 2
IV	**BOOLEAN ALGEBRA, LOGIC GATES COMBINATIONAL SYSTEM** 4.1Number representation Decimal, Binary, Octal and Hexadecimal Number Systems - Conversion of number from one number system to another (withoutdecimalpoint)-BCDCODE—ASCIICodes-Paritybit—Useofaparitybit Odd parity and Even parity 4.2Logic gates Positive and Negative logic System - Definition, Truth table, Symbol and Logical equations of AND–OR-NOT–EXOR-EXNOR (Only2-inputs) gates–Universal gates-NAND-NOR–Symbol and truth table. 4.3Boolean Algebra Basic laws of Boolean algebra–De-morgan's Theorem and proofs—Duality theorem-Simplification of logical equations using Boolean laws-De-Morgan's theorem–Two and three variable Karnaugh map 4.4Arithmetic Circuits Half Adder and full adder-Truth table, Circuit diagram–Half subtractor and Full subtractor-Truth table, Circuit diagram. 4.5Combinational logic circuits Parity generator and checker-Multiplexer–Demultiplexer–Encoder-Decoder (Definition and Basic Circuits only) Comparator Circuit for two bit words.	16 4 4 3 3 2

V	**SEQUENTIAL LOGIC SYSTEM** 5.1 Flip flops Basic principle of operation- S-R, D flip-flop–Operation and truth table- Race Condition — JK flip flop–T flip flop– Toggling-Edge Triggered Flip-flop–Level Triggered flip flop-Need for a Master-slave flip flop- JK Master Slave flip flop. 5.2 Counters Need-Typesofcounters-4bit Asynchronous counter-Mod N counter-Decade Counter-4bit Synchronous counter-Distinguish between Synchronous and Asynchronous counter - Application of counters 5.3 Registers Shift Register-Block diagram representation and waveform of serial in , Serial Out, Serial in Parallel out, Parallel in-parallel out Applications of Shift Registers. 5.4 Basics of Microprocessor Microcontroller–Embedded system.	16 6 5 3 2

TEXTBOOKS

Sl.No	Title	Author	Publisher	Year of Publishing /Edition
1	Electrical Technology Vol I and II	B.L.Theraja	S.Chand &Co, New Delhi	Mutiple Colour Revised First Edition, 2012
2	Modern Digital Electronics	R.P.Jain	TataMc-Graw Hill, New Delhi	Third Reprint2010
3	Principles of Digital Electronics	K.Meena	PHI learning Private Ltd	2009

REFERENCE BOOKS

Sl.No	Title	Author	Publisher	Year of Publishing/ Edition
1.	Digital Electronics and Logic Design	JaydeepChakravarthy	University Press, Hyderabad	FirstEdition2012
2.	Basic Electrical Engineering	V.N.Mittle	TataMc-GrawHill, NewDelhi	First Edition
3.	Basic Electrical and Electronics Engineering	R,Muthu subramanian R.Salivajanan	TataMc-GrawHill, NewDelhi	SeventhReprint2011
4.	Principles of Electronics	V.K.Mehta	S.Chand&Co, NewDelhi	Second Edition
5.	Digital Electronics	G.K.Kharate	Oxford University Press	2010

4F3202 – OPERATING SYSTEM

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F3202

Term : III

Course Name : Operating System

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / Term	Marks			Duration
			Internal Assessment	Autonomous Examinations	Total	
Operating System	5	80	25	100	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

Unit	Topic	Hrs.
I	Introduction to Operating System	14
II	Process Management	15
III	Memory Management	14
IV	I/O and File Management, Security and Protection	16
V	Computer System Architecture	14
Test and Model Exam		7
Total		80

RATIONALE:

Students have to be conversant with computer, its terminology and functioning. The heart of a computer is based around its Operating System. The processor deals with request coming from all directions asynchronously. The operating system has to deal with the problems of contention, resource management and both program and user data management, and provide a useful no-wait user interface. The course provides clear vision, understanding and working of Operating Systems. Computer Architecture is concerned with the structure and behavior of the various functional modules of the computer and their interaction. This course provides the necessary understanding of the hardware operation of digital computers.

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to

- Understand the purpose, goals, functions and evolution of Operating Systems.
- Understand the concept of process, process states and their scheduling.
- Learn to write shell script. Know the fundamental blocks of computer
- Realize the function of I/O in different operation modes
- Use of I/O processor
- Study the different processors
- Classify different types of schedulers and scheduling algorithms.
- Identify the significance of inter-process communication and synchronization.
- Know about the usage of semaphore in inter-process communication.
- Understand the condition for a dead lock, ways to prevent or recover from the deadlock.
- Know about memory protection against unauthorized access and sharing.
- Compare and contrast paging and segmentation techniques.
- Define virtual memory and its underlying concepts.
- Describe page replacement policies and disk scheduling techniques.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course outcome		BTL	Linked PO
4F3202-CO1	To understand the role and responsibilities of OS in the computer system.	U	
4F3202-CO2	To understand about the system architecture.	U	
4F3202-CO3	To explain how the OS deals with process management and analyze working of process, synchronization and deadlocks	R	
4F3202-CO4	To explain how the OS deals with the memory management.	R	
4F3202-CO5	To apply the knowledge about OS and deals with storage management and OS security	AR	

Legends: R = Remember U= Understand; A= Apply and above levels (BTL-Bloom's revised taxonomy Level)

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**INTRODUCTION TO OPERATING SYSTEMS**	16
	1.1 Basics of Operating Systems Definition–Types of Operating Systems: Mainframe, Desktop, Multiprocessor, Distributed, Clustered, Multiprogramming, Real time, Embedded and Timesharing ,Mobile OS (Android, iOS).	3
	1.2 Operating System Components Process Management component– Memory Management component - I/O Management component – File Management component- Protection System– Networking Management component– Command interpreter.	3
	1.3 Operating System Services	3

	Process Execution – I/O operations– File manipulations – Communications–Error detection and recovery–Resource allocation– Accounting–System Protection-System Calls–System call Execution. **1.4** Operating System Structures Simple structure, Layered, Monolithic, Microkernel Operating Systems – Hybrid Operating System – Views – User, System view –Concept of Virtual Machine–Booting. **1.5** User Interface Command Line Interface (CLI) based OS–DOS, Unix–Graphic User Interface (GUI) based OS–Windows, Linux–Difference between CLI and GUI.	3 2
II	**PROCESS MANAGEMENT** 2.1 PROCESSES Definition–Process Relationship-Process states–Process State transitions-Process Control Block–Context switching–Threads– Concept of multithreads–Benefits of threads–Types of threads **2.2** .PROCESS SCHEDULING Definition–Scheduling objectives–Types of Schedulers–Scheduling criteria – CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time (Definition only)–Scheduling algorithms – Preemptive and Non – pre emptive - FCFS – SJF –SRT–PS–RR-MQ-Multiprocessor scheduling–Types-Performance evaluation of the scheduling. 2.3. Inter-process Communication and Synchronization Definition – Shared Memory System – Message passing – Critical section–Mutual Exclusion-Semaphores. 2.4 Deadlocks 2.5 Definition–Deadlock characteristics–Deadlock Prevention–Deadlock Avoidance–Deadlock detection and Recovery.	15 4 6 3 2

III	**MEMORY MANAGEMENT**	14
	3.1 Basic Memory Management Definition – Logical and Physical address map – Memory allocation – Contiguous Memory allocation – Partition allocation -Single, Fixed and Variable partition–Internal and External fragmentation and Compaction – Swapping - Paging – Principle of operation – Page allocation – Hardware support for paging – Protection and sharing –Disadvantages of paging.	5
	3.2 Virtual Memory Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging, Segmentation	4
	3.3 Page Replacement Algorithms Optimal (OPT), First In First Out (FIFO), Second Chance (SC), Not Recently Used (NRU) and Least Recently Used (LRU), Advantages and Disadvantages of Virtual Machine.	5
IV	**I/O AND FILE MANAGEMENT,**	16
	4.1 Disk Management Disk Structure – Physical structure, Logical structure, Disk formatting, Disk Scheduling and its algorithms, RAID structure of disk, RAID levels0-6.	4
	4.2 File Management File concept – File attributes – Name, Identifier, Type, Location, Size, Time, Date, user identification–File Operations-File system structure– Byte sequence, Record sequence and Tree-based Directory Structure– Single level, Two level, Tree structured Directory.	4
	4.3.Access Methods Sequential, Random access – File allocation methods – Contiguous, Linked, Indexed.	4
	4.4.Security and Protection Security threats–Security Policies and mechanisms–Authentications	4
V	**COMPUTER SYSTEM ARCHITECTURE**	14
	5.1. INPUT/OUTPUT INTERFACE Need for I/O interface, I/O bus and interface, I/O, commands, Example of I/O interface	4

	5.2.MICROPROCESSORS AND PARALLEL PROCESS Block diagram of 8086-registers: segment registers, address: effective address, flag registers and application of microprocessor 5.3. CONCEPTS OF ADVANCED PROCESSORS Symmetric Multiprocessors: Organizations, a mainframe 5.4. NUMA and vector : NUMA organizations and approaches to vector computation.	4 3 3

Reference Books

Sl.No	Title	Author	Publisher	Year of Publishing/ Edition
1.	Operating System Internal and Design Principles	William Stallings	Pearson Education	7th Edition
2.	Operating System, Principles & Design	Pal Chaudhury	PHILearning	FirstEdition
3.	Operating System	RohitKhuranaI TLESE	VikasPub lishingLtd	FirstEdition 2011
4.	Operating System concepts	Abraham Siberschatz Galvin, Gagne	WileyPublishers	9thEdition
5.	Operating Systems	Harvey M. Deiteland Paul J.Deitel, David R.Choffnes	Pearson Education, NewDelhi	Third Edition,2007
6.	Computer System Architecture	M.Morris Mano, Prentice	Hall of India Pvt Limited	Revised Third Edition
7.	Computer Organization And Architecture Designing For Performance	William Stallings	Pearson Publications	Eighth Edition
8.	Computer Organization and Design: The Hardware/Software Interface	David A. Patterson and John L.Hennessey	Morgan Kauffman / Elsevier	Fifth Edition, 2014
9.	Computer Architecture and Organization	John P. Hayes	Tata Mc Graw Hill	Third Edition

Learning Websites

https://en.wikipedia.org/wiki/Operting_system
https://computer.howstuffworks.com/operating-system.htm
https://www.tutorialspoint.com/operating_system/index.htm
https://www.geeksforgeeks.org/operating-systems/
https://codescracker.com/operating-system/
https://www.computerhope.com/os.htm

Shell Script Programs Website links

http://www.codepoc.io/blog/unix
https://books.google.co.in

4F3203 – C - PROGRAMMING

Programme Name : DIPLOMA IN COMPUTER ENGINEERING
Course Code : 4F3203
Term : III
Course Name : C Programming

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / term	Marks			Duration
			Internal Assessment	Autonomous Examinations	Total	
C Programming	6	96	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

UNIT	Topic	Hrs.
I	Fundamentals of C language	18
II	Control statements	18
III	Functions, arrays and string manipulation	18
IV	Structure, union and pointers	18
V	File handling, Command line Argument	17
	Test & Model Exam	7
	Total	96

RATIONALE:

This course offers students a theoretical understanding of and basic knowledge of C language. Students can develop logics which help them to create programs, applicationsin C. C is the most powerful general purpose structural language. It is flexible and suitablefor

different development environment. The syllabus is designed to include basic programming concepts which enable a student to learn other programming languages easily.

OBJECTIVES:

- It aims to provide the basic concepts of C-programming language
- It provides the understanding of data types, operators, variables, expressions, variable types, control flow structures, functions, arrays, pointers, structures, unions and file operations
- It describes dynamic Data structure using Java and memory management It provides the ability to design and develop computer programs

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**Program development and Introduction to C** 1.1:Program development cycle – levels of programming languages, - Introduction to algorithms, flowchart and symbols 1.2:Introduction to C – Basic Structure, Character Sets, Keywords, Identifiers 1.3:Constants, datatypes, Variable type declaration; Execution of some simple sample programs. 1.4:Operators: Arithmetic, Relational, Logical and Assignment, Increment, Decrement and Conditional; Operator Precedence and conversion 1.5:I/O statements, Formatted input & output; Unformatted I/O	18 3 3 3 6 3
II	**Control statements, arrays, Strings** 2.1:Branching statements - The if statement, The if-else statement, Nesting of if statements, The conditional expression, The switch statement. 2.2:Looping statements - The while loop, The do…while loop, The for loop. 2.3:The nesting of for loops, the break statement and continue 2.4:Array declaration and initialization, one dimensional array, Two dimensional array, accessing array elements, programs	18 4 3 2

	using arrays 2.5:String – Declaration and initialization of strings, Reading and writing Strings, String handling functions – String manipulation programs	3 3
III	**Functions, Structures, unions** 3.1: Function Basics, Function Prototypes 3.2:Passing Parameters: Passing Parameter by value and Passing Parameter by reference, passing string to function 3.3:Passing array to function, Structures and Functions 3.4:Structures - Definitions & initialization, Arrays of structures, Arrays within structure 3.5:Unions - Declaration and initialization	18 4 4 3 4 3
IV	**Pointers and Dynamic memory management** 4.1:Pointers - Declaration & Initialization, Accessing variables through pointers 4.2:Pointer arithmetic, Pointers & arrays; Strings; Pointer to Functions & Structures. 4.3:Dynamic Memory Allocation, Allocating Memory with malloc, Allocating Memory with calloc. 4.4:Freeing Memory, Reallocating Memory Blocks	18 4 5 5 4
V	File management, Command line arguments, Preprocessor 5.1:File management in C - Defining and Opening a file, Closing Files, Input/output Operations on File, Random Access to Files. 5.2:Command line arguments. 5.3:Introduction to C preprocessor – macro substitution – file inclusion – compiler control directives.	17 8 3 6

Reference Books

Sl.No	Title	Author	Publisher	Year of Publishing/ Edition
1.	Programming in C	E. Balagurusamy	Tata Mcgraw-Hill publications	7th Edition
2.	Programming in C	D.Ravichandran	New Age publishers Chennai	First Edition 1996 , Reprint 2011
3.	Let Us C	Yeshwanth Kanetkar	BPB publications	
4.	A Text book on C	E.Karthikeyan	PHI private Limited, New Delhi	2008

4F3204 – ELECTRICAL AND ELECTRONICS ENGINEERING PRACTICAL

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F3204

Term : III

Course Name : Electrical and Electronics Engineering Practical

TEACHING&SCHEME OF EXAMINATION

No.of weeks per term: 16 Weeks

COURSE	Instructions		Examination			
	Hours /Week	Hours/ Term	Marks			Duration
			Internal Assessment	Autonomous Examinations	Total	
Electrical and Electronics Engineering Practical	4	64	25	100*	100	3Hrs

*Examinations will be conducted for 100 Marks and it will be reduced to 75 marks.

RATIONALE:

Diploma Engineers from all branches of engineering are expected to have somepracticalknowledgeofelectricalandelectronicsengineering.Alsothetechniciansworkingin differentengineeringfieldshavetodealwithvarioustypesofelectricalequipments.Varioustypesof electroniccircuitsareusedindifferentelectricalequipments. Hence it is necessary to have practice with electric circuits, different types of electronic devices to know the principles and working characteristics.

OBJECTIVES

On completion of the following practical contents the students must be able to

- Verify Power supply of SMPS
- Find the efficiency and voltage regulation of a single phase transformer
- Study the characteristics of PN junction diode and Zener Diode

- Function of Rectifier circuit
- Test the performance of Light devices
- Know about the function of a Transistor
- How to construct different logic functions using universal gates
- Realize the combinational circuits and sequential circuits

Contents: Practical

LAB EXERCISES

1	A	Checking of power supply in SMPS
	B	Construct the circuit and draw the graph for different stages of Bridge Rectifier with filter using CRO.
2	A	Construct the circuit and draw the forward characteristics of PN Junction Diode and find input resistance.
	B	Construct the circuit and draw the reverse characteristics of Zener Diode and find break down voltage.
3		Construct the circuit and draw the VI characteristics of LED
4		Construct the circuit and draw the characteristics of LDR
5	A	Construct CE configuration circuit and draw the input characteristics and Also find input resistance.
	B	Construct CE configuration circuit and draw the output characteristics and also find output resistance.
6	A	Verify the truth tables of NAND, AND, NOR, OR, NOT, XOR using IC's
	B	Realization of basic gates using either NAND or NOR gate.
7		Construct and verify Half adder and Half Subtractor
8		Construct and verify the truth table of Full adder
9		Construct and verify the truth table of Full subtractor
10		Verify the truth tables of RS, D, T and JKFF
11		Construct and test the paritygeneratorandcheckerfunctionusingIC74180
12		Construct and test encoder and decoder circuit(IC74138)
13		Construct and test the function of Multiplexer and De-Multiplexer(IC74151)
14		Constructandtestthe4bitRipplecounter(IC7493)
15		Construct and test decade counter(IC7490)

DETAILED ALLOCATION OF MARKS	
Aim	10
Procedure & circuit diagram / Truth table	35
Simulation	35
Result	10
Viva	10
Total	100

LIST OF EQUIPMENTS / COMPONENTS REQUIRED

SL.No	Name of the Equipments	Range	Required Nos
1	Ammeter	(0-50)ma	6
2	Voltmeter	(0-20)V,(0-1v)	6
3	Power supply	0-30V	6
4	Digital Trainer Kit		6
5	Bread Autonomous		6
6	Fixed dual power supply	0-15V	2
7	Signal generator	1MHz	2
8	CRO Dual Trace	30MHz	6

COMPONENTS

SL.No	Name of the components	
1	Resistors	1150Ω,1KΩ,2.2KΩ,10KΩ,220Ω
2	Capacitor	10μF,4.7μF
3	PN Diode	IN4007
4	Zener Diode	Z11.1
5	Transistor	SL100,CL100
6	IC7400, IC7402, IC7404, IC7408,IC7432,IC7486	
7	Ic74180,IC74153,IC7476,IC7474	
8	IC7490,IC7493,IC7495	

4F3205 – LINUX Practical

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F3205

Term : III

Course Name : LINUX Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / term	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
LINUX PRACTICAL	4	64	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

Linux is an open-source Operating System which offer a variety of functions, programs or applications and Linux soft wares to choose from, to the users, most of them are free. It has a good graphical user interface (GUI) and almost all the functionality that other proprietary OS offer.This practical enables to learn the commands used to perform various operations in a Linux system and write shell scripts for various functions. One of the top practical uses for Linux and Server administration.

DETAILED SYLLABUS

Contents: Practical

Units	Topics	Hours
I	Basics of Linux OS: Entering and Exiting from a Linux system – User Accounts - General understanding of various application programs – Different shells	2
II	Linux Commands: Learn the syntax and usage of : Directory Management Commands - File Management Commands - General Purpose Commands - Simple Filters — Advanced Filters - Communication Commands - Check the Process Status - Process Management Commands - Search Patterns - Exercises.	28
III	Text Editor: File operations (New, Open, Close, Save, Save and Exit, Print) – Text Editing operations (Inserting, deleting, finding, replacing, copying and moving) .	2
IV	Shell Scripts: Use of shell scripts - Numerical operations - Looping – Swapping Technique - String operations –Using Command line arguments – Filters – Date Functions – Relational operations - Logical operations - Boolean operations - Basic arithmetic operations – Case statement – Search Directory or File - Exercises.	32

Exercise

PART – A **LINUX COMMANDS**	
Write down the syntax and usage of the following exercise with all options. Check the commands with the system	
Learn to use Linux Operating System (Study Exercise) (a) Logon to LINUX and logoff. (b) Learn usage of various applications installed in Linux OS such as Terminal, Editor, System Monitor	
1	age of Directory Management commands: ls, cd, pwd, mkdir, rmdir
2	age of File Management commands: cat, chmod, cp, mv, rm, more
3	Use the General Purpose commands: wc, cal, date, who, tty, ln
4	Using the Simple filters: pr, head, tail, cut, paste, nl, sort
5	a) Advanced filters : Search for a pattern using grep, egrep, fgrep, uniq b) Communication Commands: write, wall
6	Check the details of process name, PID, status using ps command. Process Management commands: kill, nice, fg, bg
7	Device pattern using meta character to match each of the following situations: a. All threecharacter filenames. b. All filenames that contains the characters a or b or c. c. All filenames beginning with a particular string. d. All filenames beginning with ca and ending with two digits. e. All filenames beginning with s and having at somewhere.
8	Communication commands from E scheme syllabus.

PART – B SHELL SCRIPTS	
Test commands related with File Editing with Vi, Vim, gedit (Study Exercise)	
1	Write a shell script that accepts a numerical value N. Then display the decrementing value of N till it reaches 0.
2	Write a shell script to exchange the values of two variables with or without using third variable.
3	Write a shell script to reverse a string and display it.
4	Write a shell script that takes three command line arguments. The first argument is the Name of the destination file and the other two arguments are names of files to be placed in the destination file.
5	Write a shell script to print contents of file from given line number to next given number of lines.
6	a) Write a shell script to say Good morning/Afternoon/Evening as you log in to system. b) Write a shell script that print out date information in this order: time, day of the week,day number, year – that is like this. 21:18:00 IST Thu 4 Feb 2016
7	Develop a Basic math Calculator using case statement
8	Write a shell script that presents a multiple choice question, gets the user's answer and report back whether the answer is right, wrong or not one of the choices.
9	a) Write a shell script to determine whether given file exist or not, file name issupplied as command line argument, also check for sufficient number of command line argument b) Write a shell script that takes a command line argument and reports on whether it is a directory, a file or something else.

LINUX PRACTICAL

Note:

1. The student should be given proper training in all the exercises. All the exercisesshould be completed before the examinations.
2. The student should maintain observation note book / manual and record notebook. The record note book should be submitted during the Autonomous Practical Examinations. Common printout for the record note book should not be allowed. Individual student output for every exercise should be kept in the record note book.
3. All exercises should be given in the question paper and student is allowed to select any one by lot. All exercises with the hard copy of the template related tothe exercise should be provided by the external examiner for the examination. Template can be varied for every batch.
4. The external examiner should verify the availability of the infrastructure for the batch strength before the commencement of Practical Examination.

DETAILED ALLOCATION OF MARKS	
Correctness of Commands in Part-A	15 Marks
Execution of Commands in Part-A *	20 Marks
Writing program in Part-B	20 Marks
Execution of program in Part-B *	25 Marks
Printed Output (Part –A) ^	5 Marks
Printed Output (Part –B) ^	5 Marks
VIVA – VOCE	10 Marks
TOTAL	100 Marks

* *Should be evaluated during the execution by the examiners only.

^ Students output should be printed and submitted with the exam paper for evaluation.

HARDWARE AND SOFTWARE REQUIREMENTS

Minimum Hardware Requirements:

Desktop Computers : 30Nos

Processor : 1 GHz, RAM: 2 GB, Hard Drive: 500 GB,

Monitor : 15”,Keyboard & Mouse, other accessories

Overhead Projector : 1 No.

Laser Printer : 1 No.

Minimum Software Requirements:

Operating System: Any Linux Based GUI Operating System

4F3206 – C PROGRAMMING PRACTICAL

Programme Name : DIPLOMA IN COMPUTER ENGINEERING
Course Code : 4F3206
Term : III
Course Name : C Programming Practical

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per term: 16 weeks

COURSE	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / term	Internal Assessment	Autonomous Examination	Total	
C Programming Practical	4	64	25	100*	100	3Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to75 marks.

RATIONALE:

As 'C' is the most widely used computer language in software industry to provide the hands on experience on writing C programs and on implementation of linear and non-linear Data structure using Java , this course is introduced. The knowledge of 'C' language and data structures will be reinforced by practical exercises during the course of study. This course will help students to develop the capability of selecting a particular data structure.

OBJECTIVES:

At the end of the Course, the Students will able to

- Analyze the given problem.
- Think the logic to solve the given problem.
- Describe the concepts of constants, variables, data types and operators.
- Develop programs using input and output operations.
- Write programs using command line arguments.
- Write programs using compiler control directives.

- Write programs using different looping and branching statements.
- Write programs based on arrays.
- Write Programs using string handling functions.
- Write programs using user-defined functions, Structures and Union.
- Write programs using the concept of Pointers.
- Understand the use of arrays
- Implement linear data structure algorithms using java language.
- Implement non - linear data structure algorithms using java language.
- Write programs for traversing a binary tree.
- Write programs for searching and sorting.

DETAILED SYLLABUS

Contents: Practical

PART – A	
1.	Write a simple C Program a. Print your Name and Address b. Find Simple interest and Compound interest.
2.	Write a C program to swap two variables using (i) third variable and (ii) without using a third variable.
3.	Write a program to find the largest number between given three numbers
4.	Write a program to print all prime numbers from 1 to N.
5.	Write a program to prepare the total marks for N students by reading the Reg.No,Name, Mark1 to Mark6 by using array of structures.
6.	Write a program using the function power (a,b) to calculate the value of a raised to b.
7.	Write a program to find the length of the given string using pointers.
8.	Write a program to find factorial of a number using recursion.
PART – B	
9.	Write a program to find the biggest of given 10 numbers
10.	Write a “C” program to read 10 elements and sort the above numbers using bubble sort.
11.	Write a Program to arrange the given N names in alphabetical order.
12.	Write a program to perform following tables a) Print Fibonacci series upto N terms and it’s Sum. b) Print whether a given year is leap or not.
13.	Write a “C” program to add two 3 x 3 matrices and display the result in Matrix
14.	Read a sentence through command line argument and print the string form.
15.	Write a C Program to store the marks of students and print them using structure.
16	Write a program to show the basic file operations.

DETAILED ALLOCATION OF MARKS	
Writing any one program from PART – A	20 Marks
Writing any one program from PART – B	25 Marks
Executing program (PART – A)	20 Marks
Executing program (PART – B)	20 Marks
Result with printout (PART – A)	05 Marks
Result with printout (PART – B)	05 Marks
VIVA – VOCE	05 Marks
Total	100 Marks

HARDWARE REQUIREMENT

Desktop Computers - 30 No's

Laser Printer - 1 No

SOFTWARE REQUIREMENT

C – Compiler with Editor.

4F3301 –E- PUBLISHING PRACTICAL

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F3206

Term : III

Course Name : E- Publishing Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / term	Marks			Duration
			Internal Assessment	Autonomous Examinations	Total	
E -PUBLISHING PRACTICAL	4	64	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

This course will enable the students to familiarize with the features and use of application packages such as CorelDraw, Photoshop and Adobe in design. This COURSE will develop skills in handling the above packages to develop software for-publishing. It makes the students exactly suitable for DTP industry.

OBJECTIVES:

On completion of the following exercises, the students must be able to

- Learn all tools and options in CorelDraw.
- Create designs like Bit Notice, Notebook Wrapper, Invitation and Calendar in Corel Draw.
- Learn all tools and options in Photo Shop.
- Create designs using layers, tools, text effects and filters in Photoshop.
- Learn to use character styles, paragraph styles, text effects and textframe in Adobe In design.
- Create master page, multipage document and monthly calendar in AdobeIn design.

DETAILED SYLLABUS

Contents: Practical

LAB EXERCISES

PART-A

1. Create a Bit Notice with specified height and width with various text styles.
2. Create a design using all basic tools and make changes using shape tool.
3. Create a notebook wrapper design using fountain filling and pattern filling tools.
4. Create an invitation using arrange menu commands like transformations, align anddistribute and order.
5. Create a calendar with the help of Grid Tool, Power clip and import commands.
6. Create a simple logo using text tool, rectangle tool and ellipse tool.
7. Transform one object into another object using blend tool.

PART-B

1. Create a design by using the various Selection Tools, cutting and pasting the images.
2. Using multiple layers, create a design with the use of masking various images.
3. Create a design by the use of text tools and apply text effects.
4. Change the color of an image by the use of selective coloring method
5. Create a design by applying the various filtering effects.
6. Create a simple layout and master page by using master page palette and Character Styles.
7. Create a multipage document by using character, paragraph, auto flow and text commands.
8. Create a stylish monthly calendar sheet by using table and its formatting commands.

DETAILED ALLOCATION OF MARKS	
Procedure Writing – One Question from PART - A	15 Marks
Procedure Writing – One Question from PART - B	20 Marks
Executing Exercise (PART – A)	25 Marks
Executing Exercise (PART – B)	25 Marks
Result(Part – A)	5 Marks
Result(Part – B)	5 Marks
VIVA - VOCE	5 Marks
TOTAL	**100 Marks**

LIST OF EQUIPMENTS

HARDWARE REQUIREMENTS

Desktop Computers	.....	30 Nos
Laser printer	.....	1 No
Scanner	.....	1 No

SOFTWARE REQUIREMENTS

Any Open Source Software

- GIMP
- Scribus
- Inkscape
- Krita
- Pinta
- Shotwell or any equivalent open source software.[or]
- Corel draw, Photoshop, Adobe indesign.(optional)

[Open source software usage is recommended than proprietary for doing lab exercises]

IV - TERM

4F4207 – DATA STRUCTURES

Programme Name : DIPLOMA IN COMPUTER ENGINEERING
Course Code : 4F 4207
Term : IV
Course Name : Data Structures

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Term	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Data structure using Java	5	80	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

Unit	Topic	Hrs.
I	Introduction	15
II	Linear Data Structures	15
III	Non Linear Data Structures	15
IV	Searching & Sorting	13
V	Graph & File Structure	15
Test & Model Exam		7
Total		80

RATIONALE:

Data structures are the techniques of designing the basic algorithms for real-life projects. In the present era, it is very essential to develop programs and organize data in such a way that it solves a complex problem efficiently. Understanding of data structures is essential and this facilitates to acquire sound knowledge of the insight of hardware requirement to any problem base. The practice and assimilation of data structure techniques is essential for programming.

This course introduces fundamental concepts in data structures and reviews important concepts in object oriented programming; it also attempts to develop good programming skills and habits, including for example, good software testing skills.

OBJECTIVES:

- To understand the concepts of algorithm and operation of stack
- To understand the concept of queue and linked list operation in data Structures
- To know about the tree structure and analyze how the values are inserted and deleted in binary tree
- To sort the data using different sorting techniques and how to use hash table functions
  to store the data
- To understand the graph techniques to solve problems and to know how to use file indexing

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):**Course outcome**		**BTL**
4F4207-CO1	To understand the concepts of algorithm and operation of stack	R
4F4207-CO2	To understand the concept of queue and linked list operation in data Structures	U
4F4207-CO3	To know about the tree structure and analyze how the values are inserted and deleted in binary tree	R
4F4207-CO4	To sort the data using different sorting techniques and how to use hash table functions to store the data	A
4F4207-CO5	To understand the graph techniques to solve problems and to know how to use file indexing.	A

Legends: R = Remember U= Understand; A= Apply and above levels (BTL-Bloom's revised taxonomy Level)

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	INTRODUCTION 1.1: Problem Solving-Various aspects-Different phases-Implementation of Algorithms- Characteristics-Algorithm design Techniques- Judgment of Algorithm 1.2: Algorithm -Efficiency of algorithms-Computational complexity-Analysis of algorithms-Worst case, Best case, Average case (Definition only) Chapter: 1.3: Stack-Stack operations-push, pop-Stack Implementation- Application of stack: Conversion of Infix to Prefix and Postfix Expressions, Evaluation of postfix expression using stack., Applications ofrecursion in problems like „Tower of Hanoi".	15 5 5 5
II	LINEAR DATA STRUCTURES 2.1: Queues: Array and linked representation and implementation of queues, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, D-queues and Priority Queues 2.2: Linked lists: Representation-Traversing and searching of a linked list-insertion and deletion operations- Insertion and deletion Algorithms -Doubly linked list- Polynomial representation and addition - Garbage Collection and Compaction	15 8 7
III	NON LINEAR DATA STRUCTURES 3.1: Trees: Basic terminology, Binary Trees, Binary tree representation, algebraic Expressions, Complete Binary Tree, Extended Binary Trees and Array -Traversing Binary trees, Threaded Binary trees, Traversing Threaded Binary trees, Huffman algorithm 3.2: Searching and Hashing: Sequential search, binary search,	15 8

	comparison and analysis, Hash Table, Hash Functions, Collision Resolution Strategies, Hash Table Implementation.	7
IV	SEARCHING & SORTING 4.1: Sorting: Insertion Sort, Bubble Sorting, Quick Sort, Two Way Merge Sort, Heap Sort, Sorting on Different Keys, Practical consideration for Internal Sorting 4.2: Binary Search Trees: Binary Search Tree (BST), Insertion and Deletion in BST, AVL Tree- representation-single rotation-double rotation- B-trees.	13 7 6
V	GRAPH & FILE STRUCTURE 5.1: Graphs: Terminology & Representations, Graphs & Multi-graphs, Directed Graphs, Sequential Representations of Graphs, Adjacency Matrices, Traversal, Connected Component and Spanning Trees, Minimum Cost Spanning Trees. 5.2: File Structure: Concepts of fields, records and files, Sequential, Indexed and Relative/Random File Organization, Indexing structure for index files, hashing for direct files, Multi-Key file organization and access methods.	15 8 7

Reference Books

Sl.No	Title	Author	Publisher
1.	Programming in ANSI C	E Balagurusamy	Tata McGraw-Hill
2.	Fundamentals of Data Structure	Ellis Horowitz & Sartaj	Sahni Galgotia Book Source
3.	Data structure using C	ANDREW S Tanenbaum, Yedidyeh langsam, Moshe J Augenstein	PHI Pub

4F4208 – WEB DESIGN AND PROGRAMMING

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F4208

Term : IV

Course : Web Design and Programming

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / term	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Web Design and Programming	5	80	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

UNIT	Topic	Hrs.
I	Internet, HTML and Advanced HTML	15
II	Frames, Forms and CSS	14
III	JavaScript	15
IV	PHP	15
V	PHP Programming and MySQL	14
Test and Model Exam		7
Total		80

RATIONALE:

The main objective of the of this COURSE is to introduce the students to the building blocks of Internet and Web Design & Programming using HTML, CSS,

Java Script, PHP and MySQL. The COURSE will impart knowledge to design web pages, dynamic and interactive web si tes with client-side and server-side scripting. After completion the students will be able to independently design and develop web sites.

OBJECTIVES:

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

- To impart knowledge on Internet and basics of networking concepts.
- To impart basic knowledge on web development Develop simple components in web pages using CSS.
- To impart knowledge for validations and event handlers using JavaScript.
- To provide the basic knowledge about PHP and web services.
- To impart PHP scripting ideas and importance in web development.
- Write PHP Programs with MySQL database.

Unit	Name of the Topic	Hours
I	INTERNET, HTML AND ADVANCED HTML 1.1 Internet History of the Internet - Basics of Networking Concepts – WAN, LAN, TCP/IP, UDP, FTP, Telnet, SMTP, Ports - World Wide Web – HTTP, SMTP, POP3, MIME, Understanding roles of Web Browsers – Concepts of Web Servers. 1.2 HTML Introduction - Basic Tags of HTML - HTML Tag - TITLE Tag – BODY Tag - Formatting of Text: Headers - Formatting Tags: BOLD, ITALICS, UNDERLINE, PARAGRAPH, TT, STRIKETHROUGH, EM, BR and HR tags - PRE Tag - FONT Tag – Special Characters - Working with Images - META Tag. 1.3 Advanced HTML Difference between HTML & HTML5 - New elements in HTML5 - Links - Anchor tag – Lists- UnorderedLists - OrderedLists – Definition Lists; Tables - TABLE, TR and TD Tags - Colspan and Rowspan	15 5 5 5

II	FRAMES, FORMS AND CSS 2.1 Frames Frameset – FRAME Tag – Frame inside other frames – NOFRAMESTag.	14 2
	2.2 Forms FORM and INPUT Tag — Textbox - Radio Button — Checkbox — SELECT Tag and Pull Down Lists: Hidden - Submit and Reset; Some Special Tags: COLGROUP - THREAD, TBODY, TFOOT –_blank, _self, _parent, _top – IFRAME – LABEL - Attribute for <SELECT> - TEXTAREA.. 2.3 CSS Introduction – Features – Style Sheet basics - Working with CSS files – Syntax - Types of Style Sheets - Inline Styles - Embedded Styles - External or Linked Styles - What is CSS3? Animation – Borders – Backgrounds – Fonts –Multiple columns – Text effects. 2.4 Formatting Text and Fonts Font Families Font Size Kerning, Leading and Indenting - Formatting Colors and Backgrounds: The Color Attribute - The Background Attribute - Background Colors and Images. Exploring CSS Class and ID Attributes: Defining the CSS Class Attribute – Defining the CSS ID Attribute - Dynamic effects with CSS - Lists- Tables – Forms – Simple Examples using above properties.	3 4 5
III	JAVASCRIPT 3.1 JavaScript Basics Need of scripting languages — Variables and Data Types: Declaring Variables — Life span of variables - Data Types - Operators: Assignment, comparison, computational and logical operators - Control Structures: Conditional Statements — Loop Statements: for, while, for in, break and continue statements. 3.2 Object-Based Programming and Message boxes Functions - Executing Deferred Scripts - objects: Document object Model, Predefined objects, Array object, History object, Location object - Dialog Boxes - Alert Boxes - Confirm Boxes - Prompt Boxes. 3.3 JavaScript with HTML	15 5 5 5

	Events - Event Handlers: onLoad and onUnload – onFocus and onBlur – onError - Forms: Forms Array – Form element properties - Introduction to jQuery – Features of jQuery - jQuery example	
IV	PHP 4.1Introduction A Brief Introduction to Apache, MySQL, PHP and Open Source -Server-Side Web Scripting. 4.2 PHP PHP Structure and Syntax - Integrating HTML with PHP - Syntax and Variables - Constants and Variables - Passing Variables between Pages — if Statements - if and else — switch case - for loop — for each loop. 4.3 Includes Includes and Functions for Efficient Code - Strings – Arrays and Array Functions - Sessions and Cookies – Sample Programs – (Alternates to Incrementing/Decrementing Values.) 4.4 OOP PHP Frame works – Framework type – design pattern – model view command. Object oriented Programming – Classes – Properties and Methods	15 4 5 3 3
V	PHP PRGRAMMING AND MYSQL 5.1 PHP with MYSQL MySQL Syntax and Commands - Connecting to the MySQL Server — Data types - Functions - Querying the Database - SELECT, Logical Operators — MySQL Programs. 5.2 Form Elements Processing the Form - FORM Element - Tables to Display Data – Edit, Update and Delete data. 5.3 Hands on Experiments Creating a Simple Shopping - Cart Script – Mini Project. 5.4 eWay corp.com 1. integration of PHP with cloud to develop webapps 2. improved cyber security of websites with PHP	14 3 3 3 3

	3. PHP tools and IoT 4. Use of Accelerated mobile pages (AMP) 5. Creation of smart chat boxes 5.5 PHP - 8	2

Reference Books

Sl.No	Title	Author	Publisher
1.	The Internet Book	Douglas E. Comer	Prentice Hall
2.	Web Development and Design Foundations with HTML5	Terry Felke-Morris	Pearson
3.	HTML & CSS: The Complete Reference	Thomas A. Powell, Fritz Schneider	Tata McGras-Hill
4.	Java Script: The Complete Reference	Thomas Powell, Fritz Schneider	Tata McGras-Hill
5.	Beginning PHP6, Apache, MySQL, Web Development	Timothy Boronczyk, Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, Michael K. Glass	Wrox Publications

4F4302 – OBJECT ORIENTED PROGRAMMING WITH JAVA

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F4302

Term : IV

Course Name : Object oriented Programming with java

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

course	Instructions		Examination			
	Hours / Week	Hours / Term	Marks			Duration
			Internal Assessment	Autonomous Examinations	Total	
Data structure using Javas	5	80	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

Unit	Topic	Hrs.
I	Introduction	15
II	Object oriented programming	13
III	Packages, Exception handlings, Array & String, Thread	15
IV	Files & Collection of useful classes	15
V	GUI Programming & event handlings	15
Test & Model Exam		7
Total		80

RATIONALE:

This course explains the fundamental ideas behind the object oriented approach to programming. Knowledge of java helps to create the latest innovations in programming. Like the successful computer languages that came before, java is the blend of the best elements of its rich heritage combined with the innovative concepts required by its unique environment. This COURSE is designed to give you exposure to basic concepts of object oriented technology. This COURSE will help in learning to write programs in java.

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to

- Understand the basic concepts and applications of Object Oriented Programming.
- Know the history & features Java.
- Use of control structures in Java Program.
- Use of Arrays and Vectors in Java Program.
- Demonstrate the use of string and String Buffers.
- Define Class with the attributes and methods.
- Know the types of inheritances.
- Define and Implement Interfaces.
- Create and access packages.
- Handle the errors using exceptions.
- Creating own exceptions
- Understand the concepts of multithreading.
- Develop multithreaded programs in Java.
- Develop File programs
- Develop simple Applets.
- Use of Graphics, Color & Font class
- List the types of AWT Components and types of event listeners

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**INTRODUCTION** 1.1: Programming language : Programming language Types and Paradigms, Computer Programming Hierarchy, How Computer Architecture Affects a Language ? , Why Java ? , Flavors of Java, Java Designing Goal, Role of Java Programmer in Industry, Features of Java Language, JVM –The heart of Java , Java's Magic Byte code. 1.2: The Java Environment: Installing Java, Java Program Development, Java Source File Structure, Compilation, Executions. 1.3: Basic Language Elements: Lexical Tokens, Identifiers, Keywords, Literals, Comments ,Primitive Datatypes, Operators Assignments.	15 5 5 5
Ii	Object Oriented Programming 2.1: Class Class Fundamentals , Object & Object reference , Object Life time & Garbage Collection, Creating and Operating Objects , Constructor & initialization code block, Access Control, Modifiers, methods Nested , Inner Class &Anonymous Classes ,Abstract Class & Interfaces Defining Methods, Argument Passing Mechanism , Method Overloading, Recursion, Dealing with Static Members, Finalize() Method, Native Method. Use of "this " reference, Use of Modifiers with Classes & Methods, Design of Accessors and Mutator Methods Cloning Objects, shallow and deep cloning, Generic Class Types. 2.2: Extending Classes and Inheritance Use and Benefits of Inheritance in OOP, Types of Inheritance in Java, Inheriting Data members and Methods , Role of Constructors in inheritance , Overriding Super Class Methods ,Use of "super" ,	13 6

	Polymorphism in inheritance ,Type Compatibility and Conversion Implementing interfaces.	7
Iii	Packages, Exception handlings, Array & String, Thread 3.1: Package Organizing Classes and Interfaces in Packages , Package as Access Protection , Defining Package ,CLASSPATH Setting for Packages , Making JAR Files for Library Packages Import and Static Import Naming Convention For Packages. 3.2: Exception Handling: The Idea behind Exception ,Exceptions & Errors ,Types of Exception ,Control Flow In Exceptions, JVM reaction to Exceptions ,Use of try, catch, finally, throw, throws in Exception Handling ,In-built and User Defined Exceptions, Checked and Un-Checked Exceptions. 3.3: Array & String : Defining an Array, Initializing & Accessing Array, Multi –Dimensional Array, Operation on String, Mutable & Immutable String, Using Collection Bases Loop for String, Tokenizing a String, Creating Strings using StringBuffer . 3.4 Thread Understanding Threads , Needs of Multi-Threaded Programming ,Thread Life-Cycle, Thread Priorities ,Synchronizing Threads, Inter Communication of Threads ,Critical Factor in Thread –DeadLock,	15 4 4 4 3
Iv	Files & Collection of useful classes 4.1: Collection of useful classes Utility Methods for Arrays ,Observable and Observer Objects , Date & Times ,Using Scanner Regular Expression, Input/Output Operation in Java(java.io Package) 4.2: Files Streams and the new I/O Capabilities ,Understanding Streams, The Classes for Input and Output, The Standard Streams, Working with File Object, File I/O Basics, Reading and Writing to Files, Buffer and Buffer	15 8 7

	Management, Read/Write Operations with File Channel, Serializing Objects .: Binary Search Tree (BST), Insertion and Deletion in BST, AVL Tree- representation-single rotation-double rotation- B-trees.	
V	GUI Programming & event handlings 5.1: GUI Programming Designing Graphical User Interfaces in Java, Components and Containers, Basics of Components, Using Containers, Layout Managers, AWT Components, Adding a Menu to Window, Extending GUI Features Using Swing Components, Java Utilities (java.util Package) The Collection Framework : Collections of Objects , Collection Types, Sets , Sequence, Map, Understanding Hashing, Use of ArrayList & Vector. 5.2: Event Handling Event-Driven Programming in Java, Event- Handling Process, Event-Handling Mechanism, The Delegation Model of Event Handling, Event Classes, Event Sources, Event Listeners, Adapter Classes as Helper Classes in Event Handling.	15 8 7

Reference Books

Sl.No	Title	Author	Publisher
1.	Programming with Java	E. Balagurusamy	Tata Mc-Graw Hill, New Delhi
2.	Java - The complete reference	“Herbert schildt	Tata Mc graw Hill,New Delhi
3.	Java 2,J2SE1.4 Complete		BPB Publications

4F4209 – Relational Database Management System

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F4209

Term : IV

Course Name : RDBMS

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / term	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
RDMS	5	80	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

UNIT	Topic	Hrs.
I	Concepts of Databases and Data Modeling	15
II	Relational Data model & MYSQL Administration	15
III	Interactive MYSQL	15
IV	MYSQL Performance Tuning	14
V	Stored Program Concepts & Development	14
Test and Model Exam		7
Total		80

RATIONALE

The Database Management system is a collection of programs that enables to store, modify and extract information from a database. The primary resource that fuels knowledge power is the database. Organizations are employing mechanisms to effectively manage and utilize the data stored in the databases. Relational Database Management System has been developed to harness the information stored in the database.

The major objectives of this COURSE are to provide a strong formal foundation in Database Concepts, technology and practice to the students to enhance them into well informed application developers. After learning this COURSE, the students will be able to understand the designing of RDBMS and can use any RDBMS package as a backend for database applications.

OBJECTIVES:

On completion COURSE, the students must be able to

- Describe data, database, database management systems and database models.
- To make the students to understand the concept of relational model and constraints.
- To make the students to understand the concept of Client/Server technology, Datawarehousing, Data mining and Big Data.
- State CODD's rules.
- Understand Normalization and explain different types of normal form.
- To know DDL, DML, DCL and all related commands.
- Write logical and conditional statement for database query.
- Works with Procedures and functions.
- Create and use Cursors and Triggers.

DETAILED SYLLABUS

Unit	Name of the Topics	Hours
I	**CONCEPTS OF DATABASES AND DATA MODELING**	15
	1.1 Basic Concepts	
	Data, Databases, Database Management System – Components of Database – Data Dictionary – Architecture: Overall Architecture of DBMS, Three level architecture.	4
	1.2 Data Models	
	Types of Database models: Hierarchical Database Model, Network Database Model and Relational Database Model. E-R model: Entities - Attributes – Relationships – E-R diagram – Samples.	3
	1.3 Database Administrator	
	Server / Client and distributed concept — DBA tasks — DBA Tools/Utilities – Database Maintenance – Backup & Recovery.	3
	1.4 Advanced Concepts	
	Introduction to Data warehousing and Data mining – Applications – Data marts. Big Data: Definition — Characteristics — Various Technologies used – Applications – Overview of No SQL: Difference between RDBMS and No SQL – Tools used in Big Data, Scalability, and Understanding storage architecture.	5
II	**RELATIONAL DATA MODEL & MYSQL ADMINISTRATION**	15
	2.1 Relational data model	
	CODD's rules – components of DBMS – Table Structure – Records, rows, tuples, attributes. Keys: Primary key, foreign key, composite key. Meta data – Data Dictionary – Data Integrity – Data constraints and validation – Types of constraints – Difference between SQL and MySQL.	5
	2.2 Normalization	3
	Benefits – Normal forms: 1st Normal form, 2nd Normal form, 3rd Normal form.	
	2.3 MySQL Installation	3
	Install, Configure and test the MySQL server on Microsoft Windows	
	2.4 Working with MySQL Admin	
	Creating (CREATE cmd), Selecting (USE cmd) and Describing	4

	database (DESC cmd) – SHOW cmd – backing up databases.	
III	**INTERACTIVE MYSQL**	15
	3.1 Introduction to MySQL	
	MySQL data types - Data Definition Commands – Data Manipulation Commands – Data retrieval commands.	4
	3.2 MySQL Operators and Expressions	
	Types of Operators – Arithmetic, Comparison and logical operators – Pattern matching – Import and Export of data.	2
	3.3 Built-in Functions	
	Single row functions – Aggregate functions – Conversion functions.	3
	3.4 Querying the table	
	Selecting rows using Where, Order by, group by & Having clauses. Sub-queries – correlated sub-queries.	3
	3.5 Flow control	
	IF(), IF NULL(), CASE, LOOP, LEAVE, ITERATE, REPEAT, WHILE	3
IV	MYSQL PERFORMANCE TUNING	14
	4.1 Indexes and sequences	
	Index types, Creating of an Index: Simple and Composite Index, Dropping Index. Sequences: creating, altering and dropping sequences.	3
	4.2 Views	
	Introduction – Advantages of views – Creating, Updating and Deleting views.	3
	4.3 Joins & Unions	
	Joins — definition - Types of Joins: natural join, inner join, self join, outer join. Unions: Types: Union, Union All, Union Distinct – order by and Limit handling.	4
	4.4 User and Transaction management	
	Creating, deleting, renaming users grant & revoke commands — Transaction command: commit, rollback and save points.	4

V	**STORED PROGRAM CONCEPTS & DEVELOPMENT** 5.1 MySQL Procedures & Functions Creating – Executing and Deleting stored procedures – Creating – Executing and Deleting stored functions – Advantages. 5.2 MySQL Trigger & Cursor Use of Trigger — Creating Trigger — Types of Triggers — Cursor: Creation and Deletion. 5.3 MySQL and Web Need for own MySQL programs – MySQL Application Programming Interfaces. 5.4 MySQL with PHP Database connections — Managing Database connections— Performing Queries – Closing Connections.	14 3 3 3 5

Reference Books

S.No	Title	Author	Publisher	Year of Publishing/ Edition
1.	Database System Concepts	Abraham Silberschatz, Henry F.Forth, S.Sudarshan	Mc Graw Hill Education	Seventh Edition
2.	Murach's MySQL	Joel Murach	Mike Murach & Associates	Inc. 3rd Edition
3.	The Complete Reference MySQL	Vikram Vaswami		
4.	MySQL Developers library	Paul DuBois	Addison Wesley	4th Edition

4F4210 – WEB DESIGN AND PROGRAMMING PRACTICAL

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F4210

Term : IV

Course Name : Web Design and Programming Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / Term	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Web Design and Programming Practical	4	64	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

The main objective of the of this practical COURSE is to introduce the students to build a complete site, with the writing of a single web page in Web Design & Programming Practical using HTML, CSS, Java Script, PHP and MYSQL. The COURSE will impart knowledge to design web pages, dynamic and interactive web sites with client-side and server-side scripting. After completion the students will be able to independently design and develop web sites and web applications.

OBJECTIVES:

By introducing the Web design and Programming Practical, it is intended to:

- Develop to build a complete website using HTML.
- Create web pages using Advanced HTML and CSS.
- Practice to include JavaScript for form validations.
- Develop and run sample programs using PHP script.
- Develop a simple web application using server side PHP script and MySQL.

DETAILED SYLLABUS

PART – A

Contents: Practical

1. Design a HTML page describing your profile in one paragraph. Design in such a way that it has a heading, a horizontal rule, three links and your photo. Also, write three HTML documents for the links. Include facilities for forward, backward and HOME.
2. Design a HTML page about computer languages. List the language. Each Language's name is a link. Prepare separate HTML documents for each language and call them in the appropriate link.
3. Design a single page website for your polytechnic containing a description of the courses offered. It should also contain some general information about the college such as its history, the campus, and its unique features and so on. The site should be colored and each section should have a different color.
4. Develop a web page using CSS to create a time table for the class using different border style.
5. Write a Java script code that converts the entered text to uppercase.
6. Write a Java script code to validate the username and password. The username and password are stored in variables.
7. Write a Java Script code using frames and Events (When a cursor moves over anobject it should display the specification of the object in another frame).
8. Create a site containing banner advertisement at the top of the page. The ads arechanged every 10 or 15 seconds.
9. Write jQuery Program for Count the number of milliseconds between the two click events on a paragraph.
10. Write jQuery Program for Disable/enable the form submit button & Blink the text.

PART – B

11. Write a PHP program to implement at least 05 string functions with description
12. Create a PHP script which display the capital and country name from the given array.Sort the list by the name of the country.
13. Write a PHP program to implement Date and Time Functions.
14. Write a PHP program to perform Form validation for Train Ticket reservation
15. Write a PHP script to display table with implementing Form Processing Controls of Insert and Delete data from data base.
16. Create a simple shopping - cart script using PHP and MySQL.

DETAILLED ALLOCATION OF MARKS	
Writing answer for any one program from PART – A	20 Marks
Writing answer for any one program from PART – B	25 Marks
Executing program – PART – A	20 Marks
Executing program – PART – B	20 Marks
Result with printout – PART – A	5 Marks
Result with printout – PART – B	5 Marks
VIVA – VOCE	5 Marks
TOTAL	100 Marks

LIST OF EQUIPMENTS

Hardware Requirement

1. Desktop Computers – 30 Nos.
2. Laser Printer – 1 No.

Software Requirement

1. Notepad / Notepad++ / Dreamweaver
2. Apache XAMPP
3. Any Browser

4F4303 – DATA STRUCTURES USING JAVA PRACTICAL

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F4303

Term : IV

Course Name : Data Structures Using Java Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours/ Term	Marks			Duration
			Internal Assessment	Autonomous Examinations	Total	
DATA STRUCTURES USING JAVA PRACTICAL	4	64	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

- To understand various concepts of JAVA and to familiarize Java environment to create, debug and run Java programs.

OBJECTIVES:

- Develop programs using different operators and expressions.
- Develop programs using Iterative statements.
- Develop programs using arrays
- Develop applications using Vectors.
- Create classes and objects with constructors
- Solve problems using inheritance

- Handle exception arising in programs.
- Use multithreading in programs
- Develop programs using File/ Create Applet programs
- Develop programs using Graphics & Color classes
- Use GUI components to develop GUI applications

DETAILED SYLLABUS

Contents: Practical

PART – A

1. Write a java program to implement Stack and Operations unit using vector class. (push, pop, showall)
2. Write a java program to implement classic queue structure using enque(), deque(), showall()
3. Implement singly linked list through a java program with the operations insert, fetch, delete, update, showall
4. Write a program to implement telephone information directory applications.
5. Implement a binary search tree structure with methods insert, fetch, delete, update, find node
6. Write a java program to perform merge sort on two sorted sub lists
7. Write a java program to perform quick sort on a list of 10 numbers.
8. Write a program to create an array of integers and accept a number. Check whether it exist or not and throw your own exception with appropriate error message .

Demo programs :

1. Write a program to get a file name at run time and check for its existence check whether it is a directory or normal file. If it is a normal file display its size attributes of the file.

2. Write a program to list all the files in a directory depending upon given Pattern.

3. Write a program to copy a file to another file using java.io package Classes

4. . Write a program to get a file at runtime and display the number of lines, Words and characters in that file.

5. Write a program for single and multi threading.

PART – B

9. Create a Frame with two labels. At runtime display x and y co-ordinates of mouse pointer in the Labels.
10. Create a Frame and Checkbox group with five Checkboxes with labels as Red, Green, Blue, Yellow and White. At run time change the background color of Frame with appropriate selection of Checkbox.
11. Create a Frame with a Choice and label. Add 5 items in the Choice. Display the selected item of Choice in the Label
12. Create a Frame with 3 Scrollbars. Change the background color of the Frame using RGB function with values of scrolls
13. Create a Notepad Application using AWT controls
14. Create a java application for simple calculator to perform Addition, subtraction, Multiplication and Division using Button, label and Text field
15. Create a java application to Draw a bar chart for the following details
    - i) Student name
    - ii) Course
    - iii) Mark in COURSE1
    - iv) Mark in COURSE2
    - v) Mark in COURSE3
    - vi) Mark in COURSE4
    - vii) Mark in COURSE5

Autonomous Examination-Question Paper Pattern

DETAILED ALLOCATION OF MARKS	
Writing any one program from PART – A	25 Marks
Writing any one program from PART – B	20Marks
Executing program (PART – A)	20Marks
Executing program (PART – B)	20 Marks
Result with printout (PART – A)	05 Marks
Result with printout (PART – B)	05 Marks
VIVA – VOCE	05 Marks
Total	100 Marks

LIST OF EQUIPMENTS

HARDWARE

1. DESKTOP COPMUTERS – 30 NOs

2. Printer – 1 No

SOFTWARE

1. Any Text Editor

2. JDK 1.7 or above

4F4211 – RDBMS PRACTICAL

Programme Name	:	DIPLOMA IN COMPUTER ENGINEERING
Course Code	:	4F4211
Term	:	IV
Course Name	:	RDBMS Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / term	Marks			Duration
			Internal Assessment	Autonomous Examinations	Total	
RDBMS Practical	4	64	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

The main objective of this practical COURSE is to provide basic and advanced concepts of MySQL. MySQL is a relational database management system based on the Structured Query Language, which is the popular language for accessing and managing records in the database. MySQL is open-source and free software under the GNU license. This practical includes all topics of MySQL database that provide for how to manage database and manipulate data with the help of various SQL queries.

OBJECTIVES:

On Completion of the following exercise, the students must be able to

- How to install, configure and connect to MySQL server and MySQL

workbench inWindows.

- Understand basic concepts of how a database stores information via tables.
- Understand SQL syntax used with MySQL.
- Learn how to retrieve and manipulate data from on or more tables.
- Learn how to filter data based upon multiple conditions.
- Understand the advantages of stored functions and procedures.
- Learn way of connecting to MySQL through PHP, and how to create tables, enter data, select data, change data, and delete data. Connect to SQL server and other data sources.

DETAILED SYLLABUS

Contents: Practical

PART – A

1. Install, configure and connect to MySQL server and MySQL workbench in windows.Create a database, backup and restore the database.

2. To study Basic MySQL commands (create database, create table, use, drop, insert)and execute the following queries using these commands:

- Create a database named ‘employee’.
- Use the database ‘employee’ and create a table ‘emp’ with attributes ‘ename’, ‘ecity’, ‘salary’, ‘enumber’, ‘eaddress’, ‘deptname’.
- Create another table ‘Company’ with attributes ‘cname’, ‘ccity’, ‘empnumber’ in the database ‘employee’.

3. To study the viewing commands (select, update) and execute the following queries using these commands:

- Find the names of all employees who live in Chennai.
- Increase the salary of all employees by Rs.5,000.
- Change the company city to Chennai where the company name is ‘TCS’.

4. To study the commands that involve compound conditions (and, or, in, not in, between, not between, like, not like) and execute the following queries using these commands:

- Find the names of all employees who live in ‘Chennai’ and whose salary is between Rs.20,000 to Rs.30,000.
- Find the names of all employees whose names begin with either letter ‘A’ or‘B’.

- Find the company names where the company city is ‘Chennai’ and the number of employees is not between 5000 and 10,000.
- Find the names of all companies that do not end with letter ‘A’

5. a) Create a database ‘polytechnic_collee’. Create 2 users namely ‘staff’ and ‘student’.

- Grant all privileges to the user ‘staff’ and grant only ‘create’ privilege to ‘student’ user and verify the same.
- Revoke all privileges to the 2 users and verify the same.

b) Implement the following transactions control statements.

i) Commit ii) Rollback iii) Save point

6. Create table ‘author’ with the following structure

Author _id

i) Insert 4 books published by 3 authors each. (12 records)

ii) Fetch all the rows and observe how the data duplicated.

iii) Apply 1st and 2nd normal forms to fix it.

7. To study the commands for views and execute the following queries using these commands:

- Create a view having ename and ecity
- In the above view change the ecity to ‘Chennai’ where ename is ‘John’.
- Create a view having attributes from both the tables.
- Update the above view and increase the salary of all employees of IT department by Rs.1000.

8. Create a library table with proper fields. Create another table called library1 and insert rows from library table.

Hint:

CREATE TABLE new_table LIKE original_table;

INSERT INTO new_table SELECT * FROM original_table;

PART – B

9. Create a table to store the details of a customer in a Bank. Do some transactions like withdrawal, deposit. Find the Balance amount(Credit Limit). Based on customer’s

credit limit, write a program using IF or CASE flow control statements to find thecustomer levels namely SILVER, GOLD or PLATINUM.

If the Credit limit is

- greater than 50K, then the customer level is PLATINUM
- less than 50K and greater than 10K, then the customer level is GOLD
- less than 10K, then the customer level is SILVER

10. Create two tables with the following structure.

a) users - table name

user_id - UNSIGNED, INT, AUTO INCREMENT, PRIMARY KEY

username - VARCHAR (60) password - VARCHAR (128)

email - VARCHAR (255)

b) users_profiles

user_id - FOREIGN KEY refers to user_id field of user tablefirst_name - VARCHAR(60)

last_name - VARCHAR(60)

mobile - VARCHAR(15)

i) SELECT all the users along with their profile details. (Hint: Use INNER JOIN)

ii) SELECT the users who do not have profiles (Hint: USE LEFT JOIN and exclude the rows generated with NULL values from joining table)

11. Create an employee database and create a stored procedure that accepts employee_Id as input and returns complete details of employee as output.

12. Create two tables with the following structure

Authors

author_id - INT

name VARCHAR (60)

titles_count INT -- holds the total number numbers of titles authored.

Titles

author_id - INT

name VARCHAR (512) -- name of the title

a. Create a trigger to update the titles count field of respective row in authors table each time a title gets inserted into titles table.

b. Create log table with the following structureauthor_id — INT

name VARCHAR (512) -- name of the title

status VARCHAR(25) --- ADDITION,DELETION,UPDATION

and insert an entry in that table each time the tile is added, deleted or updated. Use a trigger to accomplish this.

13. Create a table containing phone number, user name, address of the phone user. Write a function to search the address using phone number.

14. Create a table to store the salary details of the employees in a company. Declare the cursor id to contain employee number, employee name and net salary. Use cursor to update the employee.

15. Write a program to connect PHP with MySQL and create a database using PHP MySQL.

DETAILLED ALLOCATION OF MARKS	
Writing answer for any one program from PART – A	20 Marks
Writing answer for any one program from PART – B	25 Marks
Executing program (PART – A)	20 Marks
Executing program (PART – B)	20 Marks
Result with printout (PART – A)	5 Marks
Result with printout (PART – B)	5 Marks
VIVA – VOCE	05 Marks
TOTAL	100 Marks

LIST OF EQUIPMENTS

HARDWARE

1. Desktop Computers – 30 Nos
2. Printer – 1 Nos

SOFTWARE

1. mysql 5.5.20
2. XAMPP (OR) Any Web Server with PHP support

4F5007- CONCURRENT CAREER DEVELOPMENT

Programme Name : COMPUTER ENGINEERING

Course Code : 4F0007

Term : IV

Course Name : CONCURRENT CAREER DEVELOPMENT

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

Course Code	Instruction periods per week		Credit	Total Periods per term	Scheme Of Examinations			
	Theory	Practical			Duration (Hrs)	Internal Assessment Marks	End Exam Marks	Total Marks
2F0007	5	--	5	75	3	25	100*	100

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

TOPICS AND ALLOCATION OF HOURS

Unit No	Topic	Hours
I	**National Integration and Awareness**	**15**
II	**Social Awareness and Community Development**	**15**
III	**Health and Hygiene**	**15**
IV	**Environmental awareness and Conservation**	**15**
V	**Traffic Control Organization**	**15**
	Total	**75**

RATIONALE

Career Development or Career Development Planning refers to the process an individual may undergo to evolve their occupational status. It is the process of making decisions for long term learning, to align personal needs of physical or psychological fulfillment with career advancement opportunities. Career Development can also refer to the total encompassment of an individual's work-related experiences, leading up to the occupational role they may hold within an organization. Career Development can occur on an individual basis or a corporate and organizational level.

OBJECTIVES

1. To promote harmony and the spirit of common brotherhood amongst all the

people of the country. To safe guard public property and abjure violence.

2. To develop the idea of ability and better thinking to work for the betterment of community.
3. To prevent illness and have positive health attitude, correct and complete knowledge of health is necessary.
4. To develop a world population that is aware of, and concerned about the environmental and its associated problems
5. To provide for the safe, rapid, comfortable efficient, convenient, and environmentally compatible movement of people, goods, and services.

DETAILED SYLLABUS

Contents: Theory

Unit	Name Of The Topic	Hours
I	National Integration and Awareness Introduction – Importance of National Integration – Essence of national integration : Cultural Integration, Economic Integration, Political Integration, Religious Integration, Social Integration- Necessity of National Integration :Maintenance of peace and harmony, Growth and development of the nation, Law and Order, Culture and religious development, dignity and self respect, welfare and wellbeing of thepeople- Roleof NCC in nation Building	15
II	Social Awareness and Community Development Need of social awareness – Types of Social Awareness : Empathy, Organizational awareness- Service – How to build Social Awareness – Aims of Social Awareness – Different Social Awareness Programmes–Aims of Community development–Different community awareness programmes	15
III	Health and Hygiene Introduction to the structure of the body – Personal hygiene - Food hygiene –water supply and its purification – Sanitisation – Waste Product/Refuse – Types of waste product – Sources of refuse – Collection and removal of refuse – Preventable diseases – Classification of disease – Preventive measures Yoga –Definition and meaning of Yoga-Principles of Yoga- Asana – Definition, Types, Benefits - Effect of various yogic practices on Respiratory and Circulatory system-Method of performing various asanas –	15

	Padmasana, Siddhasana, Gyan Muthra, Suryanamaskar. Physical and Mental heath – Elements of good health – Objectives and scopes of health education – Characteristics of healthy mind, Measures to secure mental health	
IV	Environmental awareness and Conservation Introduction-Human activities and the environment – Depletion and deterioration – Deforestation – Forest and wild life – Water Resources – Global Warming – Depletion of Ozone layer – Role of the NCC cadets towards the environment – Ecology – Definition and components Conservation of environment and ecology – Resource depletion – Resource pollution – Environmental damage – Environment, life and ecology –Conservation measures – Methods of managements and conservation of natural resources.	15
V	Traffic Control Organization Understanding Road Safety – Importance or road safety: Major causes of road accident – Role of Education sector in road safety – Role of general Community in road safety – Road Safety tips – Safety Devices – Safe and Responsible driving : Getting ready to drive before driving, Physical and mental alertness, Know your vehicle, Know your blind spots, Fasten Your seat belt, Turn on head lights at night and in poor light conditions– Driving License.	15

ASSESSMENT:

This is a compulsory credit course. The assessment is to provide a fair state of development of the student, so participation in classroom discussions, etc.will be used in evaluation.

- Final marks = 25% of Assignment mark + 50% of Online exam mark
- (proctored)+ 25 % of External exam (unproctored).
- Un proctored means candidate will be taking the exam from college.
- The overall pass percentage is 40%.

REFERENCE :

1. Cadet's Hand Book.
2. Public Health And Hygiene, Dr.Sudhar R.Wagh.
3. Question Answers Of Environment And Road Safety Awareness Kindle Edition By Brijesh Pathak (Author) .

4. Environment And Road By Naresh Kumar (Author).
5. Traffic Safety And Environment: Conflict Or Integration Author Links Open Overlay Panel burkhard E.Horn(Professor)A.Hh.Jansson.

COURSE OUTCOME

CO1	Ability to know the responsibility to see that injustice, inequality, oppression; exploitation, corruption, misuse of public money etc. are done away with. Students play a vital role in the society. They are the guardians of freedom, Justice, equality, ethics and social equilibrium.
CO2	Ability to understand social and ethical norms for behavior, and to recognize family, school, and community resources and supports
CO3	Ability to develop good personal hygiene habits on their own.
CO4	Ability to understand the fragility of our environment and the importance of its protection.
CO5	Ability to understand various traffic enforcements rules and regulations.

V - TERM

4F5212– PYTHON PROGRAMMING

Programme Name : DIPLOMA IN COMPUTER ENGINEERING
Course Code : 4F5212
Term : V
Course Name : PYTHON PROGRAMMING

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / Term	Marks			Duration
			Internal Assessme	Autonomous Examination	Total	
Python Programming	6	96	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

UNIT	Topic	Hrs.
I	INTRODUCTION TO PYTHON PROGRAMMING	17
II	DECISION MAKING CONTROL STRUCTURE AND FUNCTIONS	18
III	STRINGS AND LISTS, TUPLES AND ,DICTONARIES	18
IV	FILES AND EXCEPTION HANDLING	18
V	DATABASE AND GUI PROGRAMMING	18
Test & Model Exam		7
Total		96

RATIONALE:

To introduce the student to the basic features of industry standard programming language and impart skills to develop industry standard solutions to the problems. The python language is one of the most accessible programming languages available because it has simplified syntax and not complicated, which gives more emphasis on natural language. Due to its ease of learning and usage, python codes can be easily written and executed much faster than other programming languages. Python has several modules to write programs to solve Artificial Intelligence, Machine Learning, Data Analysis problems. Python is a cross-platform language used by many leading organizations such as Google and NASA.

OBJECTIVES:

. On completion of the following units of syllabus contents, the students must be able to

- To read and write simple Python programs.
- To develop Python programs with conditionals and loops
- To define Strings in Python and operations on String.
- To define Python functions and call them.
- Decompose a Python program into functions.
- Represent compound data using Python lists, tuples, dictionaries.
- To use Python data structures –- lists, tuples, dictionaries.
- To do input/output with files in Python.
- To do exception handling in Python

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topics	Hours
I	**Introduction to Python** **1.1** Features of Python - Installing and running Python – interpreter and Interactive mode - Identifiers - Reserved Keywords - Variables - Comments in Python **1.2** Data Types – Numeric, String, List, Sets, Tuple, Dictionary, Boolean; Operators – Arithmetic, Relational, Assignment, Logical, Bitwise, Membership operator, identity operator. **1.3** Statements and Expressions, String Operations; Boolean Expressions, Data Type Conversion, Type coercion; Input from Keyboard - input function, raw input function, Mutable and immutable Objects; Illustrative programs.	17 5 5 7
II	**Decision Making, Control structure and Functions** 2.1 Decision Making – Simple if, if…else and if … elif statement; Control Statement - for loop, range(), while, break , continue, pass 2.2 Functions: Built in functions-Mathematical functions , Date and Time, dir(), help() Functions; User defined functions-Return values, parameters and arguments, function calls, local and global scope, function composition, recursion, anonymous functions. 2.3 Writing Scripts in Python; Illustrative programs.	18 6 6 6
III	**STRINGS AND LISTS** 3.1 Strings :Strings in python, String functions and methods, string slicing, immutable property, string Traversal, Escape Characters, string formatting operators and functions. 3.2 Lists – Creation of List, values and accessing elements, mutable property, Traversing a List, copying the list, altering values, deleting elements from list.- Built-in List operators and built-in methods. Illustrative Programs	18 5 5

	3.3 Tuples and Dictionaries:: Tuples-creating, accessing values, immutable property, assignment of tuples, returning tuples, tuples as arguments - variable length arguments - basic tuple operations, Built-in tuple functions. 3.4 Dictionaries: Creating a Dictionary , accessing values, updating dictionary, deleting elements from dictionary; dictionary keys-Properties, operations in Dictionary, Built-in dictionary methods, Illustrative Programs.	4 4
IV	**Files and Exception Handling** 4.1 Files: Text files, opening a file, closing a file, reading from a file and writing into a file, file opening modes, closing a file, File Object Attributes, File positions, renaming, deleting a file and files related methods. 4.2 Directory :Directory methods – mkdir(), chdir(), getcwd(), rmdir(). 4.3 Exceptions in Python: Definition - Built-in exceptions, Handling Exceptions-try…except, except with No Exception, except with Multiple Exceptions, try…finally; User defined exceptions. Illustrative programs	18 7 5 6
V	**Data base & GUI programming** 5.1 Databse : Introduction , Connection, Executing queries, trasactions, Error handling. 5.2 GUI Programming : Introduction- Tkinter Programming – Tkinter widgets	18 9 9

Reference Books :

Sl.No	Title	Author	Publisher
1.	Introduction to Computing and Problem Solving using Python	E.Balagurusamy	McGraw Hill Education(India) Pvt. Ltd.

2.	Learning Python Programming	Jeffrey Elkner, Allan B. Downey, Chris Meyers	Samurai Media Limited.
3.	Taming Python By Programming	Jeeva Jose	Khanna Book Publishing Co(P) Ltd
4.	Python Programming	Ashok Namdev Kamthane and Amit Ashok Kamthane	McGraw HillEducation(India) Pvt. Ltd
5.	Learn and Practice Python programming	Swapnil Saurav	Eka Publishers
6.	Programming in Python	Dr.Pooja Sharma	BPB Publications

4F5304 – CLOUD COMPUTING AND INTERNET OF THINGS

Programme Name : DIPLOMA IN COMPUTER ENGINEERING
Course Code : 4F5304
Term : V
Course Name : CLOUD COMPUTING AND INTERNET OF THINGS

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / Term	Marks			Duration
			Internal Assessment	Autonomous Examinations	Total	
CLOUD COMPUTING AND INTERNET OF THINGS	5	80	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

UNIT	Topic	Hrs.
I	INTRODUCTION TO CLOUD COMPUTING	12
II	CLOUD COMPUTING ARCHITECTURE AND SERVICES	16
III	SECURITY IN THE CLOUD	12
IV	INTRODUCTION TO IOT	17
V	IOT PLATFORMS: DESIGN AND DEVELOPMENT	16
Test & Model Exam		7
Total		80

RATIONALE:

The course aims to groom the students to enable them to work on current technologyscenarios: in specific about the Cloud Computing as well as Internet of Things and prepare the students to keep pace with the changing face of technology and the requirements of the growing IT industry. The course curriculum has been designed keeping in view the emerging trends in advanced Cloud Computing as well as IoT and futuristic human resource requirements of the IT industry.

OBJECTIVES:

- To understand the overview of the basic concepts of cloud Computing;
- To understand the advantages of deploying cloud Computing;
- To know the practical adoption of a cloud deployment through real life Case studies.
- To Know the Advantages and limitations of cloud Computing and List the benefits of cloud computing
- To understand Cloud architecture
- To Know the Cloud services and benefits
- To address the security issues in cloud
- To assess the vision of IoT
- To understand the dynamic, self-configuring and inter-operable network of things
- To understand the design and development methodology for IoT domains.
- To build simple IoT systems using Raspberry Pi.

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**INTRODUCTION TO CLOUD COMPUTING**	12
	1.1 Cloud computing overview – Origins of Cloud computing – Cloud components -Essential characteristics – on-demand self-service, Broad network access, Location independent resource pooling, Rapid elasticity, measured service	4
	1.2 Architectural influences – High-performance computing, utility and enterprise grid computing, Autonomic computing, Service consolidation, Horizontal scaling, Web services, High scalability architecture	4
	1.3 Cloud scenarios– Benefits - scalability, simplicity, vendors, security. Limitations – Sensitive information, Application development – Security concerns -privacy concern with a third party, security level of third party, security benefits. Regularity issues – Government policies	4
II	**CLOUD COMPUTING ARCHITECTURE & SERVICES**	16
	2.1 Cloud architecture: Cloud delivery model – SPI framework, SPI evolution, SPI vs. traditional IT Model.	3
	2.2 Software as a Service (SaaS): SaaS service providers – Web Services – Web 2.0 – Web Operating system -Google App Engine, Salesforce.com and google platform – benefits – Operational benefits, Economic benefits – Evaluating SaaS	3
	2.3 Platform as a Service (PaaS): Cloud Plat form & Management – Computation& Storage - PaaS service providers – Right Scale – Salesforce.com – Rackspace - Force.com – services and benefits.	3
	2.4 Infrastructure as a Service (IaaS): IaaS service providers –Amazon EC2, GoGrid – Microsoft implementation and support – Amazon EC service level agreement – recent developments – benefits.	4
	2.5 Cloud deployment model: Public clouds – private clouds – community clouds – hybrid clouds - Advantages of Cloud computing.	3

III	**SECURITY IN THE CLOUD** 3.1 Understanding Cloud Security - Securing the Cloud - Security service boundary: CSA Cloud Reference Model - Securing Data – Brokered cloud storage access - Storage location and tenancy – Encryption 3.2 Cloud Computing Security Challenges - Security Policy Implementation - Policy Types - Virtualization Security Management - Virtual Threat	12 6 6
IV	**INTRODUCTION TO INTERNET OF THINGS** 4.1 Definition and characteristics of IOT - Physical design of IOT - Things in IOT- IOT Protocols- Logical Design of IOT - IOT functional blocks- IOT communication Models - IoT communication API's 4.2 IOT enabling Technologies: Wireless sensor networks – Cloud Computing- Big Data Analytics- Communication protocols- embedded systems. 4.3 IOT Levels and Deployment templates: IOT Level-1- IOT Level-2- IOT Level-3-IoT Level-4 - IOT Level-5- IOT Level-6	17 6 6 5
V	**IOT PLATFORMS : DESIGN AND DEVELOPMENT** **5.1** Introduction- IOT Design and Methodology- Purpose and requirements specification- Process specification- Domain model specification- Information model specification- service Specification - IoT level specification- functional view specification -Operational view specification - Device and component integration- application development. **5.2** What is an IOT device? - Basic Building blocks of an IoT Device - Exemplary Device: Raspberry Pi - About the Autonomous - Linux on Raspberry Pi- Raspberry Pi Interfaces- Other IOT devices.	16 8 8

Reference Books

S.No	Title	Author	Publisher	Year of Publishing/ Edition
1.	CLOUD SECURITY A Comprehensive Guide to Secure Cloud Computing	Ronald L. Krutz , Russell Dean Vines	Wiley Publishing	Inc
2.	Cloud Computing A practical Approach		Tata McGrawHill	2008 Edition
3.	Cloud Computing Bible	Barrie Sosinsky	Wiley Publishing	Inc
4.	Internet of Things – A Hands on Approach	Arshdeep Bahga and Vijay Madisetti	Universities Press	ISBN
5.	Designing the Internet of Things	Adrian McEwen & Hakim Cassimality	Wiley India	ISBN: 9788126556861

4F5305.1 –SOFTWARE ENGINEERING

Programme Name : DIPLOMA IN COMPUTER ENGINEERING
Course Code : 4F5305.1
Term : V
Course Name : Software Engineering

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / Term	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
SOFTWARE ENGINEERING	5	80	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

Unit No	Topic	No of Hours
I	INTRODUCTION TO SOFTWARE ENGINEERING	15
II	SOFTWARE DESIGN AND PLANNING	15
III	SOFTWARE MAINTENANCE AND RISK MANAGEMENT	15
IV	SOFTWARE TESTING	15
V	SOFTWARE RELIABILTY AND QUALITY ASSURANCE	13
	TEST AND REVISION	07
TOTAL		80

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 understand the importance of good software, design and develop test plans from design specifications. The course also covers other important aspects of software Engineering such as software lifecycle, requirement analysis and documentation, characteristics of good design, design techniques, testing, software implementation and maintenance etc.

OBJECTIVES:

- . On completion COURSE, the students must be able to Define Software Engineering.
- Understand the characteristics of Software Engineering.
- Explain different software development models.
- Learn about the phases of software development cycle.
- Understand the significance of requirement analysis.
- Know various tools and techniques used for requirement analysis.
- Understand architectural and modular design.
- Understand the different types of project metrics.
- Understand different software estimation techniques. Describe CASE.
- Explain about software maintenance. Need for software maintenance.
- Identify and mange risks.
- Know the different scheduling methods.
- Define the basic terms used in testing terminology.
- Describe black box and white box testing.
- Describe testing tools.
- Understand the concepts of Software quality and quality assurance.
- Know the concepts of software reliability and software quality standards.
- Define software re-engineering.
- Differentiate forward engineering from re-engineering

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DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**INTRODUCTION TO SOFTWARE ENGINEERING** 1.1:Basics of Software Engineering : Need for Software Engineering – Definition – Software Characteristics – Software Myths – Program versusSoftware Products 1.2:Software Development Life Cycle Models: Introduction –Waterfall Model – Prototyping model – Spiral Model – Iterative Enhancement model – Agile model – Object Oriented Model -Advantages and Disadvantages of above models – Comparison of various models. 1.3:Software Requirement Analysis (SRS): Value of good SRS-developing SRS from Business Requirements- Requirement Process-Requirement Specification — Desirable Characteristics of an SRS-Components of an SRS- Structures of a requirements documents-Requirements gathering- Creating a backlog in Agile model.	15 3 6 6
II	**SOFTWARE DESIGN AND PLANNING** 2.1:Software Design : Definition of software design – Objectives of software design – Process of software design – Architectural design – Modular design – Structure chart – Coupling and Cohesion – Different types – Interface design – Design of Human Computer Interface 2.2:CODING: Information Hiding–Programming style— Internal documentation —Monitoring and Control for coding — Structured programming- Error / Exception handling-Executing sprints for agile model. Scrum meetings in agile - importance of code reviews and unit testing 2.3:Software Planning: Software metrics - Definition – Types of metrics – Product and product metrics-relevant metrics in agile-Function point and feature point metrics - Software project	15 4 4

	estimation – Steps for estimation –Reason for poor and inaccurate estimation – Project estimation guidelines – Models for estimation – COCOMO Model – Automated tools for estimation – Sprint planning in agile. 2.4:Case: CASE and its scope- Architecture of CASE environment – Building blocksfor CASE – CASE support in software Life cycle – Objectives of CASE – Characteristics of CASE tools – List of CASE tools – Categories, advantages and advantages of CASE tools.	4 3
III	SOFTWARE MAINTENANCE AND RISK MANAGEMENT 3.1:Software Maintenance: Software as an evolution entity – Software configuration management activities – Change control process – Software version control – Software configuration management – Need for maintenance – Categories of maintenance – Maintenance cost – Factors affecting the effort 3.2:Risk management : Definition of risk – Basics for different types of software risks – Monitoring of risks – Risk management – Risk avoidance – Risk detection – Risk control – Risk recovery – Sources of risks –Types of risks 3.3:Project scheduling : Introduction – Factors affecting the task set for the project – scheduling methods – Work breakdown structure – Flow graph –Gant chart - PERT - Setting up Sprint burn down charts for Agilemodel	15 5 5 5
IV	SOFTWARE TESTING 4.1:Software Testing : Introduction to testing – Testing principles – Testing objectives – Basic terms used in testing – Fault – Error – Failure - Test cases – Black box and white box testing – Advantages and disadvantagesof above testing Methods for Block box testing strategies – Methods for white box testing strategies – Testing activities – Test plan – Tracking defects. 4.2:Levels of testing: Integration tests – System testing – Types. 4.3:Software Testing strategies: Static testing strategies – Formal	15 3 3 3

	technical reviews – Code walkthrough – Code inspection - Debugging – Definition– Characteristics of bugs – Life cycle of a Debugging task – Debuggingapproaches. 4.4:Software Testing Tools: Need for tools – Classification of tools – Functional/Regression Testing tools – Performance/Load Testing Tools –Testing process management Tools – Benefits of tools – Risk Associated with tools – Selecting tools – Introducing the tool in the testing process - Different categories of tools – Examples for commercial software testing tool. 4.5:Code of Ethics for Software Professionals: Human Ethics – Professional Ethics – Ethical issues in Software Engineering – Code of Ethics and professional Practice: Software Engineering code of ethics and professional Practice – Ethical issues: Right versus Wrong	3 3
V	SOFTWARE RELIABILITY AND QUALITY ASSURANC 5.1:Software Quality Assurance : Verification and validation – SQA – Objectives and Goals – SQA plan - Definition of software quality – Classification of software qualities - Software quality attributes – Important qualities of software products - Importance of software quality –SEI – CMM - Five levels - ISO 9000 – Need for ISO Certification – Benefits of ISO 9000 certification – Limitation of ISO 9000 certification– Uses of ISO - Salient features of ISO 9000 Requirements –Introduction to ISO 9126 5.2:Software Reliability : Definition – Reliability terminologies – Classification of failures – Reliability metrics – Reliability growth modeling - Reliability measurement process 5.3:Reverse Software Engineering: Definition – Purpose - Reverse engineering Process – Reverse engineering tasks – Characteristics and application areas of reverse engineering – Software re-engineering – Principle – Re-engineering process – Difference between forward engineering and re-engineering.	13 5 3 5

References:

Sl.No	Title	Author	Publisher	Year of Publishing/ Edition
1.	Software Engineering	Ian Sommerville	Pearson Education	Sixth Edition
2.	Fundamentals of Software Engineering	Rajib Mall	PHI Learning Pvt Limited, New Delhi	28th Printing – August 2011
3.	Software Engineering	Bharat Bhusan Agarwal Sumit Prakash Tayal	Firewall Media, New Delhi	Second Edition 2008
4.	Software Testing	K.Mustafa and R.A.Khan, Narosa	Publishing House, New Delhi	Reprint 2009
5.	Software Quality	R.A. Khan, K.Mustafa and SI	Narosa Publishing House, New Delhi	Reprint 2008
6.	Software Engineering	Stephen Schach	TMGH Education Pvt Ltd, New Delhi	Eight Reprint 2011
7.	Suftware Testing Concepts and Tools	Nageshwara Rao Pusulri	DreamTeach	First Edition
8.	Software Engineering Concepts and application	Subhasjit Dattun	OXFORD University Press	2010
9.	Software Engineering	Rohit Khurana	Vikas Publishing	Second Edition

4F5305.2 – ARTIFICIAL INTELLIGENCE AND DATA ANALYTICS

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F5305.2

Term : V

Corse Name : Artificial Intelligence and Data Analytics

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per term 16 Weeks

Course	**Instructions**		**Examination**			
Artificial Intelligence and Data Analytics	**Hours/ Week**	**Hours/ Term**	**Marks**			**Duration**
	5	80	**Internal Assessment**	**Autonomous Examination**	**Total**	
			25	100 *	100	3 Hrs

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

Unit No.	**Topic**	**No. of Hours**
I	Artificial Intelligence	15
II	Introduction to Machine Learning	14
III	Data Analytics and NumPy Library	15
IV	Data Analysis with Pandas	15
V	Visualization with Matplotlib	14
Test and Revision		7
Total		80

RATIONALE:

This course provides the foundations for AI problem solving techniques and data analytics and articulates the different dimensions of these areas. The syllabus is designed to provide exposure to the theory as well as practical systems and software used in data analysis. This course explains fundamental data science techniques and the various Python programming packages required for data science.

OBJECTIVES:

After studying this COURSE students will be able

- To understand the fundamentals of Artificial Intelligence and its importance.
- To understand the techniques used in AI.
- To understand how the knowledge is represented, and the characteristics of intelligent agents.
- To Identify and formulate appropriate AI methods for solving a problem.
- To understand some of the search strategies and the constraint satisfaction problems.
- To understand the principles of Machine Learning.
- To explore some of the real-world applications of Machine learning techniques.
- To understand a range of topics and concepts related to data analytics.
- To familiarize with the Python NumPy library for array processing.
- To utilize the Pandas packages in Python for exploratory data analytics.
- To create informative visualizations with matplotlib to identify patterns.

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**Artificial Intelligence**	15
	1.1 Artificial Intelligence: What is AI?-Types of AI-History of AI-Turing Test- Structure of AI-Goals of AI-Importance of AI-Techniques used in AI-Perception, Understanding and Action-Technological drivers of modern AI.	4
	1.2 Knowledge: Definition-Knowledge Representation-objectives and requirements-practical aspects of representation-Components Intelligent Agents: Agents and Environments-Properties of environments-characteristics of agents- classification of agents -	4
	1.3 Problem Solving: Problem Formulation-Goal Formulation-State Space Search-Search Problem-Basic search algorithm-Search Tree-Search strategies –Uninformed and informed search-Breadth First Search, Depth First Search, Best First Search- Constraint Satisfaction Problem (CSP)-Backtracking Search. Problem Definitions: N Queen Problem, 8 Puzzle Problem, Tic-Tac-Toe.	7
II	**Introduction to Machine Learning**	14
	2.1 Learning: Strategies of Learning- Learning Model- Classes of Learning (Supervised, Unsupervised, Reinforcement)- Process of ML- Common types of ML algorithms.	5
	2.2 Neural Network: Biological and Artificial, Mathematical model of a neuron	3
	2.3 Machine Learning Applications: Learning Associations, Regression, Classification, Prediction-Natural Language Processing (NLP)- Automatic Speech Recognition (ASR)- Machine	6

	Vision-Robotics.	
III	**Data Analytics and Computing with NumPy** 3.1 Data Analytics: Data-Types of Data- Importance of Data- Data Analysis Vs Data Analytics-Types of Data Analytics- Elements of Analytics- Data Analysis Process- Qualitative and Quantitative analyses- Open-Source Data. 3.2 Introduction to Python: Features of Python-Installing Python- Python IDEs- PyPI Python Package Index- Pip Python package manager- Importing Libraries and Functions- Python data structures (list, set, tuple, dict)- Functional programming (map, filter, reduce, lamda, list comprehension). 3.3 NumPy Library: Introduction- Installation- Ndarray: creating an array, intrinsic creation of an array, Data types- basic operations- aggregate functions- Indexing, slicing, Iterating- Conditions and Boolean arrays- Array manipulation: Joining, splitting, shape changing, sorting- Structured arrays- Reading and Writing array data on a File.	15 4 5 6
IV	**Data Analysis with Pandas** 4.1 Introduction: Pandas data structures: Series - Declaration, selecting elements, assigning values, Filtering values, operations, mathematical functions, evaluating values, Handling missing data, creating series from dictionaries, adding two series. 4.2 Data Frame: Defining, Selecting elements, assigning values, membership, deleting a column, filtering. Index Objects: Indexing, Reindexing, Dropping- sorting and ranking- Descriptive Statistics 4.3 Data Loading: Reading and Writing csv, xls, text data files- 4.4 Data Cleaning and Preparation: Handling missing data, Removing duplicates, replacing values- Vectorized String Methods- Hierarchical Indexing- Merging and Combining- Data	15 5 4 3

	aggregation and Grouping.	3
V	**Visualization with Matplotlib** 5.1 Data Visualization: Introduction to Matplotlib -PyPlot package-Figures and Subplots-showing plots and images 5.2 Customizing Plots: Colors, Markers, Line Styles, Limits, Tics, Labels, Legends, Grids - Annotating with text-Matplotlib configuration 5.3 Chart types: Line, Bar, stacked bar, Box plots, pie chart - Histogram and Density plots- Scatter plot- Saving Plots to a file- Close and clear plots.	14 4 4 6

Reference books

Sl.No	Title	Author	Publisher	Year of Publishing/ Edition
1.	Artificial Intelligence Basics	Tom Taulli	A Non-Technical Introduction-A press	2019
2.	Fundamentals of artificial intelligence	Chowdhary K.R	Springer	2020
3.	Artificial Intelligence A Modern Approach	Stuart J.Russell,Peter Norvig	Prentice Hall- 2010	Edition 3
4.	NPTEL Web Content-Artificial Intelligence	Prof.P.Mitra, Prof.S.Sarkar	IIT Kharagpur	(Link: https://nptel.ac.in/courses/106/105/106105078/
5.	Python Data Analytics	Fabio Nelli	APRESS	2015
6.	Python for Data Analysis	Wes McKinney Data Wrangling with Pandas	NumPy,and IPython	O'REILLY 2018, Second Edition

4F5305.3 –MOBILE COMPUTING

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4E5305.3

Term : V

Course name : Mobile Computing

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per term 16 Weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / Term	Marks			Duration
			Internal Assessme	Autonomous Examination	Total	
Mobile Computing	5	80	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

Unit No.	Topic	No. of Hours
I	Introduction to Mobile Computing	14
II	Mobile and Smart TV OS	14
III	Android Development Environment	15
IV	Basic and Advanced Views	15
V	Location Based Services and SQLite	15
Test and Revision		07
Total		80

RATIONALE:

Mobile Application development is the very hot business domain. Majority of the corporate have a separate division for the development of mobile applications. It is imperative that students must know the way to apply advanced data communicating methods and networking protocols for wireless and mobile devices. Students must utilize and employ application frameworks for developing mobile applications including under disconnected and weakly connected environment. They should be in a position to select components and networks for particular application, creatively analyze mobile and wireless networks and critically analyze security issues of mobile and wireless computing systems

OBJECTIVES:

Students will be able

- To introduce the characteristics, basic concepts and systems issues in mobile Computing
- To illustrate architecture and protocols in Mobile computing and to identify the trends and latest development of the technologies in the area
- To understand the network protocols governing the mobile communication
- To know the different kinds of mobile OS prevailing in the market
- To know Android OS in detail
- To know Apple iOS and Smart TV OS
- To understand the components of a Mobile App.
- To give practical experience in the area through the development of Mobile apps
- To design successful mobile computing applications and services
- To evaluate critical design tradeoffs associated with different mobile technologies, architectures, interfaces and business models and how they impact the usability, security, privacy and commercial viability of mobile and pervasive computing services and applications
- To know the development of Mobile apps using SQLite database
- To know the cross platform application development tools

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	Introduction to Mobile Computing	14
	1.1 Introduction to Mobile Computing	
	Evolution of Mobile Computing - Important terminologies	4
	1.2 Wireless LAN and Protocols	
	WI-FI and WI-MAX , Bluetooth ,RFID, Wi-Fi-Direct, Li-Fi, LTE, and 6LoWPAN , VoLTE	5
	1.3 Cellular Network Generations :	
	Features of 1G,2G ,3G ,4G ,5G	5
II	Mobile and Smart TV Operating System	14
	2.1 Mobile Operating Systems :	
	Evaluation of Mobile Operating System-Handset Manufactures and their Mobile OS- Mobile OS and their features. Linux Kernel based Mobile OS	4
	2.2Apple Mobile Operating Systems :	
	History and features of Apple Operating Systems - iPadOS, tvOS, and watchOS	3
	2.3 Smart TV operating systems	
	Smart TV Operating System development History - versions and their features	3
	2.4 Android Operating System :	
	Android Operating System development History - versions and its feature - The various Android devices on the market , The Android Market application store	4

III	Android Development Environment 3.1 Android Development Environment System Requirements, Android SDK, Installing Java, and ADT bundle - Eclipse Integrated Development Environment (IDE), Creating Android Virtual Devices (AVDs) – Android Studio 3.2 Android Architecture Android Architecture - The Linux Kernel, Android Runtime - Dalvik Virtual Machine, Android Runtime – Core Libraries, Dalvik VM Specific Libraries, Java Interoperability Libraries, Android Libraries, Application Framework, 3.3 Creating a New Android Project Defining the Project Name and SDK Settings, Project Configuration Settings, Configuring the Launcher Icon, 3.4Activity Creating an Activity, Running the Application in the AVD, Stopping a Running Application, Modifying the Example Application, Reviewing the Layout and Resource Files	15 4 4 3 4
IV	Basic and Advanced Views 4.1 Basic Views : Text View, Button, Image Button, EditText, CheckBox, ToggleButton, RadioButton and RadioGroup Views, ProgressBar View, Auto Complete Text View 4.2 Advanced Views : Time Picker View and Date Picker View – List Views – Image View – Menus – Analog and Digital View – Dialog Boxes	15 4 3
	4.3 Displaying Pictures & Menus with Views: Image View – Gallery View – ImageSwitcher – GridView - Creating the Helper Methods – Options Menu – Context Menu 4.4 SMS and Dailer : Sending SMS – Receiving SMS – Making phone call	5 3

	Location Based Services and SQLite 5.1Location Based Services : Obtaining the Maps API Key- Displaying the Map – Zoom Control – Navigating to a specific location – Adding Marker – Geo Coding and reverse Geo coding 5.2 Content Provider and Storage: Sharing data – view contacts – Add contacts – Modify contacts – Delete Contacts - Store and Retire data's in Internal and External Storage – SQLite - Creating and using databases 5.3 Android Service : Consuming Web service using HTTP , downloading binary Data – Downloading Text Content – Accessing Web Service 5.4 Cross Platform App Development : Cross platform application development tools and their features:	15 4 5 4 2

REFERENCE BOOK:

Sl.No	Title	Author	Publisher	Year of Publishing/ Edition
1	Beginning Android Programming with Android Studio	J. F. DiMarzio	Wiley	4th Edition (2016)
2	Beginning Android 4 Application Development	Wei-MengLee		2012 - Wiley India Edition
3	Mobile Computing	Asoke K Talukder,Hasan Ahmed, Roopa R Yavagal		2005 - MGH

4F5213 – PYTHON PROGRAMMING PRACTICAL

Programme Name	:	DIPLOMA IN COMPUTER ENGINEERING
Course Code	:	4F5213
Term	:	V
Course Name	:	Python Programming practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / Term	Marks			Duration
			Internal Assessment	Autonomous Examinations	Total	
Python Programming	4	64	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

To write, debug and run programs in Python to understand the basic concepts of industry standard modern programming language.

OBJECTIVES:

- To write, test and debug simple Python programs
- To Implement Python Programs with conditionals and Loops
- To use functions for structuring Python Programs
- To implement string manipulation functions using Python Program
- To implement List and its built-in functions and methods
- To implement Tuples and passing tuple as arguments
- To create Python Dictionaries and updating Dictionaries

- To develop programs to read and write data from or to files in Python

DETAILED SYLLABUS

Contents: Practical

PART – A	
1.	i) Write a Python Program to do basic trim and slice operations on String. ii) Write a Python Program to accept line of text and find the number of characters, vowels and blank spaces on it
2. .	i) Write a Python Program using function to display all such numbers which is divisible by 3 but are not multiple of 5 in a given range. ii) Write a Python Program using recursion to print 'n' terms in Fibonacci series.
3. .	Write a Python Program to add 'ing' at the end of a given string if the string has 3 or more characters . If the given string is already ends with 'ing' then add 'ly' instead. If the string has less than 3 characters, leave it unchanged.
4. .	Write a Python Program to print the first half values of tuple in one line and last half values in next line.
PART – B	
5.	Write a Python Program to take a list of words and return the length of the longest one using string.
6.	Write a Python Program to find an element in a given set of elements using Linear Search
7.	Write a Python Program to sort a set of elements using Selection sort.
8.	Write a Python Program to multiply two matrices.
9.	Write a Python program to demonstrate different operations on Tuple.
10.	Write a Python Program to demonstrate to use Dictionary and related functions.
11.	Write a Python Program to copy file contents from one file to another and display number of words copied.
12.	Create a GUI Marksheet using Tkinter
13.	To do GUI application using Tkinter
14.	Develop a GUI calendar application using Tkinter
15.	Develop a File Explorer in Python using Tkinter

References:

1. Geeksforgeeks.org

DETAILED ALLOCATION OF MARKS		
1.	Any one program from PART - A	20 Marks
2.	Execution	15 Marks
3.	Result with Print out	5 Marks
4.	Any one program from PART - B	30 Marks
5.	Execution	20 Marks
6.	Result with Print out	5 Marks
7.	Viva voce	5 Marks
TOTAL		100 Marks

LIST OF EQUIPMENTS

HARDWARE:

1. Desktop Computers - 30 Nos.
2. Printer – 1 No

SOFTWARE:

1. Windows / Linux Operating System
2. Python (to run as interactive mode and IDLE mode)

4F5306 – CLOUD COMPUTING AND INTERNET OF THINGS PRACTICAL

Programme Name : DIPLOMA IN COMPUTER ENGINEERING
Course Code : 4F5306
Term : V
Course Name : Cloud Computing and Internet of Things Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / Term	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Cloud Computing and Internet of Things Practical	4	64	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75marks.

RATIONALE:

To understand the Key concepts of virtualization. To implement the various deployment models such as private, public, hybrid and community with SaaS, Iaas and Paas. To train student show to design and program the Cloud based IoT based system. To understand innovative application's needs such as Smart City, Smart Health, Smart Manufacturing, Smart Agriculture, etc. To build industry capable talent, start-up community and entrepreneurial ecosystem for IoT.

OBJECTIVES

- On completion of the following exercises, the students must be able to
- Adapt different types of virtualization and increase resource utilization.

- Build a private cloud using open source technologies.
- Explain the concept and Application of Internet of Things
- Application of IOT in automation of Commercial and Real-World examples
- Design a simple IOT system comprising sensors, edge devices and wireless network connections involving prototyping, programming and data analysis.

LIST OF EXPERIMENTS

Experiment No.	**Part – A : List of Experiments Performed on Cloud Computing**
1	To implement program on SaaS to Create an word document of your class time table and store locally and on cloud with doc and pdf format
2	To implement program on SaaS to Create a spread sheet to generate a mark sheet for student progress report.
3	To implement web services by create your BlogSpot and Collaborating via Wikis
4	To implement on PaaS to Install Google App Engine, create a program to validate user; create a database login(username, password)in mysql and deploy to cloud
5	Install Virtualbox /VMware Workstation with different flavours of linux or windows OS on top of windows7 or 8.
6	Install OpenStack and use it as Infrastructure as a Service and use technology own Cloud.
7	Case Study on any one Open source and commercial Cloud-Microsoft Azure , Eucalyptus , Amazon EC2
Experiment No.	**Part – B : List of Experiments Performed on IoT**
8	To implement LED Blink and LED Pattern With Arduino
9	To implement LED Pattern with Push Button Control With Arduino
10	To display “Hello World “ in LCD 16X2 Display With Arduino

11	To implement the Servo Motor Control with Arduino
12	To implement and monitor the LM35 Temperature Sensor and Ultrasonic Distance Measurement With Arduino
13	To implement the IR Sensor Analog Input With Arduino
14	Using ThinkSpeak Cloud Reading Temperature Sensor Monitoring with NodeMCU /Raspberry Pi

DETAILED ALLOCATION OF MARKS		
1.	Any one program from PART - A	20 Marks
2.	Execution and Result	15 Marks
3.	Print out	5 Marks
4.	Any one program from PART - B	30 Marks
5.	Execution and Result	20 Marks
6.	Print out	5 Marks
7.	Viva voce	5 Marks
TOTAL		100 Marks

LIST OF EQUIPMENTS

Software Requirement:

1. Arduino SDK
2. Open Source Cloud Services [virtualBox / VM Ware/ Open Stack]

Components Requirement:

1. Arduino kit - 10 Numbers
2. Node MCU / Raspberry Pi - 10 Numbers
3. LED Bulb – 10 Numbers

4. 330K Resistor - 10 Numbers
5. Push Button - 10 Number
6. Servo Motor 5 V DC - 10 Numbers
7. 5V DC Relay - 10 Numbers
8. Mini Bread Autonomous - 10 Numbers
9. 16x2 LCD Display - 10 Numbers
10. IR Sensor - 10 Numbers
11. LM35 Temperature Sensor - 10 Numbers
12. Connecting Wires

4F5307.1–SOFTWARE ENGINEERING PRACTICAL

Programme name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F5307.1

Term : V

Course name : Software Engineering Practical

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per Term: 16 Weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Term	Internal Assessment	Autonomous Examination	Total	Duration
Software Engineering Practical	6	96	25	100*	100	3 hours

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

The course aims at making the students familiar with the Software Development Lifecycle. While the Software Engineering theory paper provides a good view to our students on the various models, different phases involved in the model, risk tracking etc., the practical application of this is missing. This subject is quite difficult to comprehend just by sitting in theory classes or reading books, unless the students experience it practically. Hence exposing our students to a lab which mimics a real-life situation / case study would immensely benefit the students. This way the student will understand the concept of Software Engineering – how projects are planned and executed, different stages of the project life cycle, how are metrics tracked, risk management and quality assurance. IT companies spend a lot of time and effort in teaching the Software Development Life cycle principles. Each team member must have complete understanding of the execution methodology and the role he / she is playing in the project, without which the project will never be successful. Inculcating this knowledge to our team would help in easily deploying them in the industry.

OBJECTIVES

On completion of the following exercises, the students must be able to

- Understand the difference between different SDLC models especially Iterative / incremental and Agile methodologies
- Understand difference between a green field implementation (programs) and Software products.
- Learn how the requirements management phase works – how does the requirement gathering happen, how does this get converted to BRDs / SRSs in Iterative and Backlog in Agile, Dos and Don'ts etc
- Understand how the estimation and project planning is done based on the requirements. We will do feature point / complexity point estimate for Iterative and Story point estimate for Agile
- Preparing a work breakdown structure
- Setting up quality assurance process in line with CMMI principles and defining metrics that will be gathered
- Convert the requirements to design. Understand the different designing principles and alignment to standards. Building interface designs to integrate different modules
- Convert the design to structured coding following the coding standards. Understand the concept of continuous integration. Assessing the quality of the code.
- Perform Unit Testing
- Perform System Integration testing – preparing the test plan, test cases, system testing, tracking the defects found during testing
- Understand how the Requirement Traceability works
- Assessing the risk of the project by analyzing the metrics gathered

LAB EXERCISES

REQUIREMENT ANALYSIS
1) Develop requirements specification for student Management system such as overall problem description, system features, external interface requirements and non-functional requirements.
DESIGN
Draw the following Structural modeling diagrams for student Management system: 2) Develop an UML Class Diagram. 3) Develop an UML Object Diagram. 4) Develop an UML Component Diagram. 5) Develop an UML Deployment Diagram.
Draw the following Dynamic modeling diagrams for Library Management system: 6) Develop a Use case Diagram. 7) Develop an UML Sequence Diagram. 8) Develop an UML Collaboration Diagram. 9) Develop an UML StateChart Diagram. 10) Develop an UML Activity Diagram.
TESTING
11) Write a simple JAVA code and perform unit testing.
REVERSE ENGINEERING
12) Perform reverse engineering from a simple JAVA code.
MINI PROJECT
Develop a University Result Management System using Classical Life Cycle model.

DETAILED ALLOCATION OF MARKS	
Procedure Writing – One Question	45 Marks
Executing Exercise	35 Marks
Result	10 Marks
Demonstration of mini project	5 Marks
VIVA - VOCE	5 Marks
TOTAL	100 Marks

REQUIREMENTS

Hardware Requirements :

30 Nos

Desktop Systems

Software Requirements :

Microsoft office (Word, Excel, Power point),

MS – Project or JIRA for mini project

Relational Database(SQL Server Express or MYSQL,
JAVA/IDE, JUNIT(open source) for unit testing

SELENIUM(automated testing)

4F5307.2–DATA ANALYTICS USING PYTHON PRACTICAL

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F5307.2

Term : V

Course : Data Analytics Using Python Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Term	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Data Analytics Using Python Practical	4	64	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

This course provides the students the foundations for data analytics with python. The syllabus is designed to provide exposure to practical systems and software used in data analysis. The course explains data science techniques and the various Python programming packages required to prepare data for analysis, perform data analytics and create meaningful data visualization.

OBJECTIVES:

- To familiarize with the Python NumPy library for array processing.
- To utilize the Pandas packages in Python for exploratory data analytics.
- To explore some of the real world applications of Machine learning techniques.
- To create informative visualizations with matplotlib to identify patterns.

DETAILED SYLLABUS

Prerequisite:

- Python : Install Python IDE and important Python Libraries. Install Anaconda and find the features of Jupyter Notebook.
- Data Source:
  https://archive.ics.uci.edu/ml/machine-learning-databases/auto-mpg/

  https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data

  https://www.kaggle.com/arshid/iris-flower-dataset

  https://www.kaggle.com/rohankayan/years-of-experience-and-salary-dataset

PART A

Perform the exercises in PART A using NumPy

1. Basic data structures in NumPy
   a. Create a List, set, tuple and dictionary which stores the details of a student (rollno, name , dept, branch, percentage of mark) in Python and print the values.
   b. Convert the list and tuple as NumPy array.
2. Arrays in NumPy
   a. Create arrays using different intrinsic methods (ones, zeros, arange, linspace, indice) and print their values.
   b. Check the results of arithmetic operations like add(), subtract(), multiply() and divide() with arrays created using arange and ones intrinsic method.
   c. Check the results of mathematical operations like exp(), sqrt(), sin(), cos(), log(), dot() on an array created using arange intrinsic method.

3. Built-in functions in NumPy.

   a. Load your class Marklist data from a csv (comma separated value) file into an array. Perform the following operations to inspect your array. Len(), ndim, size, dtype, shape, info()
   b. Apply the aggregate functions on this data and print the results.
      (Functions like min(), max(), cumsum(), mean(), median(), corrcoef(), std())

4. Handling Multiple Arrays

   a. Create two python NumPy arrays (boys, girls) each with the age of n students in the class.
   b. Get the common items between two python NumPy arrays.
   c. Get the positions where elements of two arrays match.
   d. Remove from one array those items that exist in another.
   e. Extract all numbers between a given range from a NumPy array.

5. Array Slicing in NumPy

   a. Load your class Marklist data into an array called “marks” to store students roll_num, subject marks and result.
   b. Split all rows and all columns except the last column into an array called “features”.
   c. Split the marks array into 3 equal-sized sub-arrays each for 3 different subject marks.
   d. Split the last column into an array “label”.
   e. Delete the roll_num column from the marks array and insert a new column student name in its place.

6. Indexing & Sorting in NumPy

   a. Load your class Marklist data from a csv file into an array.
   b. Access the mark of a student in a particular subject using indexing techniques.
   c. Sort the student details based on Total mark.
   d. Select a subset of 2D array using fancy indexing (indexing using integer arrays)

e. Print student details whose total marks is greater than 250 using Boolean indexing.

7. Handing Two dimensional array in NumPy

a. Import iris dataset with numbers and texts keeping the text intact into python NumPy.
b. Convert the 1D iris to 2D array (iris2d) by omitting the species text field.
c. Find the number and position of missing values in iris2d's sepal_length
d. Insert np.nan values at 20 random positions in iris 2d dataset
e. Filter the rows of iris2d that has petal_length > 1.5 and sepal_length < 5.0

PART-B

Perform the exercises in PART B using Pandas

8. Working with a Series

a. Create a series using list and dictionary.
b. Create a series using NumPy functions in Pandas.
c. Print the index and values of series.
d. Print the first and last few rows from the series.

9. Working with Data Frame Columns

a. Create and print a DataFrame.
b. Find the descriptive statistics for each column.
c. Group the data by the values in a specified column, values in the index.
d. Set Index and columns in a DataFrame.
e. Rename columns and drop columns
f. Select or filter rows based on values in columns.
g. Select single and multiple columns with specific names

10. Working with DataFrame Rows

a. Slicing DataFrame using *loc* and *iloc*.
b. Filter multiple rows using *isin*.
c. Select first n rows and last n rows
d. Select rows randomly n rows and fractions of rows (use *df.sample* method)

e. Count the number of rows with each unique value of variables
f. Select *nlargest* and *nsmallest* values.
g. Order/sort the rows

11. Handling missing data and duplicates

a. Identify rows with missing data (isnull(), notnull()) and replace NA/Null data with a given value.
b. Drop rows and columns with any missing data (dropna(), dropna(1))
c. Find duplicate values and drop duplicates.
d. Fill the missing values using forward filling and backward filling.
e. Replace the missing value with new value and write the dataframe to a CSV file in the local directory.

12. Merge and combine data

a. Perform the *append, concat* and *combine_first* operations on DataFrames.
b. Apply different types of merge on data.
c. Use a *query* method to filter DataFrame with multiple conditions.

Perform the following exercises using Pandas matplotlib

13. Consider the Salary dataset, which contains 30 observations consisting of years of working experience and the annual wage (in dollars).

a. Create a linear plot to identify the relationship between years of working experience and the annual wages with suitable title , legend and labels.
b. Create a scatter plot to identify the relationship between years of working experience and the annual wages with title , legend and labels.
c. Also distinguish between observations that have more than 5 years of working experience and observations that have less than 5 years of working experience by using different colors in one single plot.

14. Consider the Iris dataset, where observations belong to either one of three iris flower classes.

a. Visualize the average value for each feature of the Setosa iris class using a bar chart.

b. Format the obtained bar graph by Changing the color of each bar, Change the Edge color , Linewidth and Line style.

15. Consider the Iris dataset, where observations belong to either one of three iris flower classes.

a. Visualize the Histogram for each feature (Sepal Length, Sepal Width,petal Length & petal Width) separately with suitable bin size and color.
b. Plot the histograms for all features using subplots to visualize all histograms in one single plot. Save the plot as JPEG file.
c. Plot the boxplots for all features next to each other in one single plot.

DETAILED ALLOCATION OF MARKS	
Write any one program from PART-A	15 Marks
Write any one program from PART-B	20 Marks
Executing program (PART-A)	20 Marks
Executing program (PART-B)	20 Marks
Result with print out(PART-A)	10 Marks
Result with print out(PART-B)	10 Marks
VIVA-VOCE	05 Marks
TOTAL	100 Marks

LIST OF EQUIPMENTS

Hardware Requirements

Desktop Computers – 30 Nos

Printer - 1 No.

Software Requirement:

Python 3.0 or above version , Microsoft Excel

4F5307.3 – MOBILE COMPUTING PRACTICAL

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F5307.3

Term : V

Course name : Mobile Computing Practical

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per term 16 Weeks

COURSE	Instructions		Examination			
Elective Practical-I Mobile Computing Practical	Hours / Week	Hours/ Term	Marks			Duration
	4	64	Internal Assessment	Autonomous Examination	Total	
			25	100 *	100	3 Hrs

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

The Mobile Computing Lab studies design principles and evaluation methodologies for understanding and building systems support mechanisms for mobile computing systems including mobile adhoc and sensor networks for achieving the goal of anytime, anywhere computing in wireless mobile environments. The primary research focuses of the Mobile Application development practical are in mobility management, data and service management, security and dependability aspects in mobile computing environments.

OBJECTIVES:

On completion of the following exercises, the students must be able to

1. Provide a solid foundation and skills for programming to create applicationsfor Mobile Devices

2. Install, configure and use Android development environment.
3. To Learn about Basic Mobile Application Development tools
4. To learn How to create interactive applications in android with multiple activities
5. Create Mobile Application using SQLite Database

LIST OF EXPERIMENTS

PART -A

1.	Write a program to demonstrate activity(Application Life Cycle)
2.	Write a program to demonstrate different types of layouts
3.	Write a program to implement simple calculator using text view, edit view, option button and button
4.	Write a program to demonstrate list view
5	Write a program to display Text in Text View using different Font Style
6	Write a program to demonstrate AutoComplete Text View
7	Write a program to demonstrate Image Button View

PART-B

1	Write a program to demonstrate Date picker and time picker
2.	Develop an simple application with context menu and option menu
3.	Develop an application to send SMS
4.	Write a program to view ,edit, contact
5.	Write a program to send e-mail
6.	Write a program to display map of given location/position using map view
7.	Write a program to demonstrate the application of intent class
8.	Write a program to demonstrate SQLite (Create Database , Table , Insert ,Update, Delete and view records)

DETAILED ALLOCATION OF MARKS	
Write any one program from PART-A	15 Marks
Write any one program from PART-B	20 Marks
Executing program (PART-A)	20 Marks
Executing program (PART-B)	20 Marks
Result with print out(PART-A)	10 Marks
Result with print out(PART-B)	10 Marks
VIVA-VOCE	05 Marks
TOTAL	100 Marks

HARDWARE REQUIREMENTS:

Desktop Computers with minimum 4 GB RAM	30 Nos
Printer	1 No

SOFTWARE REQUIREMENTS:

Android Studio / Netbeans /Eclipse	Android ATD
Android SDK	JDK 6.0 or above

4F5401 – ENTREPRENEURSHIP AND STARTUP

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F5401

Term : V

Course name : Entrepreneurship and Startup

TEACHING AND SCHEME OF EXAMINATION

No. of Weeks per term: 16 Weeks

COURSE	Instruction		Examination			
	Hours/ Week	Hours/ Term	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Entrepreneurship and Startup	4	64	25	75	100	3 Hours

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

TOPICS AND ALLOCATION OF HOURS

UNIT	Topics	Hours
1	Entrepreneurship – Introduction and Process	10
2	Business Idea and Banking	10
3	Start ups, E-cell and Success Stories	10
4	Pricing and Cost Analysis	10
5	Business Plan Preparation	10
Revision, Field visit and Preparation of case study report		14
Total		64

RATIONALE:

Development of a diploma curriculum is a dynamic process responsive to the society and reflecting the needs and aspiration of its learners. Fast changing society deserves changes in educational curriculum particularly to establish relevance to emerging socio-economic environments; to ensure equity of opportunity and participation and finally promoting concern for excellence. In this context the course on entrepreneurship and start ups aims at instilling and stimulating human urge for excellence by realizing individual potential for generating and putting to use the inputs, relevant to social prosperity and thereby ensure good means of living for every individual, provides jobs and develop Indian economy.

OBJECTIVE:

At the end of the study of 5th TERM the students will be able to

- To excite the students about entrepreneurship
- Acquiring Entrepreneurial spirit and resourcefulness
- Understanding the concept and process of entrepreneurship
- Acquiring entrepreneurial quality, competency and motivation
- Learning the process and skills of creation and management of entrepreneurial venture
- Familiarization with various uses of human resource for earning dignified means of living
- Know its contribution in and role in the growth and development of individual and the nation
- Understand the formation of E-cell
- Survey and analyze the market to understand customer needs
- Understand the importance of generation of ideas and product selection
- Learn the preparation of project feasibility report
- Understand the importance of sales and turnover
- Familiarization of various financial and non financial schemes
- Aware the concept of incubation and starts ups

DETAILED SYLLABUS

Unit	Name of the Topic	Hours
1	ENTREPRENEURSHIP – INTRODUCTION AND PROCESS ● Concept, Functions and Importance ● Myths about Entrepreneurship ● Pros and Cons of Entrepreneurship ● Process of Entrepreneurship ● Benefits of Entrepreneur ● Competencies and Characteristics ● Ethical Entrepreneurship ● Entrepreneurial Values and Attitudes ● Motivation ● Creativity ● Innovation ● Entrepreneurs - as problem solvers ● Mindset of an employee and an entrepreneur ● Business Failure – causes and remedies ● Role of Networking in entrepreneurship	10
2	**BUSINESS IDEA AND BANKING** ● Types of Business: Manufacturing, Trading and Services ● Stakeholders: Sellers, Vendors and Consumers ● E- Commerce Business Models ● Types of Resources - Human, Capital and Entrepreneurial tools ● Goals of Business and Goal Setting ● Patent, copyright and Intellectual Property Rights ● Negotiations - Importance and methods ● Customer Relations and Vendor Management ● Size and Capital based classification of business enterprises ● Role of Financial Institutions ● Role of Government policy ● Entrepreneurial support systems	10

	● Incentive schemes for State Government ● Incentive schemes for Central Government	
3	**STARTUPS, E-CELL AND SUCCESS STORIES** ● Concept of Incubation centre's ● Activities of DIC, financial institutions and other relevance institutions ● Success stories of Indian and global business legends ● Field Visit to MSME's ● Various sources of Information ● Learn to earn ● Startup and its stages ● Role of Technology – E-commerce and Social Media ● Role of E-Cell ● E-Cell to Entrepreneurship	10
4	**PRICING AND COST ANALYSIS** ● Calculation of Unit of Sale, Unit Price and Unit Cost ● Types of Costs - Variable and Fixed, Operational Costs ● Break Even Analysis ● Understand the meaning and concept of the term Cash Inflow and Cash Outflow ● Prepare a Cash Flow Projection ● Pricing and Factors affecting pricing ● Understand the importance and preparation of Income Statement ● Launch Strategies after pricing and proof of concept ● Branding - Business name, logo, tag line ● Promotion strategy	10
5	**BUSINESS PLAN PREPARATION** ● Generation of Ideas, ● Business Ideas vs. Business Opportunities ● Selecting the Right Opportunity ● Product selection ● New product development and analysis ● Feasibility Study Report – Technical analysis, financial	10

	analysis and commercial analysis ● Market Research - Concept, Importance and Process ● Marketing and Sales strategy ● Digital marketing ● Social Entrepreneurship ● Risk Taking-Concept ● Types of business risks	

. REFERNCE BOOKS:

Sl.No	Title	Author	Publisher
1.	Fundamentals of Entrepreneurship	Dr. G.K. Varshney	Sahitya Bhawan Publications, Agra - 282002
2.	Business Regulatory Framework	Dr. G.K. Varshney	Sahitya Bhawan Publications, Agra - 282002
3.	Entrepreneurship	Robert D. Hisrich, Michael P. Peters, Dean A. Shepherd	McGraw Hill (India) Private Limited, Noida - 201301
4.	Essentials of Entrepreneurship and small business management	M.Scarborough, R.Cornwell	Pearson Education India, Noida - 201301
5.	Entrepreneurship Development and Small Business Enterprises	Charantimath Poornima M.	Pearson Education, Noida - 201301
6.	Innovation Management and New Product Development	Trott,	Pearson Education, Noida - 201301
7.	A Textbook of Cost and Management Accounting	M N Arora	Vikas Publishing House Pvt. Ltd., New Delhi-110044
8.	Financial Management	Prasanna Chandra	Tata McGraw Hill education private limited, New Delhi
9.	Indian Banking System	I. V. Trivedi, Renu Jatana	RBSA Publishers, Rajasthan

10.	HOW TO START A BUSINESS IN INDIA	Simon Daniel	BUUKS Chennai - 600018
11.	The Business Plan Write-Up Simplified - A practitioners guide to writing the Business Plan	Ramani Sarada	Notion Press Media Pvt. Ltd Chennai 600095

4F0006- UNIVERSAL AND HUMAN VALUES

Programme Name : COMPUTER ENGINEERING

Course Code : 4F0006

Term : V

Course Name : UNIVERSAL AND HUMAN VALUES

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

Course Code	Instruction periods per week		Credit	Total Periods per term	Scheme Of Examinations			
	Theory	Practical			Duration (Hrs)	Internal Assessment Marks	End Exam Marks	Total Marks
4F0006	5	--	5	75	3	25	100*	100

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

TOPICS AND ALLOCATION OF HOURS

Unit No	Topic	Hours
I	Course Introduction - Need, Basic Guidelines, Content and Process for Value Education vehicles	15
II	Understanding Harmony in the Human Being- Harmony in Myself	15
III	Understanding Harmony in the Family and Society-Harmony in Human	15
IV	Personality Development and Leadership	15
V	Stress Management	15
	Total	75

RATIONALE:

Holistic value-based education will focus on preparing graduates with these desirable attributes . By way of:

1. Education on values, leading to the development of a holistic and humane world vision:

• Universal Human Values of truth, love and compassion

• Indian constitutional values of justice, liberty, equality and fraternity

• Human rights, sustainable development and sustainable living as well as global well-being Universal Human Values (UHV Team) provides well-tested foundational inputs on value education Courses, examples and case studies of local, regional and national values, languages and skills to reinforce and exemplify a holistic and humane world vision The Indian Knowledge System (IKS) is based on a deep understanding of human being as well as of the underlying harmony in nature and the entire existence. It has been tested through practice, verified and improved over thousands of years. As a result, the Indian Knowledge System is an effort for the 'wellbeing of all'. Therefore, IKS, its science, technology and systems offers many good case-studies of effort for human thought, culture, science, technology and systems

Objectives:

1. To help students distinguish between values and skills, and understand the need, basic guidelines, content and process of value education.
2. To help students initiate a process of dialog within themselves to know what they' really want to be' in their life and profession
3. To help students understand the meaning of happiness and prosperity for a human being.
4. To understanding the moral values that ought to guide engineering profession or practice, resolving moral issues in engineering, and justifying the moral judgments in engineering.
5. To Understand the concept of values, meaning of stress, various causes of stress and to manage stress.

DETAILED SYLLABUS

Contents: Theory

Unit	Name Of The Topic	Hours
I	Course Introduction - Need, Basic Guidelines, Content and Process for Value Education Purpose and motivation for the course, recapitulation from Universal Human Values-I -Self-Exploration – what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration - Continuous Happiness and Prosperity- A look at basic HumanAspirations-RightunderstandingRelationshipandPhysicalFacility-thebasic requirements for fulfilment of aspirations of every human being with their correct priority -Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario- Method to fulfill the above human aspirations: understanding and living in harmony at various levels.	15

II	Understanding Harmony in the Human Being - Harmony in Myself Understanding human being as a co-existence of the sentient 'I' and the material 'Body'- Understanding the needs of Self ('I') and 'Body' - happiness and physical facility-Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)- Understanding the characteristics and activities of 'I' and harmony in 'I'- Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail- Programs to ensure Sanyam and Health.	15
III	Understanding Harmony in the Family and Society-Harmony in Human - Human Relationship Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfillment to ensure mutual happiness; Trust and Respect as the foundational values of relationship-Understanding the meaning of Trust; Difference between intention and competence-Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values inrelationship-Understandingtheharmonyinthesociety(societybeinganextensionoffamily):Resolution,Prosperity,fearlessness(trust)andco-existenceascomprehensiveHumanGoals-Visualizingauniversalharmonious order in society- Undivided Society, Universal Order- from family to world family.	15
IV	Personality Development and Leadership Introduction- Personality- Character- Determinants of Personality and Character Development - Measures to Develop the Personality - Measures to Improve Character– leadership - leadership traits Senses of engineering -Variety of moral issues-Types of inquiries - Moral dilemma -Moral autonomy -Moral development (theories)-Consensus and controversy-Profession-Models of professional roles-Responsibility-Theories about right action (Ethical theories)-control-Self-interest–Customs -Religion-Self-respect-Case study: Choice of the theory	15
V	Stress Management Characteristics of Values- Meaning- Sources of Value Formation: Social institutions, Organisation, Colleagues, Work Need of studying values, Need for Studying Values- Stress -Meaning and Definition- Nature of Stress- Stress Level and Its Impacts- Causes of Stress- Stress	15

	Management- Individual Approaches- Organizational Approaches.	

ASSESSMENT:

- This is a compulsory credit course. The assessment is to provide a fair state of development of the student, so participation in classroom discussions, etc. will be used in evaluation.

  Example:
- Assessmentbyfacultymentor:10marks
- Socially relevant project/Group Activities/Assignments:15 marks
- SemesterEndExamination:100 marks
- Question Pattern for End semester is 50 MCQ.
- Eachquestioncarries2points(10MCQ'sfromEachUnit)
- Theoverall pass percentage is 40%.

REFERENCEBOOKS

1. Human Values, A.N.Tripathi, New AgeIntl. Publishers, NewDelhi, 2004.
2. The Story of Stuff(Book).
3. Small is Beautiful -E.F Schumacher.
4. Slow is Beautiful-Cecile Andrews
5. Economy of Permanence - JC Kumarappa
6. Bharat Mein Angreji Raj -Pandit Sunderlal
7. Rediscovering India-by Dharampal
8. Hind Swaraj orIndian Home Rule-by MohandasK. Gandhi
9. India Wins Freedom- Maulana AbdulKalam Azad
10. Vivekananda- Roma in Rolland (English)
11. IES Master Institute of Engineering.

COURSE OUTCOME

CO1	Ability to understand the significance of value inputs in a classroom and start applying them in their life and profession
CO2	Ability to Distinguish between values and skills, happiness and accumulation of physical facilities, the Self and the Body, Intention and Competence of an individual, etc
CO3	Ability to understand the value of harmonious relationship based on trust and respect in their life and Profession
CO4	Ability to understand the harmony inexistence in their profession and lead an ethical life.
CO5	Ability to understand the individual and organizational strategies to manage stress.

VI - TERM

4F6308 – COMPUTER HARDWARE AND SERVICING

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F6308

Term : VI

Course Name : Computer Hardware and Servicing

TEACHING AND SCHEME OF EXAMINATION

No of weeks per Term: 16 weeks

COURSE	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Term	Internal Assessment	Autonomous Examination	Total	
COMPUTER HARDWARE AND SERVICING	6	96	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

TOPICS & ALLOCATION OF HOURS :

Unit No.	Topics	Time (Hours)
I	MOTHERBOARD COMPONENTS	17
II	MEMORY & I/O DEVICES	18
III	DISPLAY, POWER SUPPLY & BIOS	18
IV	DESKTOP, LAPTOP, MOBILE AND TABLET PC	18
V	SYSTEM ADMINISTRATION &FUTURE HARDWARE SYSTEMS	18
TEST AND REVISION		7
TOTAL		96

RATIONALE:

A Computer Engineer should be able to install and maintain Keyboard, Printer, Mouse, Monitor, etc. along with the computer system. Additionally he should also be able to maintain and service mobile phones. The course provides the necessary knowledge and skills regarding working, construction and interfacing aspects of peripherals. The students will get to know how various peripherals communicate with central processing unit of the computer system and pattern their respective operations. The student will get to know about how Mobile phones are maintained. This COURSE provides the required background of installation, maintenance and testing of peripheral with Computers and Laptops. The student will also get to know about the basics Non Volatile Memory (NVM), Remote Direct Memory Access (RDMA) and Embedding hardware.

OBJECTIVES:

On completion of the following units of syllabus contents, the students must be able to

- Know the evolution of Personal Computer from PC through Core i and Laptop.
- Know and explain the major components that make up the system unit.
- Know the data process and store them in meaningful information.
- Explain about the principle of operations of Keyboard, Mouse and Displays.
- Understand the components of media system.
- Know the Basics, working principle, specification and modern technology of different types of drives.
- Know the specification of I/O Ports of all I/O devices like serial, parallel, USB — Game port,blue tooth and IP Connectors
- Know the operation, working principle and troubleshooting of devices like Dot matrix, Inkjet, Laser, Thermal, MFP Printers.
- Know the aspects related to Power Supply.

- Understand the common problems in the computer system and the peripherals
- Trouble shoot the problems in Personal computers.
- Trouble shoot the problems in Computer peripherals.
- Know and explain the major components of Laptop.
- Trouble shoot the problems in Laptop.
- Understand the basic components and tools used in servicing of Mobile phones.
- Know to install the software required for mobile phones and to maintain it.
- Understand the basics of Non Volatile Memory(NVM), Remote Direct Memory Access (RDMA) and Embedding hardware.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course outcome		BTL	Linked PO
CO1	Illustrate the various motherboard components and peripheral devices with different types of processors and chipsets.	R, U	1,2,3,4
CO2	Illustrate the various types of memory and IO devices which used for computer systems.	R, U	1,2,3,4
CO3	Analyze the working principles of display and power supply. And apply the system settings in BIOS for POST operations.	R, U,A	1,2,3,4,5
CO4	Illustrate the features of the Desktop computer, laptop, mobile and TABLET.	U, A	1,2,3,4,5,6,7
CO5	Understand and apply the usage of Operating system and security techniques. And Illustrate the features of Embedded system.	R,U, A	1,2,3,4

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

COURSE-PO ATTAINMENT MATRIX

CO	Program Outcomes (PO)							ProgramSpecific Outcomes (PSO)	
	PO 1	PO 2	PO3	PO4	PO 5	PO 6	PO 7	PSO 1	PSO2
CO1-4F6308	2	2	1	2	-	-	-	3	1
CO2-4F6308	2	2	1	2	-	-	-	3	1
CO3-4F6308	3	3	2	3	3	-	3	3	2
CO4-4F6308	3	3	2	3	3	3	3	3	2
CO5-4F6308	3	2	1	3	-	-	2	3	1
TOTAL	13	12	7	13	6	3	8	15	7
No.of COs mapping with POs	5	5	5	5	2	1	3	5	5
Average	2.6	2.4	1.4	2.6	3	3	2.6	3	1.4
Round off (Average)	3	2	1	3	3	3	3	3	1
Correlation									
		Medium – M /2				Weak – W / 1			

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

- *If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3*

- *If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2*
- *If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1*
- *If < 5% of classroom sessions addressing a particular PO, it is considered that PO is considered not-addressed.*

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**MOTHERBOARD COMPONENTS**	17
	1.1.Motherboard components: Processor sockets/slots — Memory sockets — Chipsets — Cache— BIOS — Clock generator — RTC — Super I/O Controller — Power connector — Battery —Keyboard/Mouse Connectors — Jumpers — Ports and Headers — Pin Connectors - Motherboard Form factor - Hardware, Software and Firmware.	5
	1.2.Computer peripheral devices: Internal and external devices	3
	1.3.Processors: Introduction —Core2 Duo processor, Quad core processor,Core i3, i5, i7 series, AMD AIO series, Xeon Processor.	4
	1.4.Chipsets: Chipset basics - North / South Bridge architecture and Hub architecture.	3
	1.5.Bus Standards: Overview and features of PCI, AGP, USB, & Processor Bus.	2
II	**MEMORY AND I/O DEVICES**	18
	2.1.Primary and Secondary Memory: Introduction. Main Memory — types – Organization, Access time, Cycle time, and Memory errors and Error detection Techniques. Hard Disk: Introduction — Construction — Working Principle — File Systems — Formatting and Troubleshooting.	4
	2.2. Removable Storage and Special Devices: DVD-ROM — Recordable DVD Rewritable DVD. Blu-ray: Introduction - Blu-ray Disc	4

	Parameters - Recording and Playback Principles. Special drives: External drives, Memory stick, USB flash drive, Solid state drive. Data Recovery tools - DOS, and Third party tools. 2.3.Keyboard and Mouse: Keyboard: Interfacing and Signals (USB, Wireless), Types of keys, Keyboard Matrix, Key bouncing, Types of Keyboard (Simple, Mechanical). Mouse: Optical mouse operation — Optical mouse cleaning — Troubleshooting flowchart for a mouse. 2.4. Printers and Scanners: Printer: Introduction Types of printers — Dot Matrix, Inkjet, Laser, Thermal, MFP printer (Multi-Function Printer) - Operation and Troubleshooting. Scanner: Introduction, Scanner mechanism, working principle — Types of Scanners (Barcode, Handheld, Flatbed) — Preventive maintenance and Troubleshooting tools. 2.5.Special I/O Devices: Trackball, Touch pad, Pointing stick, Joystick, Light pen, Graphic tablet, Camera, Bar-code reader, RFID reader	3 3 4
III	**DISPLAY, POWER SUPPLY and BIOS** 3.1.Displays and Graphic Cards: Displays: LCD Principles — Plasma Displays — TFT Displays - LED Displays. Graphic Cards: Video capture card - Troubleshoot display and graphics card problems 3.2.SMPS: Block diagram - Basic Principles and Operations O/P Voltage — Cable color code — Connectors and PowerGood — Common Failures (No circuit diagram to be discussed) 3.3.Bios: Bios functions — Cold and Warm booting — BIOS error codes — BIOS interrupts — BIOS advanced setup. Upgrading BIOS, Flash BIOS-setup. Identification of different BIOS (AMI, AWARD BIOS). 3.4.POST: Error, Beep Codes, Error messages, Post — Faults related to Hardware.	18 5 4 5 4
IV	**DESKTOP, LAPTOP, MOBILE AND TABLET PC**	18

	4.1.Upgrading of Systems: Hardware up-gradation. Updating of System & Application software: Device Driver - OS Update and Firewall Security — Control panel - Installed devices and properties — Install procedure, Rollback or Un-install procedure, Tests of various device driver software.	4
	4.2.Installation and Troubleshooting: Formatting, Partitioning and Installation of OS —Trouble Shooting Laptop and Desktop computer problems. Antivirus and Application Software Installation – Backup and Restore procedure - recovery software	
	4.3.Laptop: Difference between laptop and desktop- Types of laptop — working principles—configuring laptops and power settings – Upgrade	4
	RAM, hard disk, Replacing battery - Configuration of camera, mic, WLAN and Bluetooth, touchpad, Laptop Keyboard.	
	4.4. Mobile phone: Basics of mobile communication, battery- antenna-	
	Ear piece- microphone -speaker-buzzer-LCD- Keyboard. Basic circuit Autonomous components – Names and functions of different ICs used in mobile phones. Installation & Troubleshooting: Mobile servicing kit,	4
	Assembling and disassembling of different types of mobile phones – Installation of OS - Fault finding & troubleshooting	3
	4.5. Introduction to Tablet PC: Digitizers Versus Touch-Screen Displays, Merits and Demerits. Comparisons: Laptops, Desktops, Pocket PC, Other PDAs, Other Pen-Based Computers, Differences in Hardware. Windows XP Tablet PC Edition Configuration: Basic Interface Settings, Screen Settings, Display Properties, Other Settings and Options	3

V	**Understand of Operating Systems & FUTURE HARDWARE** 5.1.Fundamentals of Using Operating Systems Installation: Introduction; features of operating system : windows explore My Computer, Control Panel, command prompt, network place; Characteristics of Operating System files : BOOT.INI, NTLDR, NTDETECT.COM ; Install : windows -7/10/server2008/2012(any one) , linux – Ubuntu/Fedora/centos;(any one) and dual boot; config and upgrading the operating system; Installing device drivers ; Diagnostic procedure and troubleshooting techniques for operating systems. 5.2. Fundamentals and principles of security techniques for operating systems – Install, config, upgrade and optimize of security; Identify security tools, diagnose and troubleshooting techniques; Preventive maintenance for security 5.3.Embedded systems- Basic concepts, Embedded Autonomous and the von Neumann Model, Basic Electronics of Embedded devices- AC circuits, DC Circuits, and Active Devices, Power supply- Scope, Control and Probes- Advantages and Applications of Embedded devices.	18 6 6 6

REFERENCES

Sl.No	Title	Author	Publisher	Year of Publishing Edition
1	Computer Installation and Servicing	D.Balasubramanian	TataMc-Graw Hill, New Delhi	Second Edition 2010
2	Troubleshooting, Maintaining and Repairing PCs	Stephen J.Bigelow	TMH, New Delhi	Fifth Edition

3	PC Hardware in a nutshell	Robert Bruce Thompson.	O'Reilly Media	Third Indian Reprint 2008.
4	The Laptop Repair Workbook: An Introduction to Troubleshooting and Repairing Laptop Computers	Morris Rosenthal	Foner books	First Edition 2008
5	The Cell Phone Handbook	P.J. Stetz and Penelo e Stetz	FindTech Ltd	Second Edition
6	Advanced Mobile Repairing	PanditSanjib	BPB Publication, New Delhi	First Edition 2010
7	Absolute Beginner's Guide to Tablet PCs	Craig F. Mathews	ToolKits, Inc.	First Edition 2004
8	Embedded Hardware: Know It All	Ganssle J, Noergaard T, Eady F, Edwards L, Katz DJ, Gentile	Newnes	1st Edition (2007)
9.	COMPTIA A+ Complete Guide(Unit 5.1 & 5.2 – Book chapter 14,15,16 & 17]	Quentin, Emmentand Toby	Willey Publication	1st Edition - 2007

4F6214 – COMPUTER NETWORKS AND SECURITY

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F6214

Term : VI

Course Name : Computer Networks and Security

TEACHING AND SCHEME OF EXAMINATION

No of weeks per Term: 16 weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / Term	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
COMPUTER NETWORKS & SECURITY	5	80	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

UNIT	**Topic**	**Hrs.**
I	DATA COMMUNICATIONS	15
II	OSI MODEL AND LAN PROTOCOLS	16
III	TCP/IP PROTOCOLS	15
IV	NETWORK SECURITY	13
V	APPLICATION OF NETWOR SECURITY	14
Test & Model Exam		7
Total		80

RATIONALE:

The course aims to groom the students to gain concepts, knowledge and skills required to work on Computer Networking and Security industry. Course curriculum has been designed to give overview and use cases of Data Communication, Layered Networks, Internetworking technology/protocols and Computer Security is covered and this will help to prepare the students to keep pace with computer networking and security industry trends.

OBJECTIVES:

- Understand the concept of data communication.
- Discuss the advantages and disadvantages of different network topologies.
- Know different network classification based on different category.
- Study about different networking devices and their practical usages.
- Understand the different layers of OSI and their functions.
- Compare different LAN protocols.
- Understanding of Synchronization in networks
- Study of different WAN networks and protocols
- Study of Broadband Next Gen (BNG)
- Identify the protocols used in TCP /IP and compare with OSI model.
- Know the IP addressing and TCP/ IP protocols briefly.
- QoS and Traffic Engineering in networks
- Overview of Operations, Administration and Maintenance (OAM) in networks
- Understand the basic concepts of network security.
- Identify the attacks and threats.
- Understand the basic concepts of RAID and digital Signatures.
- Study about Cryptography and different Cryptography Algorithms.
- Discuss about Network Security Applications.
- Know the applications of Network Security.
- Discuss about VPN and Firewalls.
- Identify the Wireless Security Issues.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome (CO):

Course outcome		CL	Linked PO
CO1	Illustrate the various network components to set up a network and various data communication with transmission medium	R, U	1,2,3,4,5,7
CO2	Illustrate networking with reference to different types of models and topologies.	R, U	1,2,3,4
CO3	Apply the importance of LAN components, protocols that enable multiple computers to communicate with one another with the features of IP address classes	R, U,A	1,2,3,4
CO4	Illustrate the features of the network security techniques	U, A	1,2,3,4
CO5	Analyze the principles of various network security applications in order to understand the behavior and services.	R,U, A	1,2,3,4,5,7

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

COURSE-PO ATTAINMENT MATRIX

CO	Program Outcomes (PO)							ProgramSpecific Outcomes (PSO)	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO 1	PSO2
4F6214- CO1	2	2	1	2	2	-	2	3	1
4F6214- CO2	3	3	2	3	-	-	-	3	2
4F6214- CO3	3	3	2	3	-	-	-	3	2

4F6214- CO4	3	3	2	3	-	-	-	3	2
4F6214- CO5	2	2	1	2	2	-	2	3	1
Total	13	13	8	13	4	-	4	15	8
No.of CO mapping with POs	5	5	5	5	2	-	2	5	5
Average	2.6	2.6	1.6	2.6	2	-	2	3	1.6
Round off(Average)	3	3	2	3	2	-	2	3	2
Correlation									
					Medium – M /2			Weak – W / 1	

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

Method is to relate the level of PO with the number of hours devoted to the COs which address the given PO.

- *If ≥40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 3*
- *If 25 to 40% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 2*
- *If 5 to 25% of classroom sessions addressing a particular PO, it is considered that PO is addressed at Level 1*
- *If < 5% of classroom sessions addressing a particular PO, it is considered not-addressed.*

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**DATA COMMUNICATIONS** 1.1 Data Communication: Components of a data communication – Data flow: Simplex - Half duplex – Full duplex; Networks – Network criteria – Types of Connections: Point to point – multipoint; Topologies: Star, Bus, Ring, Mesh, Hybrid – Advantages and Disadvantages of each topology. 1.2Types of Networks: Need for computer Networks - LAN – MAN – WAN – CAN – HAN –Internet – Intranet – Extranet , Client-Server, Peer to Peer, Mobile Networks, Data Centre Networks, Service Provider Networks 1.3Transmission Media : Characteristics of Transmission Media - Classification of transmission media - Guided – Twisted pair – Coaxial – Fiber	15 2 5 3

	optics – Unguided – Radio waves – Infrared – Low Orbit satellite (LOS) – VSAT – Cabling and Standards 1.4 Network devices: Features and Concepts of Switches – Routers (Wired and Wireless) –Gateways. 1.5Synchronization in Networks: Concepts of Frequency and Time synchronization in Computer networks.	3 2
II	**OSI MODEL and LAN PROTOCOLS** 2.1Network Models: Protocol definition - Standards - OSI Model – Layered architecture–Functions of all layers. 2.2802.X Protocols :Concepts and PDU format of CSMA/CD (802.3) – Token bus (802.4) –Token ring (802.5) – Ethernet – Types of Ethernet (Fast Ethernet, gigabit Ethernet, High speed Ethernet 10GE to 800GE) – Comparison between 802.3, 802.4 and 802.5 – Overview of Carrier Ethernet and use cases 2.3WAN Networks: Different layers in Service Provider Networks – Protocols Involved – High level design of Data Centre Networks 2.4Switching: Definition – Circuit switching – Packet switching – Message switching – Optical Switching OTN– Multicasting 2.5BNG – Concepts – Services – Broadband NextGen	16 2 5 2 2 3 2
III	TCP/IP SUIT and PROTOCOLS 3.1 Overview of TCP / IP: OSI & TCP/IP – Transport Layer Protocol– Connection Oriented and Connectionless Services – Sockets - TCP & UDP. 3.2Network Layers Protocol: IP – Interior Gateway Protocols (IGMP, ICMP, ARP, RARP, IGP, BGP Concept only). 3.3 IP Addressing :Dotted Decimal Notation –Sub netting & Super netting – VLSM Technique-IPv6 (concepts only) 3.4Application Layer Protocols: FTP– Telnet – SMTP– HTTP – DNS – POP 3.5QoS and Traffic Engineering – Overview of QoS and Traffic Engineering techniques and protocols 3.6 OAM– Concepts of OAM in networks Protocols – Fault detection and isolation	15 3 2 3 2 3 2

IV	**NETWORK SECURITY**	13
	4.1Introduction to Network security: Definition – Need for security – Principles of Security – Attacks – Types of Attacks – Passive and Active attacks – Software Supply Chain attacks - Security Services – Security Mechanisms .	3
	4.2Cryptography: Definition – Symmetric Encryption principles – Symmetric Block Encryption Algorithms – DES, AES – Stream ciphers – RC4 – Digest function – Public key Cryptography Principles–RSA-Diffe-Hellman algorithm–Digital Signature(Definition only)	3
	4.3Network Security Application: Authentication applications – Kerberos (concepts only) - Overview- Motivation –Encryption Techniques;	2
	4.4Internet Security: Email security – PGP - S/MIME - IP security – Overview –IP Security Architecture - Web security - SSL, TLS ,SET (Concepts only) – Link Layer MACSEC security overview- Network Address Translation NAT - Distributed Denial of Service attacks– DDoS and its mitigation – Lawful intercept of traffic flow overview	5
V	**APPLICATIONS OF NETWORK SECURITY**	14
	5.1Computer Network Vulnerabilities: Definition; Sources of Vulnerabilities	2
	5.2Cyber Crimes and Hackers Techniques: Introduction ; Ways of Executing Cyber Crimes; Cyber Criminals; Historical hacking techniques; Types of Hackers; Hacker Motives; Hacking Topologies ; Hackers' Tools of System Exploitation	4
	5.3System Intrusion Detection and Prevention - Definition; Intrusion Detection; Types of Intrusion Detection Systems	2
	5.4Common threats – Demonstration-Phishing-DoS attack- Man in the middle attack-Eavesdropping-Spamming	2
	5.5Security Mechanism: Introduction – Types of Firewalls – Packet filters – Application gate ways – Limitations of firewalls.	2
	5.6Computer and Network Forensics: Definition ; Computer Forensic; Network Forensics	2

TextBooks :

Sl. No	Book Name	Author(s)	Publishers
1	Data Communication and networking	Behrouz A.Forouzen	TataMcGrawHill
3	Network Security Essentials	William Stallings	Pearson Publications.
4.	CRYPTOGRAPHY AND NETWORK SECURITY	William Stallings	Pearson Publications.
5	Computer Network Security [Unit 5]	JosephMiggaRizza	2005 Springer Science

Reference Books:

Sl.No	Book Name	Author(s)	Publishers
1.	Computer Communication Networks	AchyutS.Godbole	TataMcGraw-Hill,New Delhi
2.	Computer Networks	Andrew S.Tanenbaum	Pearson Publications.
3.	CRYPTOGRAPHY AND NETWORK SECURITY	BehrouzA.Forouzen	TataMcGraw-Hill,New Delhi.

OUTCOMES AFTER COMPLETION THE COURSE:

- On Completion of the course, the students should be able to:
- Understand the basic components and various transmission medium in computer networks.
- Understand the basics model of network and how data flows from one node to another.
- Analyze and design routing protocols.
- Understand the working of various application layer protocols
- Understand the concept of network security and its applications.

4F6309.1 – COMPONENT BASED TECHNOLOGY

Programme Name : Diploma in Computer Engineering
Corse Code : 4F6309.1
Term : VI
Course Name : Component Based Technology

TEACHING AND SCHEME OF EXAMINATION

No of weeks per term: 16 weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours / Term	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Component Based Technology	6	96	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

UNIT	Topic	Hrs.
I	INTRODUCTION TO .NET FRAMEWORK AND C#.NET	18
II	APPLICATION DEVELOPMENT USING C#.NET	18
III	APPLICATION DEVELOPMENT USING ADO.NET	18
IV	INTRODUCTION TO ASP.NET	18
V	XML	17
Test and Model Exam		7
Total		96

RATIONALE:

.NET Framework is changing the way developers write applications. .NET Framework provides a number of components to create many types of applications including those for consoles, Windows, mobile units and the web. Using .NET framework the data can be made available anytime, anywhere and on any device. This COURSE introduces the basics of .NET Framework. Writing applications on C#.Net is covered in this course. Concepts of developing Window applications using C#.NET. Concepts of developing web applications using ASP.NET are discussed. This course helps to use ADO.NET to write the applications to connect with the back end database. The COURSE also enables the users to know the concepts of XML and the XML web services.

OBJECTIVES:

- On completion of the following units of syllabus contents, the students must be able to
- List the major elements of the .NET Framework and describe some of the major enhancements to the new version of C#.
- Describe the basic structure of a C#.NET project and use the main features of the integrated development environment (IDE).
- Use the new language features and syntax in C# .NET.
- Explain and use the basic concepts and terminology of object-oriented design and programming in C#.NET.
- Use the basic concepts and terminology of object-oriented in C# .NET.
- Create applications by using Microsoft Windows Forms.
- Create applications that use ADO.NET.
- List down the features of ASP.NET.
- Create web controls using ASP.NET.
- Learn about server controls and events in ASP.NET.
- Set up and deploy various types of C# .NET-based applications.
- Develop Window applications using XML as back end database

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	**INTRODUCTION TO .NET FRAMEWORK and C#.NET**	18
	1.1 Introduction to .NET framework Features of .NET framework, .Net Architecture – Managed Code and the CLR –Intermediate Language, Metadata and JIT Compilation–Automatic Memory Management. – Assembly, .NET objects, .NET web services	4
	1.2 Visual Studio .NET – Features, Using the .NET Framework, Exploring the Visual Studio Integrated Development Environment – System requirements – Versions	4
	1.3 INTRODUCTION TO C#.NET-- Variables and constants –data types– declaration. Operators– types– precedence – Expressions – Program flow – Decision statements – if .. then, if..then..else, switch..case, Loop statements– while, do...while, for..next, for..each..next.	4 4
	1.4 Types: Value data types – Structures, Enumerations. Reference data types – Single dimensional– Multi-dimensional arrays–Jagged arrays– Dynamic arrays	
	1.5_Classes & objects – Creating and using your own classes – Data members and member methods – Instantiate an object	2
II	**APPLICATION DEVELOPMENT USING C#.NET**	18
	2.1 Windows programming–Creating windows Forms–Working with Toolbox Controls– Button, Check Box, Combo Box, Label, List Box, Radio Button, Text Box, Group Boxes, Picture Box	5
	2.2 Advanced Controls & Events : Timer , Progress Bar, Month Calendar	

	, ToolTips, Tab Controls, Panels -Events–Click, Close, Deactivate, Load, MouseMove, MouseDown, MouseUp, Keypress ,KeyDown, KeyUp. 2.3 Multiple Document Interface (MDI) Forms – Creating MDI Applications – Creating MDI Child Windows –Arranging MDI Child Windows 2.4 Menus and Dialog Boxes – Creating menus – Menu items – Creating Submenus , Menu Shortcuts, Context menu – Using dialog boxes – show Dialog() method.	5 5 3
III	**APPLICATION DEVELOPMENT USING ADO.NET** 3.1 Features of ADO.NET. Architecture of ADO.NET – ADO.NET providers – Connection – Command – Data Adapter – Dataset. 3.2 Accessing Data with ADO.NET: Connecting to Data Source, Accessing Data with Data set and Data Reader – Modifying Table data using Command Objects – Understanding Data Set and working with Data Column and DataRow – Data Tables - Working with Data GridView 3.3 Create an ADO.NET application – Using Stored Procedures	18 8 6 4
IV	**INTRODUCTION TO ASP.NET** 4.1 ASP.NET Features: Change the Home Directory in IIS – Add a Virtual Directory in IIS Set a Default Document for IIS – Change Log File Properties for IIS – Stop, Start, or Pause a Web Site – Global.asax file 4.2 Creating Web Controls: Web Controls – HTML Controls, Using Intrinsic Controls, Using Input Validation Controls, Selecting Controls for Applications – Adding web controls to a Page. 4.3 Creating Web Forms: Server Controls – Types of Server Controls – Adding ASP.NET Code to a Page.	18 8 6 4

V	**XML** 5.1 Introduction: Advantages – HTML Vs XML – Browsing and parsing XML – Creating a XML file – Data island – Well formed XML document – XML components: elements – Entities – Comments – Processing instructions – Attributes 5.2 DTD: Declarations in DTD: Element, Attribute, Entity and Notation – Construction of an XML document – XML Namespaces – Declaring namespaces – Default namespaces – XML schema – Need and use of Schema – Building blocks – Simple elements – Defining attributes – Complex elements 5.3 XML with .NET: XML Serialization in the .NET Framework – SOAP Fundamentals- Using SOAP with the .NET Framework.	17 7 6 4

TEXT BOOK

Sl.No.	Title	Author	Publisher
1.	Web Technologies	Achyut S Godbole and Atul Kahate	Tata McGraw-Hill Education

REFERENCE BOOK:

Sl.No.	Title	Author	Publisher
1.	Programming In C#,3E, 2010.	Balagurusamy	McGrawHill Publications
2.	Comdex.NET Programming Course Kit,2014	VIKAS GUPTA	DreamTech
3.	Applications of .NET Technology,2011	ISRD Group	TMGH Education

4F6309.2 – MULTIMEDIA SYSTEMS

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F6309.2

Term : VI

Course Name : Multimedia Systems

TEACHING AND SCHEME OF EXAMINATION

No of weeks per Term: 16 weeks

COURSE	Instructions		Examination			
			Marks			Duration
	Hours / Week	Hours / Term	Internal Assessment	Autonomous Examination	Total	
Multimedia Systems	6	96	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

Unit	Topics	Time (Hrs)
I	Introduction to Multimedia	17
II	Defining Objects for Multimedia Systems	18
III	Multimedia Data and Standards, Database	18
IV	Multimedia Devices and Making Multimedia	18
V	Multimedia for Internet and Streaming	18
Test and Model Exam		7
Total		96

RATIONALE:

The exponential growth of Engineering and Technology particularly Information and Communications Engineering has benefited the day-today life of entire mankind in all respects. The research and developments are continually happening in this field to fine tune and improve the field particularly in multimedia which directly or indirectly has impact on every man's daily life. As such the introduction of current and future trends and technology of multimedia systems would strengthen the knowledge and skills of Engineering community in taking one-step further the prosperity of mankind.

OBJECTIVES:

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

- Understand the relevance and underlining infrastructure of Multimedia system.
- Apply contemporary theories of multimedia learning to the development ofmultimedia products.
- Analyze instructional and informational media (audio/ visual materials, web basedmaterials, games and simulations etc) applied with multimedia techniques.
- Acquire knowledge about multimedia software tools.
- Understand the multimedia systems components and fundamental elements of anymultimedia system.
- Acquire knowledge about compression / decompression and various media fileformats.
- Understand the underlying principles of processing various multimedia data.
- Understand the working principles of various multimedia input–output devices.
- Gain knowledge about various multimedia related standards.
- Understand the design and development process of multimedia projects.
- Understand the technologies of multimedia used in Internet and its applications.
- Acquire knowledge about streaming, webcasting and many evolving technologies.

DETAILED SYLLABUS

Contents: Theory

Unit	Name of the Topic	Hours
I	1.1 **Introduction: Definition of Multimedia, Multimedia Basics, Multimedia** Elements, Multimedia Applications, Delivering Multimedia. 1.2 Multimedia Systems Architecture: Multimedia Workstation Architecture, High resolution Graphic displays, The IMA Architectural Framework, Network architecture for Multimedia systems. 1.3 Evolving Technologies For Multimedia Systems: Hypermedia Documents, Hypertext, Hyper Speech, HDTV and UDTV, 3D Technologies and Holography. 1.4 Defining Objects for Multimedia System: Text, Images, Audio and Voice, Full-Motion and Live Video, Multimedia Data Interface Standards, Video Processing Standards. 1.5 Multimedia Software: Overview of Multimedia Software Tools, Open Source Replacements, Multimedia OS, VRML, OpenGL, Windows and Open Source API.	17 3 4 3 3 4
II	2.1 Text: About Fonts and Faces, Using Text in Multimedia, Hypermedia and Hypertext, Using Hypertext, Hypermedia Structures, Hypertext Tools. 2.2 Images: Making Still Images, Bitmaps, 1 bit images, 8-bit gray level images, 8-bitcolor images, Dithering, 24 bit color images, Vector Drawing, 3-D Drawing and Rendering, Color, Understanding Natural Light and Color, Computerized Color, Color Palettes, Color Look-up table. Image Processing¸ Image acquisition, Image enhancement. Color image processing.	18 3 4

	2.3 Sound : The Power of Sound, Digital Audio, Making Digital Audio Files, MIDI Audio, MIDI vs. Digital Audio, Multimedia System Sounds, Adding Sound to Your Multimedia Project , Audio Recording, Keeping Track of Your Sounds, Audio CDs, Sound for your Mobile, Sound for the Internet.	4
	2.4 Animation, the Power of Motion, Principles of Animation, Animation by Computer, Animation Techniques. Animation using OpenGL.	3
	2.5 Video: Using Video, How Video Works and Is Displayed, Analog Video, Digital Video, Displays, Digital Video Containers, Codec, Video Format Converters, Obtaining Video Clips, Shooting and Editing Video.	4
III	3.1 Data Compression: Need for Data compression, General Data compression Scheme, Compression standards, Non-lossy compression for images, Lossy compression for Photographs and Video, Hardware Vs Software Compression.	18 3
	3.2 Compression Schemes and standards:(Only Concepts of) Binary Image Compression, Color, Gray Scale and Still-Video Image Compression, JPEG, Video Image Compression, Multimedia Standards for Video, Requirements for Full-motion Video Compression, MPEG, Audio compression, Fractal compression, advantages / disadvantages.	4
	3.3 Data and File Format Standards: Popular File Formats, RTF, RIFF, GIF, PNG, TIFF, MIDI, JPEG, JFIF, AVI, WAV, BMP, WMF, MIX, MPEG standards. TWAIN.	3
	3.4 Database System: Data Types in Multimedia Databases, Storage and Retrieval, Database Management System, Database Organization and Transaction Management for Multimedia System.	4
	3.5 Content Based Retrieval in Digital Libraries(C-BIRD)– C-BIRD GUI – Color Histogram – Color Density – Color Layout – Texture layout- - Search by Illumination Invariance – Search by Object Model.	4
IV	4.1 Multimedia Input/output Technologies: Limitations of Traditional input devices, Multimedia input/output devices, PEN input, Working of	18 5

	Electronic Pen, Digitizer, (only the concepts of) Video and Image display systems, Printer, Scanner. Digital voice and video: Voice Recognition system, Digital Camera, Video frame grabber, Video and still image processing, Full – motion video controller, Video Capture Autonomous. 4.2 Making Multimedia: The Stages of a Multimedia Project: Creativity, Organization, Communication, Hardware, Software: Text Editing and Word Processing Tools, OCR Software, Painting and Drawing Tools, 3-D Modeling and Animation Tools, Image-Editing Tools, Sound-Editing Tools, Animation, Video, and Digital Movie Tools, Authoring Systems, Making Instant Multimedia, Types of Authoring Tools. 4.3 Multimedia Skills: The Team, Project Manager, Multimedia Designer, Interface Designer, Writer, Video Specialist, Audio Specialist, Multimedia Programmer, Producer of Multimedia for the Web. 4.4 Designing and Producing, Designing, Designing the Structure, Designing the User Interface, Producing–Tracking, Copyrights.	5 4 4
V	5.1 The Internet and Multimedia : The Bandwidth Bottleneck, Internet Services, MIME Types, Multimedia on the Web, Web Page Makers and Site Builders, Plug-ins and Delivery Vehicles. 5.2 Designing for the World Wide Web: Developing for the Web, Small-Device Workspace, text and images for the Web, Clickable Buttons, Client-Side Image Maps, Sound for the Web, Animation for the Web, and Video for the Web, HTML5 Video - Plug-ins and Players. 5.3 Multimedia Communication: Study of Multimedia networking, Quality of data transmission, Media on demand, Multimedia Over Wireless and Mobile Networks – Media Entertainment, web-based applications, e-learning and education. 5.4 Streaming: Introduction - Applications of Streaming- The Streaming Architecture, Stream Serving: Webcasting – On-Demand Servicing – Voice and Video Conferencing - Internet Telephony - Virtual Reality.	18 4 4 4 6

Reference books

Sl. No.	Name of the Book	Author	Publisher
1	Entrepreneurship and Small Business Management	P. M. Charantimath	Pearson Education, New Delhi
2	India land of a Billion Entrepreneurs	Upendra Kachru	Pearson Education, New Delhi
3	Entrepreneurship Development	CPSC, Manila	Tata Mcgraw-Hill Publishing Company Limited, New Delhi
4	Entrepreneurship - Successfully Launching New Ventures	Bruce R.Barringer R.Daunce Ireland	Pearson Education, New Delhi
5	Entrepreneurship	Robert Hisrich M.P.Peter D.A.Shephard	Tata Mcgraw-Hill Publishing Company Limited, New Delhi

4F6309.3 – DATA SCIENCE AND BIG DATA

PROGRAMME NAME : DIPLOMA in Computer Engineering

Course Code : 4F6309.3

Term : VI

Course Name :Data Science and Big Data

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per Term 16 Weeks

COURSE	Instructions		Examination			
Data Science and Big Data	Hours /Week	Hours/ Term	Marks			
	6	96	Internal Assessment	Autonomous Examination	Total	Duration
			25	100 *	100	3 Hrs

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

Unit No.	Topic	No. of Hours
I	Introduction to Data Science	18
II	Fundamentals of Data Modeling	18
III	Fundamentals of Big Data	18
IV	Big Data Storage	18
V	Big Data Processing	17
Test and Revision		7
Total		96

RATIONALE:

This course provides a comprehensive understanding of data science and data modeling. The foundation on data science is laid to understand the core concepts and the techniques that underlie today's big data computing technologies. This course helps the students in identifying and applying appropriate techniques and tools to solve problems in managing huge quantities of data.

OBJECTIVES:

This COURSE has two major divisions. The objectives of these topics are givenbelow.

- To understand the fundamentals of data science, various data types, theirsources, problems and issues, various formats of data .
- To apply the Python libraries and Microsoft Excel for Data analysis.
- To work with Microsoft Excel for data analysis and applying various functions for data analysis.
- To familiarize with the basic data representation methods.
- To understand the concepts of samples, attributes and their relationships.
- To develop and implement simple linear regression models.
- To understand the concept of model equation and of fit.
- To understand and differentiate the concepts of predictive models and theclassification models.
- To familiarize with the concepts of Neural Networks, Decision Trees andNearest neighbors techniques.
- Get conceptual understanding of Big Data, Web data, classification of data, Big Data characteristics, types, classification and handling techniques.
- Get the conceptual understanding of the impact of ICT developments on BigData Adoption.
- Understand the Big Data Analytics Life Cycle.
- Get the conceptual understandings of Big Data Storage systems and

technologies.

- Understand the concepts of NoSQL databases, their types andcharacteristics.
- Understand the concepts of Hadoop and its Ecosystem.
- Understand the steps involved in Big data processing like parallelprocessing, distributed processing and Batch processing.
- Get understanding of MapReduce, map and reduce tasks, MapReduce algorithm.
- Understand the various techniques for Big Data analysis.
- Get introduced to the concepts and types of machine learning techniques.
- Explore the applications of Big Data in different fields.

DETAILED SYLLABUS

Contents : Theory

Unit	Name of the Topic	Hours
I	**Introduction to Data Science**	18
	1.1.Data Science - Subfields of Data Science- Data Types-Data Science Road Map- Programming languages for Data Science- Problems with Data- Formatting issues- Python features- Python Technical libraries- Python Arrays and Data Frames.	7
	1.2.Data sources- Data Quality- Consistency and accuracy (Integrity), Noise: Outliers, Missing and Duplicate values- Data Preprocessing using Cleaning, Enrichment, Editing, Reduction, Wrangling- Data Formats: TXT, CSV, XML, JSON, TLV- Loading and Saving files	5
	1.3 Working with Excel: Loading data- Statistical functions- Text Functions- Lookup Functions- Sorting- Filtering- Data Analysis: Correlation, covariance, Descriptive statistics, Regression.	6

II	**Fundamentals of Data Modelling** 2.1.Linear Algebra: Data representation - Data as a Matrix - Samples and Attributes- Classification of attributes- Concept of Rank-Identify the relationship among attributes 2.2.Predictive models: Regression Models - Linear regression - Simple and Multiple Regression-Correlation-Mean squared Error-Testing goodness of fit-Model Equation 2.3.Classification models: Two class- Multi class classification-Separability- Performance measures- Terminology- Confusion Matrix-Types (Concepts only): Neural Network- Decision Trees-Nearest Neighbors.	18 6 6 6
III	**Fundamentals of Big Data** 3.1Data - Web Data- Classification of Data- Big Data-Characteristics- Volume, Velocity, Variety, Veracity, Value- Need for Big Data- Big Data Types and classifications- Sources of Big Data-Big Data handling techniques-Challenges. 3.2 Impact of ICT developments on Big data Adoption: data analytics and data science, digitization, affordable technology and commodity hardware, social media, hyper connected communities and devices, cloud computing and IoT. 3.3.Big Data Analytics Life Cycle: Business Case Evaluation, Data Identification, Data Acquisition & Filtering, Data Extraction, Data Validation & Cleansing, Data Aggregation & Representation, Data Analysis, Data Visualization, Utilization of Analysis Results.	18 7 5 6
IV	Big Data Storage 4.1.Storage Concepts: Clusters, File Systems, Distributed File System, NoSQL, Sharding, Replication, Master Slave, Peer to Peer, CAP Theorem 4.2. Big Data Storage Technologies: On-Disk Storage Devices-Distributed File system-RDBMS- NoSQL Databases- Characteristics of NoSQL- Types of NoSQL Storage devices. In-Memory storage	18 6 6

	devices-Data Grids-Databases 4.3.Hadoop: Introduction- Hadoop and its Ecosystem: Hadoop core components - Features of Hadoop- Hadoop Ecosystem components- Hadoop streaming- Hadoop pipes- Hadoop distributed File system- HDFS data storage -Hadoop Ecosystem tools.	6
V	**Big Data Processing** 5.1.Parallel data processing- Distributed data processing- Hadoop Framework- Processing workloads- cluster for processing- Batch processing with MapReduce- Map and Reduce Tasks- MapReduce algorithms- Processing in Realtime mode- Real time processing and MapReduce. 5.2.Big Data Analysis Techniques: Quantitative analysis, Qualitative analysis, Data mining, Statistical analysis: Correlation, regression, Machine Learning: Classification, clustering, outlier detection, filtering. Semantic analysis: Natural language processing, Text Analytics, Sentiment analysis, Visual Analysis 5.3.Big Data Analytics Applications and case studies: Big data in Marketing and sales- Big data and Healthcare- Big data in Medicine- Big Data in Advertising.	17 7 5 5

REFERENCE BOOKS

Sl.No.	Title	Author	Publisher
1	The Data Science Handbook,2017	Field Cady	Wiley
2	Python Data Science Handbook-Essential tools for working with	Jake VanderPlas	O'REILLY
3	Introducing Data Science,2016	Davy Cielen, Arno D. B. Meysman, Mohamed Ali	manning publications
4	Big Data Fundamentals Concepts, Drivers &	Thomas Erl, Wajid Khattak	Prentice Hall

4F6310 – COMPUTER HARDWARE AND NETWORKING PRACTICAL

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F6310

Term : VI

Course Name : Computer Hardware and Servicing Practical

TEACHING AND SCHEME OF EXAMINATION

No.ofweeksperTerm : 16Weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours /Term	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Computer Hardware and Networking Practical	4	64	25	100*	100	3Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

The course aims at making the students familiar with various parts of Computers, Laptops, Tablet, devices and know the different types of peripherals desired. In addition, the course will provide the students with necessary knowledge and skills in computer ,laptop, notebook, tablet its software installation and maintenance and to make them diagnose the software faults. This COURSE also gives the knowledge and competency to diagnose the problems in computer hardware and peripherals and also gives the knowledge for trouble shooting for systematic repair and maintenance of computers and laptops.

OBJECTIVES

- On completion of the following exercises, the students must be able to
  Know the various indicators, switches and connectors used in Computers.
- Familiarize the layout of SMPS, mother Autonomous and various Disk Drives.
- Configure Bios setup options.
- Installvarioussecondarystoragedeviceswithmemorypartitionandformatting.
- Know the various types of printer installation and to handle the troubleshooting ability.
- Assemble PC system and checking the working condition.
- Installation of Dual OS in a system.
- Identify the problems in Computer systems, software installation and rectification
- Assembling and disassembling of Laptop to identify the parts and to install OS and configure it.
- Enable to perform different cabling in a network.
- Configure Internet connection and use utilities to debug the network issues.
- Configure router for any topology
- Installation of sever operating system
- Configuring various services in server operating system
- Install various packets niffing tools in linux

Course Outcomes:

CO	Details	BTL
4F6310-CO1	Able to distinguish the knowledge of PC computer systems and each components.	4
4F6310-CO2	Able to choose and assemble and test state-of-art computer hardware, including extensive hands-on experience with software and hardware	5
4F6310-CO3	Able to choose and assemble laptop	6
4F6310-CO4	Able to support and assemble the mobile phone components and servicing	6
4F6310-CO5	Able to design and construct networks using network devices.	6

Mapping Course Outcomes (CO) - Program Outcomes (PO)

CO	Program Outcomes (PO)							ProgramSpecific Outcomes (PSO)	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PSO1	PSO 2
4F6310-CO1	3	3	2	3	3	2	3	3	2
4F6310-CO2	3	3	2	3	3	3	3	3	2
4F6310-CO3	3	3	3	3	3	3	3	3	3
4F6310-CO4	3	3	3	3	3	3	3	3	3
4F6310-CO5	3	3	3	3	3	3	3	3	3
TOTAL	15	15	13	15	15	14	15	15	13
No.of COs Mapping with POs	5	5	5	5	5	5	5	5	5
Average	3	3	2.6	3	3	2.8	3	3	2.6
Round off(Average)	3	3	3	3	3	3	3	3	3
Correlation									
			Medium – M /2			Weak – W / 1			

LABEXERCISES

PART–A

Contents: Practical

1	HARDDISK a) Install Hard Disk. b) Configure CMOS-Setup. c) Partition and Format Hard Disk. d) Identify Master/Slave/IDE Devices. e) Practice with scan disk, disk cleanup, disk De-fragmentation, Virus Detecting and Rectifying Software. f) Creating System restore points in windows for system recovery.
2	a) Install and Configure a DVD Writer & Blu-ray Disc Writer. b) Recording a Blank DVD & Blu-ray Disc.
3	Printer Installation and Servicing a) Install and configure Dot matrix printer, Inkjet and Laser printer. b) Troubleshoot the above printers
4	Install and configure Scanner, Web cam, and bio-metric device with system and troubleshoot the problems
5	Do the following cabling works in a network a) Cable Crimpling b) Standard Cabling c) Cross Cabling d) Testing the Crimped cable using a Cable tester
6	a) Configure Host IP, Subnet Mask and Default Gateway in a system in LAN(TCP/IP Configuration). b)Configure Internet connection and use IPCONFIG, PING / Tracert and Net stat utilities to Debug the Network issues.
7	a) Install and configure Network Devices: HUB, Switch and Routers b)Install and Configure Wired and Wireless NIC and transfer files between systems
8	Transfer files between systems in LAN using FTP Configuration. Install a printer in LAN and share it in the network.

PART B–SYSTEM ADMINISTRATION PRACTICAL

1 Installation of Windows 2008/2013Server

2 Installation and configuration of DHCP Server

3 Installation and configuration of Mail Server

4 Installation and configuration of Active directory Services. Create a user and permission using logon script and group permissions.

5 Installation and configuration of DNS Server

6 a) Installation of Red Hat Linux using Graphical mode.

b) Installation of Red Hat Linux using VMware.

7 Installationofvariousopensourcepacketsniffingtoolsandinspectpacketsin linux.

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DETAILED ALLOCATION OF MARKS	
Procedure Writing–One Question from PART–A	20 Marks
Procedure Writing–One Question from PART-B	25Marks
Executing Exercise(PART–A)	20Marks
Executing Exercise(PART–B)	20Marks
Result(Part–A)	5Marks
Result(Part–B)	5Marks
VIVA -VOCE	5Marks
TOTAL	100Marks

LIST OF EQUIPMENTS

Hardware Requirements:

Desktop Systems	30Nos
Hard disk drive	06Nos
DVD, Blu-ray Drive	06Nos
Blank DVD ,Blu-ray Disc	30Nos
Head cleaning CD	01No
Dot matrix Printer	01No

Laser Printer		01No
Ink Jet Printer		01 No
Web camera		01 No
Biometric Device		01 No
Scanner		01 No
Crimping Tool		06Nos
Screwdriver set		06Nos
Network Cables	50 mtrs	
Switch		01No
Hub		01No
Router		01No
Wires/ Wire cutters		

Software Requirements:

Windows server OS

Windows /Linux OS

DVD and Blu-ray Burning S/W.

4F6311.1 – COMPONENT BASED TECHNOLOGY PRACTICAL

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F6311.1

Term : VI

Course Name : Component Based Technology Practical

TEACHING AND SCHEME OF EXAMINATION

No.of weeks per term 16Weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours /Term	Marks			Duration
			Internal Assessment	Autonomous Examinations	Total	
COMPONENT BASED TECHNOLOGY PRACTICAL II	4	64	25	100*	100	3Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

VB .NET is the visual programming technique based on Object Oriented Concepts. This COURSE will give the students an in-depth understanding the features of VB .NET. The practical exercise of VB.NET during the course of study will reinforce the understanding of the COURSE.

OBJECTIVES:

On completion of the following exercises, the students must be able to

- To Create simple web page using HTML5 & CSS3
- To Create web pages using simple ASP.NET
- Obtain knowledge of C#.NET.
- Obtain Knowledge of Developing Database Applications using ADO.NET
- To Develop web applications using .NET

LIST OF EXPERIMENTS:

1. Create a sample Webpage for Our Institution using HTML5&CSS3
2. Perform form validation using HTML5 & CSS3
3. Write a Program in C# to check whether the number is Palindrome or not.
4. Write a Program in C# for Stack Operations
5. Create Online feedback Form using ASP.NET controls
6. Develop an Application for calculating factorial of a given number using C# and ASP.NET controls.
7. Develop Calculator Application using C# and ASP.NET controls
8. Write a Program that gets and validates user input such as the user name, mode of payment, appropriate credit card using Validation Controls in ASP.NET
9. Create ASP.NET Web page that Helps the College Administrator to know the cost of maintaining college playground using C# & SQL Server.
10. Create ASP.NET Web page for Online Electronic Bill Payment System using C# and SQL Server.
11. Create Employee pay slip and Perform Edit, Insert, Delete Operations using Details view.
12. Create Student attendance Report and Perform Edit, Insert, Delete Operations using Grid view.
13. Create ASP.NET Web page for Student Mark Analysis System using C# and Oracle .
14. Create ASP.NET Web page for Ticket Reservation System using C# and Oracle
15. Create Online Registration form using ASP.NET and Ms-Access database.
16. Develop a Window application to read employee records from Database and generate XML document containing employee records
17. Develop a Window application to read students records from Database using ADO.NET and generate XML document containing students records
18. Create an any one application Using (ASP.NET, ADO.NET, C#)

i)Hospital Management

ii)Ticket Reservation

iii)Library Management

iv)ATM

v)Online Shopping

vi)Internal Mark Assessment

DETAILED ALLOCATION OF MARKS	
Procedure Writing–One Question from PART–A	20 Marks
Procedure Writing–One Question from PART-B	25Marks
Executing Exercise(PART–A)	20Marks
Executing Exercise(PART–B)	20Marks
Result(Part–A)	5Marks
Result(Part–B)	5Marks
VIVA -VOCE	5Marks
TOTAL	100Marks

RESOURCE REQUIREMENTS

HARDWARE REQUIREMENT

- Desktop Computers – 60 Nos
- Printer – 1 No

SOFTWARE REQUIREMNT

- Visual Studio, Browsers(Internet Explorer version 8 & above, Mozila Firefox, Google Chrome)
- Microsoft SQL Server 2005/2008 or above

4F6311.2 - MULTIMEDIA SYSTEMS PRACTICAL

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F6311.2

Term : VI

Course Name : Multimedia Systems Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per Term: 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Term	Marks			Duration
			Internal Assessment	Autonomous Examination	Total	
Multimedia Systems Practical	4	64	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

The competencies which form the basis for this practical enable students to develop skills with interactive visual and auditory technology. This lab prepares students to use digital multimedia for communication, creativity, collaboration, critical thinking. This practical is to bring awareness to the students regarding the numerous resources available in the area of multimedia. Students will become a skilled and creative user of current multimedia technology with an increased understanding of multimedia concepts and techniques

OBJECTIVES:

After the completion of this lab students will be able to

- Create Audio / Video hardware & software applications.
- Record & edit digital audio using sound editing software.
- Learn about video editing.
- Apply various filters & Compression techniques in Multimedia Applications.
- Learn photo editing software.
- Learn about 2D, 3D and cloud animation.
- Learn about chroma key technique.

DETAILED SYLLABUS

1. Use a audio processing software and perform the audio editing tasks – Import audio, select and edit the sound, create fade-in and fade-out effects, label audio segments, use noise remove filter, mix multiple sound sources, change stereo to mono tracks, export audio to different format and save.
2. Use a video processing software to perform – Trim video clips, rotate video, merge video, split video, add titles, add special effects and edit video dimensions, bit rate, frame rate, sample rate, channel.
3. Create a movie from video clips to demonstrate – Audio-Video mixing, add music, video effects, video transition and titles.
4. Use suitable software and perform a) compress / decompress audio / video files. b) Convert audio/video to different format.
5. Use a scanner to create two or more partial scanned images of large poster/photo. Create a panoramic view of multiple photos by stitching together them using any panorama software.
6. Develop a web page which shows animation with sound effect using any professional HTML editor.
7. Convert the given image into pencil sketch using suitable photo editing software.
8. Design a certificate for sports day with different text effects using suitable software.
9. Import any two pictures, Morph, Merge and Overlap those two pictures.
10. Draw the raindrop that falls on the ground. Show the splash effect and sound effect using suitable software.
11. Create a moving cloud animation using any animation software.
12. Create a 2D animation using motion guide layer and masking.
13. Create a 2D animation of an aeroplane take off using suitable software.
14. Design a metallic text using 3D animation tool

15. Import an image with green screen background. Change the background of the imported image with required image using chroma key technique.

DETAILED ALLOCATION OF MARKS	
Aim	5 Marks
Software Identification	5 Marks
Procedure / Program	35 Marks
Execution	40 Marks
Result with printout	10 Marks
VIVA – VOCE	5 Marks
TOTAL	100 Marks

LIST OF HARDWARE SUGGESTED

I Desktop PCs with i3 or High end processor, 200 GB HDD, 4 MB RAM – 36 Nos

II Laser Printer Monochrome, Color – 1 Each

III Digital (Video) Camera - 2 No.

IV Flat bed A4 size Scanner - 1 No.

LIST OF SOFTWARE SUGGESTED

Operating system: Windows 7, Windows 10, Linux

Software tools: Open Source Software or Commercial Software.

The following is the suggestive list of open source software and their commercial replacement.

Experiments may be done using either open source software or commercial software.

3D Graphics and Animation

1. Art of Illusion Replaces: AutoDesk Maya

2. Blender Replaces: AutoDesk Maya

Audio Players

3. aTunes, Audacious, Clementine are Replaces: iTunes

4. CoolPlayer, MPH-HC Replaces: Windows Media Player

5. Zing Replaces: Windows Media Player

Audio Recorders and Editors

6. Audacity Replaces: Sonar X1, Sony ACID, Adobe Audition

7. Frinika Replaces: Sonar X1, Sony ACID

Audio Ripping and Conversion

8. fre:ac, BonkEnc Exact Audio Copy, Audio Convertor Studio

9. CUERipper, CDex Exact Audio Copy

10. MMConvert Exact Audio Copy

Multimedia Players

11. VLC Media Player Replaces: Windows Media Player

12. Mplayer Replaces: Windows Media Player

13. KODI Replaces: Windows Media Player

14. MediaPortal Replaces: Windows Media Player

Video Editing

15. Cinelerra Replaces: Adobe Premiere

16. OpenShot Video Editor Replaces: Adobe Premiere Pro CS5

17. Avidemux Replaces: Adobe Premiere

18. Kdenlive Replaces: Adobe Premiere Pro CS5

19. CineFX Replaces: Adobe Premiere Pro CS5

Video File Conversion

20. DVDx Replaces: Movavi Video Converter, Zamzar

21. DVD Flick Replaces: Movavi Video Converter, Zamzar

22. FFDShow Replaces: Movavi Video Converter, Zamzar

Video Player

1. Miro Replaces: Windows Media Player

   CD / DVD Burners

   24 Infrared Recorder

   DVD Authoring

   25. DVD Flick, DVDStyler, Bombono DVD

4F6311.3 - DATA SCIENCE AND BIG DATA PRACTICAL

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F6311.3

Term : VI

Course Name : Data Science and Big Data Practical

TEACHING AND SCHEME OF EXAMINATION

No of weeks per Term: 16 weeks

Course	Instructions		Examination			
	Hours / Week	Hours / Term	Marks			Duration
			Internal Assessment	Autonomous Examinations	Total	
Data Science and Big Data Practical	4	64	25	100*	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

The data science process is about analyzing, visualizing, extracting, managing and storing data. It enables companies to efficiently understand large volume of data from multiple sources and derive valuable insights to make smarter data-driven decisions. Data Science is widely used in various industry domains, including marketing, healthcare, finance, banking, policy work, and more. This practical subject helps students understand how they can use Python NumPy, Pandas and Matplotlib to critically examine a dataset with summary statistics and graphs, and extract meaningful insights. Also, the data analysis using Microsoft Excel has been included to familiarize some advanced features like data analysis. Microsoft Excel has been chosen as the software to start with in this subject because many of our students are already be familiar with Excel, so very little further time will be required for them to learn to apply Excel for Data Processing. Processing unstructured data in the form of text files is also introduced. Basic statistics and data visualization techniques have been introduced as simple exercises.

OBJECTIVES:

On Completion of the exercises in this practical subject, the students will be able to

- Install the required packages to set up a data science coding environment
- Load different types of data into a Python Environment.
- Use basic operation with NumPy and Pandas libraries to prepare data
- Preprocess the data by handling missing data, duplicate values
- Aggregate the data
- Create data subsets
- Perform data cleaning operations
- Develop a single dataset by merging various datasets together
- Examine statistical summaries
- Use Matplotlib to create data visualizations
- Find the relationship between the data attributes
- Measure the basic statistical properties of the data
- Fit a regression model and understand the predictive capabilities of the models.
- Understand the basic text processing concepts.

LAB EXERCISES

1.	Load the data about the exam fee paid by the students of all branches of your college. Perform the following operations on it using Excel. a. Arrange the data branch wise within the branch and arrange register numbers. Replace all names with CAPITAL. b. Count the number of students in each branch and Term c. Calculate the total fee paid by students of each branch. d. Find the minimum and the maximum fee paid by the student. e. Find the sum, average, max, min of fee paid in each branch
2.	Load the data collected from all students during online answer paper submission with the following details for each exam. Regno, name, course_code, subject_code, Term, number_of_pages(nop), mode_of_dispatch, email_id, mobile_number.

	Perform the following operations using Excel. a. Check the file for any missing data in the columns. b. Count the number of students appeared for the exam. c. Count the number of papers (subjects) submitted by each student (Using register number) d. Create a new column by concatenating register number and the subject code. Using this column, perform the vlookup function to find the number of pages (nop) written by the students in that subject, and the mode of dispatch. e. Count the number of students appeared (submitted) for each subject. f. Count the number of different (unique) subject_codes that have been submitted.
3.	Read the dataset from the Auto-MPG repository and perform the descriptive statistics on the data using Excel-Data Analysis. Verify the same using the statistical functions of Excel.
4.	Read the dataset from the Auto-MPG repository and a) Identify the relationship between the variables using correlation. b) Identify the independent and the dependent variables. c) Perform the linear regression on the related variables and find the regression equation. d) Estimate the performance of the regression model.
5.	Load any external csv data file and store it in a Pandas DataFrame. a. Check the shape and column types of the DataFrame (rows and columns). [Note: Use df.info () and df.shape()] b. Subset the data column by names, by index, by range. c. Subset data based on index label, row index, multiple rows. d. Subset based on rows and columns
6.	DESCRIPTIVE STATISTICS using Python-Pandas

	a) Write a Python script to find basic descriptive statistics on AUTO-MPG dataset. b) Find the values of the descriptive statistics. c) Determine the measures of a central location, such as mean, markers such as quartiles or percentiles, and measures of variability or spread, such as the standard deviation.
7.	READING AND WRITING DIFFERENT TYPES OF DATASETS a. Reading different types of data sets (.txt, .csv) from Web and disk and writing in file in specific disk location. b) Reading Excel data sheet using Pandas c) Export the values from the DataFrame to several other formats.
8.	DATA VISUALIZATION a. Load the Auto-MPG dataset from csv file into pandas. a) Analyze the Behavior of the Number of Cylinders and Horsepower Using a Boxplot b) Find the relationship between horsepower and weight using the scatter plot using the data from Auto-MPG: c) Find the outliers using plot. d) Plot the histogram, bar chart and pie chart on sample data.
9.	COVARIANCE and CORRELATION a. Find the correlation and covariance between two variables. b. Plot the correlation plot on the dataset and visualize giving an overview of relationships among data. C. Fit a simple linear regression model using libraries such as Numpy or Scikit-learn. (importLinearRegression from sklearn.linear_model) • Import the packages and classes you need. • Provide data for independent and dependent variables.

	• Create a regression model and fit it with existing data. • Check the results of model fitting to know whether the model is satisfactory.
10.	OUTLIER Detection When analysing data collected as part of a science experiment it may be desirable to remove the most extreme values before performing other calculations. Write a function that takes a list of values and an non-negative integer, n, as its parameters. The function should create a new copy of the list with the n largest elements and the n smallest elements removed. Then it should return the new copy of the list as the function's only result. The order of the elements in the returned list does not have to match the order of the elements in the original list.
11	Text Processing a) Open a text file and read all the lines of the file. b) Tokenise (separate the words) the text. c) Count the total number of lines, total number of words and unique words d) Sort the words alphabetically. e) Find the most frequent and least frequent words. f) List the words having certain suffixes. Note: You can open a Tamil text file using 'UTF-16' encoding.
12	Text Processing-II Load a text file containing a list of words into aDataFrame. Apply the following functions and verify the results. Replace(), repeat(), count(pattern), startswith(pattern), endswith(pattern), find(pattern), findall(pattern).
	Mini Project: Develop any data science application using Python/Excel for processing your college data.

DETAILED ALLOCATION OF MARKS	
Writing answer for any one program from the list	45 Marks
Executing the program	35 Marks
Result with printout of the Program	10 Marks
Demonstration of Mini Project	5 Marks
VIVA – VOCE	5 Marks
TOTAL	100 Marks

Hardware Requirements

Desktop Systems 36 Nos

For the optimal student experience, we recommend the following hardware configuration:

• Processor: Intel Core i5 or equivalent

• Memory: 4 GB RAM

• Storage: 35 GB available space

Software Requirements

You'll also need the following software installed

- OS: Windows 7 SP1 64-bit, Windows 8.1 64-bit or Windows 10 64-bit, Ubuntu Linux.
- Browser: Google Chrome/Mozilla Firefox Latest Version
- Notepad++ as IDE (this is optional, as you can practice everything using the Jupyter Notebook on your browser)
- Python 3.4+ (latest is Python 3.9) installed (from https://python.org)
- Python libraries as needed (NumPy, Pandas, Matplotlib and so on)
- Microsoft Excel

Install Anaconda by following the instructions at this link: https://www.anaconda.com/distribution/

Data Source:

Students may use the following data sources form their department

Online examination answer paper uploaded details.

Data about the alumni of your college

Your college result details.

Data collected from students like students' profile, resume etc.

Some other online resources for testing

https://archive.ics.uci.edu/ml/machine-learning-databases/auto-mpg/

https://archive.ics.uci.edu/ml/machine-learning-databases/iris/iris.data

https://www.kaggle.com/rohankayan/years-of-experience-and-salary-dataset

4F6402 – PROJECT WORK AND INTERNSHIP

Programme Name : DIPLOMA IN COMPUTER ENGINEERING

Course Code : 4F6402

Term : VI

Course Name : Project Work and Internship

TEACHING AND SCHEME OF EXAMINATION

No.of weeks per term 16Weeks

COURSE	Instructions		Examination			
	Hours / Week	Hours /Term	Marks			Duration
			Internal Assessment	Autonomous Examinations	Total	
PROJECT WORK AND INTERNSHIP	6	96	25	100*	100	3Hrs.

Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

Project Work aims at developing innovative skills in the students whereby they apply the knowledge and skills gained through the course by undertaking a project. The individual students have different aptitudes and strengths. Project work, therefore, should match the strengths of students. The primary emphasis of the project work is to understand and gain the knowledge of the principles of software engineering practices, so as to participate and manage a large software engineering projects in future

OBJECTIVES:

- Implement the theoretical and practical knowledge gained through the curriculum into an application suitable for a real practical working environment preferably in an industrial environment.

- Develop software packages or applications to implement the actual needs of the community.
- Get exposure on industrial environment and its work ethics.
- Learn and understand the gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required
- Carry out cooperative learning through synchronous guided discussions within the class in key dates, asynchronous document sharing and discussions, as well as to prepare collaborative edition of the final project report.
- Expose students to the field of computing and to gain experience in software design.
- Understand and gain knowledge about disaster management.

GUIDELINES FOR PROJECT FORMULATION

The project work constitutes a major component in most of the professional programmes and it is to be carried out with due care and should be executed with seriousness by the candidates. Batch size : Maximum 6 students per batch

TYPE OF PROJECT

As majority of the students are expected to work out a real life project in some industry / research and development laboratories / educational institutions / software companies, it is suggested that the project is to be chosen which should have some direct relevance in day-to-day activities of the candidates in his/her institution. Students areencouraged to work in the areas listed at the end. However, it is not mandatory for a student to work on a real life project. The student can formulate a project problem with the help of Guide.

PROJECT PROPOSAL (SYNOPSIS)

The students of all the Diploma Courses have to do a Project Work as part of the Curriculum and in partial fulfillment for the award of Diploma by the State Autonomous of Technical Education and Training, Tamil Nadu. In order to encourage students to do worthwhile and innovative projects, every year prizes are awarded for the best three projects i.e. institution wise, region wise and state wise. The Project work must be reviewed twice in the same TERM. The project work is approved during the V TERM by the properly constituted committee with guidelines.

The project proposal should clearly state the project objectives and the environment of the proposed project to be undertaken. The project work should compulsorily include the software development. The project proposal should contain complete details in the following form:

1. Title of the Project.

2. Introduction and Objectives of the Project.

3. Project Category (DBMS/OOPS/Networking/Multimedia/Artificial Intelligence / ExpertSystems etc.).

4. Tools / Platform, Hardware and Software Requirement specifications.

5. Analysis (DFDs at least up to second level , ER Diagrams/ Class Diagrams/ DatabaseDesign etc. as per the project requirements).

6. A complete structure which includes: Number of modules and their description to provide an estimation of the student's effort onVthe project. Data Structures as per theproject requirements for all the modules.

- Process logic of each module.
- Testing process to be used.
- Reports generation (Mention tentative content of report).

7..Are you doing this project for any Industry/Client?
Mention Yes/No.

If Yes, Mention the Name and Address of the Industry or Client.

8. Future scope and further enhancement of the project. Also mention limitation of the project.

SUGGESTIVE AREAS OF PROJECT WORK:

- Database Management Systems
- Software Engineering and Software Development
- Web page Designing
- Digital Image Processing
- Computer Graphics and Animation
- Multimedia Systems
- Computer Networks

- Artificial Intelligence
- Internet and e-commerce
- Computer Security and Cryptography
- Computer hardware and embedded systems
- Internet Of Things
- Cloud Computing
- Any other related area found worth.

INTERNSHIP TRAINING

The internship training for a period of two weeks shall be undergone by every candidate at the end of IV / V TERM during vacation. The certificate shall be produced along with the internship report for evaluation. The evaluation of internship training shall be done along with final year "Project Work & Internship" for 20 marks. The internship shall be undertaken in any industry / Government or Private certified agencies which are in social sector / Govt. Skill Centres / Institutions / Schemes.

A neatly prepared PROJECT REPORT as per the format has to be submitted by individual student during the Project Work & Internship Autonomous examination.

INTERNAL ASSESSMENT:

The internal assessment should be calculated based on the review of the progress of

the work done by the student periodically as follows.

Detail of assessment	**Period of assessment**	**Max.marks**
First Review	6th week	10
Second Review	12th week	10
Attendance	Entire TERM	5
Total		25

Proper record should be maintained for the two Project Reviews and preserved for one TERM after the publication of Autonomous Exams results. It should be produced tothe flying squad and the inspection team at the time of inspection/verification.

DETAILS OF MARK ALLOCATION	
Demonstration/Presentation	25
Report	25
Viva Voce	30
Internship report	20
Total	100

Model Question Paper Pattern to Theory

Time : 3 Hrs Max.Mark:100

Part A : Answer any 10 out of 15 questions are to be answered each carries 3 marks (10 x 3=30)

Part B: 5 Questions will be in the either or pattern, each question carries 14 marks (5x14=70)

All the units are to be covered with equal weightage.

PART A Answer any 10 out of 15 questions are to be answered Question Number: 1 to 15.	3 x 10 = 30 Marks
PART B 5 Questions will be in the either or pattern. Students have to answer these five questions. Each question carries 14 marks. (Based on the discretion of the setter, he/she can ask the question with subdivision instead of one 14 marks questions if required). Question number 11 to 15.	5 x 14 = 70 Marks
Total	100 Marks