ANNAMALAI UNIVERSITY

FACULTY OF SCIENCE

DIVISION OF COMPUTER AND INFORMATION SCIENCE

M.Sc. SOFTWARE ENGINEERING (INTEGRATED)
(5-Year)

Programme Code: SCIS51

Handbook

2019-2020

ANNAMALAI UNIVERSITY

REGULATIONS FOR THE FIVE YEAR INTEGRATED POST GRADUATE PROGRAMMES
UNDER CHOICE BASED CREDIT SYSTEM (CBCS)

These Regulations are common to all the students admitted to the Five Year Integrated Master's Programmes in the Faculties of Arts, Science, Languages, Marine Sciences, and Education from the academic year 2019-2020 onwards.

1. Definitions and Nomenclature

1.1 **University** refers to Annamalai University.

1.2 **Department** means any of the academic departments and academic centres at the University.

1.3 **Discipline** refers to the specialization or branch of knowledge taught and researched in higher education. For example, Botany is a discipline in the Natural Sciences, while Economics is a discipline in Social Sciences.

1.4 **Programme** encompasses the combination of courses and/or requirements leading to a Degree. For example, M.A., M.Sc.

1.5 **Course** is an individual subject in a programme. Each course may consist of Lectures/Tutorials/Laboratory work/Seminar/Project work/Experiential learning/ Report writing/viva-voce etc. Each course has a course title and is identified by a course code.

1.6 **Curriculum** encompasses the totality of student experiences that occur during the educational process.

1.7 **Syllabus** is an academic document that contains complete information about an academic programme and defines responsibilities and outcomes. This includes course information, course objectives, policies, evaluation, grading, learning resources and course calendar.

1.8 **Academic Year** refers to the annual period of sessions of the University that comprises two consecutive semesters.

1.9 **Semester** is a half-year term that lasts for a minimum of 90 working days. Each academic year is divided into two semesters.

1.10 **Choice Based Credit System** A mode of learning in higher education that enables a student to have the freedom to select his/her own choice of elective courses across various disciplines for completing the Degree programme.

1.11 **Core Course** is mandatory and an essential requirement to qualify for the Degree.

1.12 **Elective Course** is a course that a student can choose from a range of alternatives.

1.13 **Value Added Courses** are optional courses that complement the students' knowledge and skills and enhance their employability.

1.14 **Experiential Learning** is a process of learning through experience. It is specifically defined as "learning through reflection on doing".

1.15 **Extension activities** are the activities that provide a link between the University and the community such as lab-to-land, literacy, population education, and health awareness programmes. These are integrated within the curricula with a view to sensitise the students about Institutional Social Responsibility (ISR).

1.16 **Credit** refers to the quantum of course work in terms of the number of class hours in a semester required for a programme. The credit value reflects the content and duration of a particular course in the curriculum.

1.17 **Credit Hour** refers to the number of class hours per week required for a course in a semester. It is used to calculate the credit value of a particular course.

1.18 **Programme Outcomes (POs)** are statements that describe crucial and essential knowledge, skills, and attitudes that students are expected to achieve and can reliably manifest at the end of a programme.

1.19 **Programme Specific Outcomes (PSOs)** are statements that list what the graduate of a specific programme should be able to do at the end of the programme.

1.20 **Learning Objectives (also known as Course Objectives)** are statements that define the expected goal of a course in terms of demonstrable skills or knowledge that will be acquired by a student as a result of instruction.

1.21 **Course Outcomes (COs)** are statements that describe what students should be able to achieve/demonstrate at the end of a course. They allow follow-up and measurement of learning objectives.

1.22 **Grade Point Average (GPA)** is the average of the grades acquired in various courses that a student has taken in a semester. The formula for computing GPA is given in Section 11.3.

1.23 **Cumulative Grade Point Average (CGPA)** is a measure of the overall cumulative performance of a student in all the semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters.

1.24 **Letter Grade** is an index of the performance of a student in a particular course. Grades are denoted by the letters S, A, B, C, D, E, and RA.

2. Programmes Offered and Eligibility Criteria

The Integrated Programmes offered by the University and the eligibility criteria are detailed below.

Faculty of Arts	
Programme	**Eligibility**
M.A. History M.A. Political Science M.A. Economics M.A. Sociology M.A. Population and Development M.Lib.I.Sc. M.A. Rural Development	A pass in H.S.E. (10+2 level) OR Equivalent thereto.
M.Com.	A pass in H.S.E. (10+2 level) OR Equivalent thereto (Commerce and Accountancy Group only).
Faculty of Science	
M.Sc. Mathematics	A pass in H.S.E. (10+2 level) OR Equivalent thereto with a minimum aggregate of 40% marks under academic stream in the following subjects viz. Mathematics, Physics & Chemistry.
M.Sc. Physics	A pass in H.S.E. (10+2 level) OR Equivalent thereto with a minimum aggregate of 40% marks under academic stream in the following subjects viz. Physics, Chemistry & Mathematics.
M.Sc. Chemistry	A pass in H.S.E. (10+2 level) Examination OR Equivalent thereto with a minimum aggregate of 40% marks in any one of the following combinations: 1. Mathematics, Physics & Chemistry 2. Biology, Physics & Chemistry 3. Botany, Physics & Chemistry 4. Zoology, Physics & Chemistry.
M.Sc. Botany	A pass in H.S.E. (10+2 level) regular or vocational with Botany/Biology or Vocational course with Agriculture/Plant Protection as one of the courses.
M.Sc. Biotechnology	A pass in H.S.E. (10+2 level) OR Equivalent thereto under academic stream with a minimum aggregate of 40% marks in any one of the following combinations: 1. Physics, Chemistry & Mathematics 2. Physics, Chemistry & Biology 3. Physics, Chemistry & Botany 4. Physics, Chemistry & Zoology 5. Physics, Chemistry & Biochemistry.
M.Sc. Microbiology	A pass in H.S.E. (10+2 level) OR Equivalent thereto under academic stream with Physics, Chemistry and Biology or Computer Science or Biochemistry or Home Science or Agri. or any Vocational Course with Biology or Botany and Zoology.
M.Sc. Geology	A pass in H.S.E. (10+2 level) OR Equivalent with Science Subjects.

M.Sc. Statistics	A pass in H.S.E. (10+2 level) OR an Equivalent examination thereto under academic stream with Mathematics / Statistics / Business Mathematics / Computer Science as one of the subjects.
M.Sc. Zoology	A pass in H.S.E. (10+2 level) OR Equivalent thereto with a minimum aggregate of 40% marks under academic stream in the following subjects viz. Physics, Chemistry and Biology or Zoology and Botany.
M.Sc. Software Engineering	A pass in H.S.E. (10+2 level) OR Equivalent thereto under academic stream with Mathematics, as one of the Subjects.
M.Sc. Information Technology	A pass in H.S.E. (10+2 level) OR Equivalent thereto under academic stream with Mathematics, as one of the subjects.
Faculty of Marine Sciences	
M.Sc. Ocean Science & Technology	A pass in H.S.E. (10+2 level) OR Equivalent thereto under Academic Stream in the following subjects viz. Mathematics, Physics, Chemistry & Biology.
Faculty of Languages	
M.A. Tamil	A pass in H.S.E. (10+2 level) OR Equivalent thereto.
M.A. English	A pass in H.S.E. (10+2 level) OR Equivalent thereto.
Faculty of Education	
M.Sc. Clinical Psychology	A pass in H.S.E. (10 + 2) OR Equivalent thereto.

2.1 **In the case of SC/ST and Differently-abled candidates, a pass is the minimum qualification for all the above Programmes.**

3. Reservation Policy

Admission to the various programmes will be strictly based on the reservation policy of the Government of Tamil Nadu.

4. Programme Duration

4.1 The Five Year Master's Programmes consist of five academic years and ten semesters.

4.2 Each academic year is divided into two semesters, the first being from July to November and the second from December to April.

4.3 Each semester will have 90 working days (18 weeks).

5. Programme Structure

5.1 The Five Year Integrated Programme consists of Language Courses, Core Courses, Allied Courses, Elective Courses, Soft Skills, Experiential Learning and Project. Students shall also participate in Extension Activities as part of their curriculum.

5.2 Language Courses

5.2.1 Each student shall take two languages of four courses each, one in each semester for the first two years of the programme.

5.2.2 Language-I shall be Tamil or another language such as Hindi or French.

5.2.3 Language-II shall be English.

5.3 Core courses

5.3.1 These are a set of compulsory courses essential for each programme.

5.3.2 The core courses include both Theory (Core Theory) and Practical (Core Practical) courses.

5.4 Allied Courses

5.4.1 Each student shall take courses in two disciplines allied to the main subject (Allied-I and Allied-II) of the programme in the first four semesters.

5.4.2 In Arts, Languages, and Education, there will be three Theory Courses each for Allied-I and Allied-II.

5.4.3 In Science and Marine Sciences, there will be two Theory courses and one Practical course each for Allied-I and Allied-II.

5.5 Elective Courses

5.5.1 **Departmental Electives (DEs)** are the electives that students can choose from a range of Electives offered within the Parent Department offering the Programme.

5.5.2 **Interdepartmental Electives (IDEs)** are electives that students can choose from amongst the courses offered by other departments of the same faculty as well as by the departments of other faculties.

5.5.3 Students shall take a combination of both DEs and IDEs.

5.6 Soft Skills

5.6.1 Soft skills are intended to enable students to acquire attributes that enhance their performance and achieve their goals with complementing hard skills.

5.6.2 Soft skills include communication skills, computer skills, social skills, leadership traits, team work, development of emotional intelligence quotients, among others.

5.6.3 Each student shall choose four courses on soft skills from a range of courses offered from the First to the Sixth Semester.

5.7 Value Education

All students shall take a course on Value Education that includes human values, sustainable development, gender equity, ethics and human rights.

5.8 Experiential Learning

5.8.1 Experiential learning provides opportunities to students to connect principles of the discipline with real-life situations.

5.8.2 In-plant training/field trips/internships/industrial visits (as applicable) fall under this category.

5.9 Extension Activities

5.9.1 It is mandatory for every student to participate in extension activities.

5.9.2 All the students shall enroll under NSS/NCC/YRC/RRC or any other Service Organisation in the University.

5.9.3 Students shall put in a minimum attendance of 40 hours in a year duly certified by the Programme Co-ordinator.

5.9.4 Extension activities shall be conducted outside the class hours.

5.10 Project

5.10.1 Each student shall undertake a Project in the final semester.

5.10.2 The Head of the Department shall assign a Project Supervisor to the student.

5.10.3 The Project Supervisor shall assign a topic for the project and monitor the progress of the student periodically.

5.10.4 Students who wish to undertake project work in recognised institutions/industry shall obtain prior permission from the University. The Project Supervisor will be from the host institute, while the Co-Supervisor shall be a faculty in the parent department.

5.11 Value Added Courses (VACs)

5.11.1 Students may also opt to take Value Added Courses beyond the minimum credits required for the award of the Degree. VACs are outside the normal credit paradigm.

5.11.2 VACs enhance the students' employability and life skills. VACs are listed on the University website and in the Handbook on Interdepartmental Electives and VACs.

5.11.3 Each VAC carries 2 credits with 30 hours of instruction, of which 60% (18 hours) shall be Theory and 40% (12 hours) shall be Practical.

5.11.4 Classes for VACs are conducted beyond the regular class hours and preferably in the VIII and IX Semesters.

5.12 Online Courses

5.12.1 The Heads of Departments shall facilitate enrolment of students in Massive Open Online Courses (MOOCs) platform such as SWAYAM to provide academic flexibility and enhance the academic career of students.

5.12.2 Students who successfully complete a course in the MOOC platform shall be exempted from one elective course of the programme.

5.13 Credit Distribution

The credit distribution is detailed in the Table.

	Credits
Semester I to VI	
Language-I (Tamil or any other Language)	12
Language-II (English)	12
Core Courses	60-65
Allied-I	10
Allied-II	10
Electives	15
Soft skills	12
Environmental studies (UGC mandated)	2
Value Education	2
Experiential learning	4
Extension activities	1
Total Credits (Semester I to VI)	**140-145**
Semester VII to X	
Core Courses	65-75
Electives	15
Project	6-8
Total Credits (Semester VII to X)	**90-95**
Total Credits Semester I to X (Minimum requirement for the award of Degree)	***230-240**

Each Department shall fix the minimum required credits for award of the Degree within the prescribed range of 230-240 credits.

5.14 Credit Assignment

Each course is assigned credits and credit hours on the following basis:

1 Credit is defined as

1 Lecture period of one hour per week over a semester

1 Tutorial period of one hour per week over a semester

1 Practical/Project period of two or three hours (depending on the discipline) per week over a semester.

6   Attendance

6.1   Each faculty handling a course shall be responsible for the maintenance of *Attendance and Assessment Record* for students who have registered for the course.

6.2   The Record shall contain details of the students' attendance, marks obtained in the Continuous Internal Assessment (CIA) Tests, Assignments and Seminars. In addition the Record shall also contain the organisation of lesson plan of the Course Instructor.

6.3   The record shall be submitted to the Head of the Department once a month for monitoring the attendance and syllabus coverage.

6.4   At the end of the semester, the record shall be duly signed by the Course Instructor and the Head of the Department and placed in safe custody for any future verification.

6.5   The Course Instructor shall intimate to the Head of the Department at least seven calendar days before the last instruction day in the semester about the attendance particulars of all students.

6.6   Each student should earn a minimum of 75% attendance in the courses of the particular semester failing which he or she will not be permitted to write the End-Semester Examination. The student has to redo the semester in the next year.

6.7   Relaxation of attendance requirement up to 10% may be granted for valid reasons such as illness.

7.   Mentor - Mentee System

7.1   To help the students in planning their course of study and for general advice on the academic programme, the Head of the Department will attach a certain number of students to a member of the faculty who shall function as a Mentor throughout their period of study.

7.2   The Mentors will guide their mentees with the curriculum, monitor their progress, and provide intellectual and emotional support.

7.3   The Mentors shall also help their mentees to choose appropriate electives and value-added courses, apply for scholarships, undertake projects, prepare for competitive examinations such as NET/SET, GATE etc., attend campus interviews and participate in extracurricular activities.

8.   Examinations

8.1   The examination system of the University is designed to systematically test the student's progress in class, laboratory and field work through Continuous Internal Assessment (CIA) Tests and End-Semester Examination (ESE).

8.2   There will be two CIA Tests and one ESE in each semester.

8.3   The Question Papers will be framed to test different levels of learning based on Bloom's taxonomy, viz. Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation/Creativity.

8.4   Continuous Internal Assessment Tests

8.4.1 The CIA Tests shall be a combination of a variety of tools such as class tests, assignments, seminars, and viva-voce that would be suitable for the course. This requires an element of openness.

8.4.2 The students are to be informed in advance about the assessment procedures.

8.4.3 The pattern of question paper will be decided by the respective faculty.

8.4.4 CIA Test-I will cover the syllabus of the first two units while CIA Test-II will cover the last three units.

8.4.5 CIA Tests will be for one to three hours duration depending on the quantum of syllabus.

8.4.6 A student cannot repeat the CIA Test-I and CIA Test-II. However, if for any valid reason, the student is unable to attend the test, the prerogative of arranging a special test lies with the teacher in consultation with the Head of the Department.

8.5   End Semester Examinations (ESEs)

8.5.1 The ESEs for the odd semester will be conducted in November and for the even semester in May.

8.5.2 A candidate who does not pass the examination in any course(s) will be permitted to reappear in such course(s) in the subsequent semester/year.

8.5.3 The ESE will be of three hours duration and will cover the entire syllabus of the course.

9   Evaluation

9.1   Marks Distribution

9.1.1. Each course, both Theory and Practical as well as Project/Internship/Field work/In-plant training shall be evaluated for a maximum of 100 marks.

9.1.2 For the theory courses, CIA Tests will carry 25% and the ESE, 75% of the marks.

9.1.3 For the Practical courses, the CIA Tests will constitute 40% and the ESE 60% of the marks.

9.2.   Assessment of CIA Tests

9.2.1 For the CIA Tests, the assessment will be done by the Course Instructor

9.2.2 For the Theory Courses, the break-up of marks shall be as follows:

	Marks
Test-I & Test-II	15
Seminar	5
Assignment	5
Total	25

9.2.3 For the Practical Courses (wherever applicable), the break-up of marks shall be as follows:

	Marks
Test-I	15
Test-II	15
Viva-voce and Record	10
Total	40

9.3 Assessment of End-Semester Examinations

9.3.1 Double Evaluation for the ESE is done by the University Teachers.

9.3.2 In case of a discrepancy of more than 10% between the two examiners in awarding marks, third evaluation will be resorted to.

9.4 Assessment of Project/Dissertation

9.4.1 The Project Report/Dissertation shall be submitted as per the guidelines laid down by the University.

9.4.2 The Project Work/Dissertation shall carry a maximum of 100 marks.

9.4.3 CIA for Project will consist of Review of literature, experimentation/field work, attendance etc.

9.4.4 The Project Report evaluation and viva-voce will be conducted by a committee constituted by the Head of the Department.

9.4.5 The Project Evaluation Committee will comprise of the Head of the Department, Project Supervisor, and a senior faculty.

9.4.7 The marks shall be distributed as follows:

Continuous Internal Assessment (25 Marks)		End Semester Examination (75 Marks)	
Review-I 10	Review-II: 15	Project / Dissertation Evaluation	Viva-voce
		50	25

9.5 Assessment of Value Added Courses

9.5.1 VACs shall be evaluated completely by Internal Examiners.

9.5.2 Two CIA Tests shall be conducted during the semester by the Department(s) offering VAC.

9.5.3 A committee consisting of the Head of the Department, faculty handling the course and a senior faculty member shall monitor the evaluation process.

9.5.4 The grades obtained in VACs will not be included for calculating the GPA.

9.6 Passing Minimum

9.6.1 A candidate is declared to have passed in each course if he/she secures not less than 40% marks in the ESE and not less than 50% marks in aggregate taking CIA and ESE marks together.

9.6.4 A candidate who has not secured a minimum of 50% of marks in a course (CIA + ESE) shall reappear for the course in the next semester/year.

10. Conferment of the Master's Degree

A candidate who has secured a minimum of 50% marks in all courses prescribed in the programme and earned the minimum required credits shall be considered to have passed the Master's Programme.

11. Marks and Grading

11.1 The performance of students in each course is evaluated in terms of Grade Point (GP).

11.2 The sum total performance in each semester is rated by Grade Point Average (GPA) while Cumulative Grade Point Average (CGPA) indicates the Average Grade Point obtained for all the courses completed from the first semester to the current semester.

11.3 The GPA is calculated by the formula

$$GPA = \frac{\sum_{i=1}^{n} C_i G_i}{\sum_{i=1}^{n} C_i}$$

where, C_i is the Credit earned for the Course i in any semester;

G_i is the Grade Point obtained by the student for the Course i and

n is the number of Courses passed in that semester.

11.4 CGPA is the Weighted Average Grade Point of all the Courses passed starting from the first semester to the current semester.

$$CGPA = \frac{\sum_{i=1}^{m}\sum_{i=1}^{n} C_i G_i}{\sum_{i=1}^{m}\sum_{i=1}^{n} C_i}$$

where, C_i is the Credit earned for the Course i in any semester;

G_i is the Grade Point obtained by the student for the Course i and

n is the number of Courses passed in that semester.

m is the number of semesters.

11.5 Evaluation of the performance of the student will be rated as shown in the Table.

Letter Grade	Grade Points	Marks %
S	10	90 and above
A	9	80-89
B	8	70-79
C	7	60-69
D	6	55-59
E	5	50-54
RA	0	Less than 50
W	0	Withdrawn from the examination

11.6 **Classification of Results.** The successful candidates are classified as follows:

11.6.1 For **First Class with Distinction:** Candidates who have passed all the courses prescribed in the Programme *in the first attempt* with a CGPA of 8.25 or above within the programme duration. Candidates who have withdrawn from the End Semester Examinations are still eligible for First Class with Distinction (*See Section 12 for details*).

11.6.2 For **First Class:** Candidates who have passed all the courses with a CGPA of 6.5 or above.

11.6.3 For **Second Class:** Candidates who have passed all the courses with a CGPA of 5.0 to less than 6.5.

11.6.4 Candidates who obtain highest marks in all examinations at the first appearance alone will be considered for University Rank.

11.7 **Course-Wise Letter Grades**

11.7.1 The percentage of marks obtained by a candidate in a course will be indicated in a letter grade.

11.7.2 A candidate is considered to have completed a course successfully and earned the credits if he/she secures an overall letter grade other than RA.

11.7.3 A course completed successfully, cannot be repeated for the purpose of improving the Grade Point.

11.7.4 A letter grade RA indicates that the candidate shall reappear for that course. The RA Grade once awarded stays in the grade card of the student and is not deleted even when he/she completes the course successfully later. The grade acquired later by the student will be indicated in the grade sheet of the Odd/Even semester in which the student has re-appeared.

11.7.5 If a student secures RA grade in the Project Work/Field Work/Practical Work/Dissertation, he/she shall improve it and resubmit if it involves only rewriting/ incorporating the clarifications suggested by the evaluators or he/she can re-register and carry out the same in the subsequent semesters for evaluation.

12. Provision for Withdrawal from the End Semester Examination

12.1 The letter grade W indicates that a candidate has withdrawn from the examination.

12.2 A candidate is permitted to withdraw from appearing in the ESE for one or more courses in **ANY ONE** of the semesters **ONLY** for exigencies deemed valid by the University authorities.

12.3 **Permission for withdrawal from the examination shall be granted only once during the entire duration of the programme.**

12.3 Application for withdrawal shall be considered **only** if the student has registered for the course(s), fulfilled the requirements for attendance and CIA tests.

12.4 The application for withdrawal shall be made ten days prior to the commencement of the examination and duly approved by the Controller of Examinations. Notwithstanding the mandatory prerequisite of ten days notice, due consideration will be given under extraordinary circumstances.

12.5 Withdrawal is **not** granted for arrear examinations of courses in previous semesters (for which the student has secured RA Grade) and for the final semester examinations.

12.6 Candidates who have been granted permission to withdraw from the examination shall reappear for the course(s) in the subsequent semester.

12.7 Withdrawal shall not be taken into account as an appearance for the examination when considering the eligibility of the student to qualify for First Class with Distinction.

13. Academic misconduct

Any action that results in an unfair academic advantage/interference with the functioning of the academic community constitutes academic misconduct. This includes but is not limited to cheating, plagiarism, altering academic documents, fabrication/falsification of data, submitting the work of another student, interfering with other students' work, removing/defacing department library or computer resources, stealing other students'

notes/assignments, electronically interfering with other students'/ University's intellectual property. Since many of these acts may be committed unintentionally due to lack of awareness, students shall be sensitised on issues of academic integrity and ethics.

14. Transitory Regulations

Wherever there has been a change of syllabi, examinations based on the existing syllabus will be conducted for two consecutive years after implementation of the new syllabus in order to enable the students to clear the arrears. Beyond that, the students will have to take up their examinations in equivalent subjects, as per the new syllabus, on the recommendation of the Head of the Department concerned.

15. *Notwithstanding anything contained in the above pages as Rules and Regulations governing the Five Year Integrated Master's Programmes at Annamalai University, the Syndicate is vested with the powers to revise them from time to time on the recommendations of the Academic Council.*

ANNAMALAI UNIVERSITY
Faculty of Science
Division of Computer and Information Science
M.Sc. Software Engineering (Five Year Integrated) Programme
Programme Code: SCIS51
Programme Structure
(For Students Admitted from the Academic year 2019 – 2020)

Course Code	Course Title	L	P	C	Marks		
		Hrs.			CIA	ESE	Total
SEMESTER - I							
19ITAC11	Language – I	3		3	25	75	100
19IENC12	Language – II	3		3	25	75	100
19ICEC13	Civics, Environment and Health Sciences	3		3	25	75	100
19IMAC14	Allied-I Mathematics–I	4		4	25	75	100
19ISET15	Core 1: Programming in C	3		3	25	75	100
19ISEE16	Elective – I (DE)	3		3	25	75	100
	Total			19			
SEMESTER – II							
19ITAC21	Language – I	3		3	25	75	100
19IENC22	Language – II	3		3	25	75	100
19IMAC23	Allied-II Discrete Mathematics	4		4	25	75	100
19ISET24	Core 2: Data Structures and Algorithms	5		5	25	75	100
19ISET25	Core 3: Digital Computer Fundamentals	4		4	25	75	100
19ISEP26	Core 4: Practical-I: C Programming		4	2	40	60	100
19ISEP27	Core 5: Practical-II: Data Structures using C		4	2	40	60	100
	Total			23			
SEMESTER – III							
19ITAC31	Language – I	3		3	25	75	100
19IENC32	Language – II	3		3	25	75	100
19IMAC33	Allied-III Resource Management Techniques	4		4	25	75	100
19ISET34	Core 6: Relational Database Management Systems	4		4	25	75	100
19ISET35	Core 7: Internet Programming		4	4	25	75	100
19ISEP36	Core 8:Practical-III: SQL & PL/SQL		4	2	40	60	100
19ISEE37	Elective – II (DE)	3		3	25	75	100
	Total			23			
SEMESTER – IV							
19ITAC41	Language – I	3		3	25	75	100
19IENC42	Language – II	3		3	25	75	100
19ISET43	Core 9: Object Oriented Programming Using C++	4		4	25	75	100
19ISET44	Core 10: Web Technology	4		4	25	75	100
19ISET45	Core 11: Computer Graphics	4		4	25	75	100
19ISEP46	Core 12: Practical-IV: C++ Programming		4	2	40	60	100

19ISEP47	Core 13:Practical-V : Web Technology Lab		4	2	40	60	100
	Total			22			
SEMESTER – V							
19ISET51	Core 14: Operating Systems	4		4	25	75	100
19ISET52	Core 15: Programming in Java	4		4	25	75	100
19ISET53	Core 16: Computer Networks	4		4	25	75	100
19ISET54	Core 17: Multimedia Systems	4		4	25	75	100
19ISEP55	Core 18: Practical-VI : Java programming		4	2	40	60	100
19ISEP56	Core 19: Practical-VII : Open Source Technology Lab		4	2	40	60	100
19ISEE57	Elective – III (DE)	3		3	25	75	100
	Total			23			
SEMESTER - VI							
19ISET61	Core 20: Programming in Python	4		4	25	75	100
19ISET62	Core 21: Software Engineering	5		5	25	75	100
19ISET63	Core 22: Linux and Shell Programming	4		4	25	75	100
19ISET64	Core 23: Mobile Computing	4		4	25	75	100
19ISET65	Core 24: Wireless Network	4		4	25	75	100
19ISEP66	Core 26: Practical-VIII : Python Programming		4	2	40	60	100
19ISEP67	Core 26: Practical-IX: Shell Programming		4	2	40	60	100
	Total			25			
SEMESTER - VII							
19ISET71	Core 27: Design and Analysis of Algorithm	5		5	25	75	100
19ISET72	Core 28: Advanced Web Technology	5		5	25	75	100
19ISET73	Core 29: Advanced Data Base Management Systems	5		5	25	75	100
19ISET74	Core 30:Software Project Management	4		4	25	75	100
19ISEP75	Core 31: Practical-X: Advanced Web Technology Lab		4	2	40	60	100
19ISEP76	Core 32: Practical-XI: Algorithm Lab		4	2	40	60	100
19ISEE77	Elective IV (IDE)	3		3	25	75	100
	Total			26			
SEMESTER - VIII							
19ISET81	Core 33: Distributed Operating System	5		5	25	75	100
19ISET82	Core 34: Advanced Java Programming	5		5	25	75	100
19ISET83	Core 35: Dot Net Programming	4		4	25	75	100
19ISEP84	Core 36: Practical-XII: Advanced Java- Lab		4	2	40	60	100
19ISEP85	Core 37: Practical-XIII: Dot Net Programming Lab		4	2	40	60	100
19ISEE86	Elective – V (DE)	3		3	25	75	100
19ISEE87	Elective – VI (DE)	3		3	25	75	100
	Total			24			
SEMESTER - IX							
19ISET91	Core 38: Digital Image Processing	4		4	25	75	100
19ISET92	Core 39: Machine Learning	4		4	25	75	100
19ISET93	Core 40: Internet of Things	4		4	25	75	100

Code	Course	L	P	C	CIA	ESE	Total
19ISEP94	Core 41: Practical-XIV: Image Processing- Lab		4	2	40	60	100
19ISEP95	Core 42: Practical-XV: Machine Learning – Lab		4	2	40	60	100
19ISEE96	Elective – VII (DE)	3		3	25	75	100
19ISEE97	Elective – VIII (DE)	3		3	25	75	100
	Total			22			
SEMESTER - X							
19ISET101	Core 43: Software Testing and Quality Assurance	4		4	25	75	100
19ISET102	Core 44: Data Science and Big Data Analytics	4		4	25	75	100
19ISEP103	Core 45: Practical-XVI: Software Testing Lab		4	2	40	60	100
19ISEP104	Dissertation and Viva-Voce / In-plant training			8	25	75	100
	Total			**18**			
	On-line Courses (SWAYAM, MOOC and NPTEL)						
	Value Added Course						
	Semester 1-10 Total Credits			**225**			

L-Lectures; P-Practical; C-Credits; CIA-Continuous Internal Assessment; ESE- End-Semester Examination

Note:

1. Students shall take both Department Electives (DEs) and Interdepartmental Electives (IDEs) from a range of choices available.

2. Students may opt for any Value-added Course listed in the University website.

Semester	Credit	Description
1	19	
2	23	
3	23	1st to 6th Semester
4	22	Total Credit : 135
5	23	
6	25	
7	26	
8	24	7th to 10th Semester
9	22	Total Credit : 90
10	18	
Total	**225**	

DEPARTMENT ELECTIVE COURSES

Course Code	Course Title	L	P	C	Marks		
		Hrs.			CIA	ESE	Total
19ISEE16.1	Computer Organization and Architecture	3		3	25	75	100
19ISEE16.2	Microprocessor and Its Applications	3		3	25	75	100
19ISEE37.1	System Software	3		3	25	75	100
19ISEE37.2	Compiler Design	3		3	25	75	100
19ISEE57.1	Open Source Technology	3		3	25	75	100
19ISEE57.2	Cyber Security	3		3	25	75	100
19ISEE86.1	Object Oriented System Development	3		3	25	75	100
19ISEE86.2	Advanced Data Structure and algorithm	3		3	25	75	100
19ISEE86.3	Theory of computation	3		3	25	75	100
19ISEE87.1	Social Computing	3		3	25	75	100
19ISEE87.2	Cloud Computing	3		3	25	75	100
19ISEE87.3	Distributed and parallel Computing	3		3	25	75	100
19ISEE96.1	Embedded Systems	3		3	25	75	100
19ISEE96.2	Cryptography and network security	3		3	25	75	100
19ISEE96.3	Web Services	3		3	25	75	100
19ISEE97.1	Web database and information system	3		3	25	75	100
19ISEE97.2	Business Intelligence	3		3	25	75	100
19ISEE97.3	Advanced Computer Networks	3		3	25	75	100

INTER DEPARTMENT ELECTIVE COURSES (IDE)

S.No.	Course Code	Course Title	Department	L	P	Credits	Marks		
				Hrs			CIA	ESE	Total
1.	19SOSE715.1	Soft Skills	**English**	3	0	3	25	75	100
2.	19MATE815.1	Discrete Mathematics	**Mathematics**	3	0	3	25	75	100
3.	19MATE815.2	Numerical Methods		3	0	3	25	75	100
4.	19MATE815.3	Statistical Computing		3	0	3	25	75	100
5.	19MATE915.1	Differential Equations		3	0	3	25	75	100
6.	19STSE715.1	Probability and Statistical methods	**Statistics**	3	0	3	25	75	100
7.	19STSE815.1	Statistical Methods		3	0	3	25	75	100
8.	19STSE815.2	Mathematical Statistics		3	0	3	25	75	100
9.	19STSE815.4	Fundamentals of Business Statistics		3	0	3	25	75	100
10.	19STSE815.5	Time Series Analysis and Forecasting		3	0	3	25	75	100
11.	19STSE815.6	Multivariate Data Analytics		3	0	3	25	75	100
12.	19STSE915.1	Bio-Statistics		3	0	3	25	75	100
13.	19PHYE815.1	Classical Mechanics and Special Theory of Relativity	**Physics**	3	0	3	25	75	100
14.	19PHYE815.2	Physics of the Earth		3	0	3	25	75	100
15.	19PHYE915.1	Bio-Medical Instrumentation		3	0	3	25	75	100
16.	19PHYE915.2	Energy Physics		3	0	3	25	75	100
17.	19CHEE815.1	Applied Chemistry	**Chemistry**	3	0	3	25	75	100
18.	19CHEE915.1	Basic Chemistry		3	0	3	25	75	100
19.	19ICHEE915.2	Instrumental Methods of Analysis		3	0	3	25	75	100
20.	19BOTE815.1	Plant Tissue Culture	**Botany**	3	0	3	25	75	100
21.	19BOTE815.2	Plant Science – I		3	0	3	25	75	100
22.	19BOTE915.1	Gardening and Horticulture		3	0	3	25	75	100
23.	19BOTE915.2	Plant Science – II		3	0	3	25	75	100
24.	19ZOOE815.1	Animal Culture Techniques	**Zoology**	3	0	3	25	75	100
25.	19ZOOE915.1	Environmental Science		3	0	3	25	75	100
26.	19GEOE815.1	Environmental Geosciences	**Earth Sciences**	3	0	3	25	75	100
27.	19GEOE915.1	Applied Geophysics		3	0	3	25	75	100
28.	19BIOE815.1	Basic Biochemistry	**Biochemistry &**	3	0	3	25	75	100

29.	19BIOE815.2	Basic Biotechnology	**Biotechnology**	3	0	3	25	75	100
30.	19BIOE915.1	Biochemical Techniques		3	0	3	25	75	100
31.	19BIOE915.2	Immunology		3	0	3	25	75	100
32.	19MIBE915.1	Microbiology	**Microbiology**	3	0	3	25	75	100
33.	19DBAE915.1	Management Decision Analysis	**Business Administration**	3	0	3	25	75	100
34.	19DBAE915.2	Soft Skills Development		3	0	3	25	75	100
35.	19DBAE915.3	Financial Risk Analysis and Management		3	0	3	25	75	100

INTER DEPARTMENT ELECTIVE COURSES OFFERED TO OTHER DEPARTMENTS

Course Code	Course Title	L	P	C	Marks		
		Hrs.			CIA	ESE	Total
19CSE215.1	R Programming	3		3	25	75	100

VALUE ADDED COURSES

COURSE CODE	COURSE TITLE	L	P	C	Marks		
		Hrs.			CIA	ESE	Total
CISA215	Web Development	3		0	25	75	100
CISA415	Advanced Web Development	3		0	25	75	100

L- Lecture;   P-Practical;   C- Credit

PROGRAMME OUTCOMES (PO)

PO1.Domain knowledge: Demonstrate knowledge of basic concepts, principles and applications of the specific science discipline.

PO2. Resource Utilisation. Cultivate the skills to acquire and use appropriate learning resources including library, e-learning resources, ICT tools to enhance knowledge-base and stay abreast of recent developments.

PO3.Analytical and Technical Skills: Ability to handle/use appropriate tools/techniques/equipment with an understanding of the standard operating procedures, safety aspects/limitations.

PO4.Critical thinking and Problem solving: Identify and critically analyse pertinent problems in the relevant discipline using appropriate tools and techniques as well as approaches to arrive at viable conclusions/solutions.

PO5.Project Management: Demonstrate knowledge and scientific understanding to identify research problems, design experiments, use appropriate methodologies, analyse and interpret data and provide solutions. Exhibit organisational skills and the ability to manage time and resources.

PO6.Individual and team work: Exhibit the potential to effectively accomplish tasks independently and as a member or leader in diverse teams, and in multidisciplinary settings.

PO7.Effective Communication: Communicate effectively in spoken and written form as well as through electronic media with the scientific community as well as with society at large. Demonstrate the ability to write dissertations, reports, make effective presentations and documentation.

PO8. Environment and Society: Analyse the impact of scientific and technological advances on the environment and society and the need for sustainable development.

PO9. Ethics: Commitment to professional ethics and responsibilities.

PO10.Life-long learning: Ability to engage in life-long learning in the context of the rapid developments in the discipline.

PROGRAMME SPECIFIC OUTCOMES (PSO)

PSO1. Apply software engineering knowledge and methods including design, analysis and evolution of models to evolve the solution for complex issues in various disciplines.

PSO2. Formulate new solutions for social problems or improve the existing methodologies to cater the present needs of the society

PSO3. Design efficient algorithms using the concepts of mathematical and computer science for better outcome within the stipulated duration.

PSO4. Modernize business / social processes and systems to increase operating efficiency by adopting latest software engineering methodologies.

PSO5. Develop and deploy software systems with assured quality and efficiency.

PSO6. Demonstrate and apply software engineering principles in the projects developing in the multidisciplinary environment.

PSO7. Develop professional skills in students that prepare them for immediate employment and life-long learning in advanced areas of software engineering.

PSO8. Work independently by applying appropriate techniques, resources in modern software developments.

M.Sc. SOFTWARE ENGINEERING

FIVE YEAR INTEGRATED DEGREE

ON–CAMPUS PROGRAMME (CBCS)

SYLLABUS

FIRST YEAR: FIRST SEMESTER

முதலாம் ஆண்டு - முதற்பருவம்

PART - I   LANGUAGE – தமிழ் - I

    19ITAC11   நவீன இலக்கியமும் நாடகமும்

மதிப்பெண் : 75

கிரடிட் : 3

நோக்கம்: தமிழில் தோன்றிய நவீன இலக்கியங்கள் குறித்து அறிமுகம் செய்தல். நவீன இலக்கியங்கள் குறித்த வரையறை - தோற்ற பின்னணி - நவீன இலக்கிய வகைகள் - உரைநடை - புதுக்கவிதை - செய்தித்தாள் - நாடகம் போன்றவற்றின் வரலாற்றை விளக்குதல். இலக்கியங்களையும் அவை தொடர்பான இலக்கிய வரலாற்றையும் இணைத்;துப் படித்தல்.

அலகு - 1   சிறுகதை

    1. புதுமைப்பித்தன்   -   பால்வண்ணம் பிள்ளை

    2. கி.ராஜநாராயணன்   -   கதவு

    3. கு.அழகிரிசாமி   -   ராஜா வந்திருக்கிறார்

    4. கண்மணி குணசேகரன்   -   உயிர்த் தண்ணீர்

    5. மேலாண்மை பொன்னுச்சாமி   -   தேசிய மயில்

அலகு - 2   புதுக்கவிதை

    1. பாரதியார்   -   புதுமைப்பெண்

    2. பாரதிதாசன்   -   தமிழ் உணவு

    3. உவமைக் கவிஞர் சுரதா   -   தமிழில் பெயரிடுங்கள்

    4. தேவதேவன்   -   புகட்டல்

    5. அறிவுமதி   -   நட்புக்காலம் (முதல் 20 மட்டும்)

    6. மித்ரா   -   ஹைகூ என் தோழி (முதல் 20 மட்டும்)

அலகு - 3   புதினம்

    1. டி.செல்வராசு   -   பொய்க்கால் குதிரை

அலகு - 4   நாடகம்

1. இன்குலாப்   -   ஒளவை

அலகு - 5   இக்கால இலக்கிய வரலாறு

ஐரோப்பியர் வருகை - நவீன இலக்கியங்கள் அறிமுகம் - புதுக்கவிதை - சிறுகதை - புதினம் ஆகியவற்றின் தோற்றமும் வளர்ச்சியும் - இலக்கிய முன்னோடிகள் - செய்தித்தாள் வருகை - நாடகம் - தோற்றமும் வளர்ச்சியும்.

பாட நூல் :

1. பாரதியார்   -   பாரதியார் கவிதைகள்
                                              நியூ செஞ்சரி புக் ஹவுஸ், சென்னை

2. பாரதிதாசன்   -   பாரதிதாசன் கவிதைகள்
                                              மணிவாசகர் பதிப்பகம், சென்னை.

3. ச.வே.சுப்பிரமணியன்   -   தமிழ் இலக்கிய வரலாறு
                                              மணிவாசகர் பதிப்பகம், சென்னை.

4. சோ.நா.கந்தசாமி   -   தமிழ் இலக்கிய வரலாறு
                                              மணிவாசகர் பதிப்பகம், சென்னை.

5. சுரதா   -   துறைமுகம்
                                              சுவாதி பதிப்பகம், அம்பத்தூர், சென்னை

6. டி. செல்வராசு   -   பொய்க்கால் குதிரை
                                              நியூ செஞ்சரி புக் ஹவுஸ், சென்னை.

7. அறிவுமதி   -   நட்புக்காலம்
                                              கவிதா பதிப்பகம், சென்னை.

8. இன்குலாப்   -   ஒளவை
                                              அகரம் பதிப்பகம், தஞ்சாவூர்.

9. உ.கருப்பத்தேவன்   -   புதுமைப்பித்தன் புதுமைக்கதைகள்
                                              நிய செஞ்சரி புக் ஹவுஸ், சென்னை.

10. மித்ரா   -   ஹைகூ

11. தேவதேவன்   -   அமுதம் மாத்திரமே வெளிப்பட்டது

19ITAC11: HINDI–I (Option)

TEXT BOOK

I. NAVEEN HINDI PATMAALA-I

First 15 lessons only (Poems omitted)

Published by Dakshina Bharatha Hindi Prachar Sabha, T. Nagar,

Chennai-17

II SARAL HINDI VYAKARAN

Part-I by S.R. Sastri Pub. By DBHP Sabha, Chennai-17.

19IENC12: ENGLISH THROUGH LITERATURE I: PROSE

LEARNING OBJECTIVES

By introducing the course, it is intended to:

LO1. Develop the Language ability of the students

LO2. Enable students to understand the passage, to read fluently, to enrich their vocabulary, and to enjoy reading and writing

LO3. Make the students proficient in the four language skills

LO4. Make the students read with correct pronunciation, stress, intonation, pause, and articulation of voice

LO5. Develop their inquiry skill

UNIT-I

Stephen Leacock   "With the Photographer"

Winston S. Churchill   "Examinations"

Grammar: Introduce the Parts of speech Nouns, Verbs, Adjectives, and Adverbs

UNIT-II

G.B. Shaw   "Spoken English and Broken English"

M.K. Gandhi   "Voluntary Poverty"

Grammar: Articles

UNIT-III

Robert Lynd   "On Forgetting"

Virginia Woolf   "Professions for Woman"

Grammar: Pronouns

UNIT-IV

A. G. Gardiner   « On Umbrella Morals"

R.K. Narayan	"A Snake in the Grass"
Grammar:	Prepositions

UNIT-V

Martin Luther King (Jr.)	"I Have a Dream"
George Orwell	"The Sporting Spirit"
Grammar:	Conjunctions & Interjections

TEXT BOOKS:

1. Ayyappa Raja. S., Deivasigamani. T., Saravana Prabhakar. N., Karthikeyan. B. *English through Literature: Prose.*

2. David Green: *Contemporary English Grammar: Structures and Composition,* Macmillan

COURSE OUTCOMES:

At the end of the course, the students will be able to:

    CO1: Competency in communication both in written and oral skills

    CO2: Fluency in the English language

    CO3: Knowledge about construction of sentence structures

    CO4: English Vocabulary to use the English language effectively

    CO5: Proficiency in the four communication skills

19ICEC13: CIVICS, ENVIRONMENT AND HEALTH SCIENCES

UNIT–I

    Introduction: Democracy – Citizenship – Duties of Good Citizen – Society, State and Citizen – Limits of State Activity.

    Indian Constitution: Preamble – Basic Features – Citizenship – Fundamental Rights – Fundamental Duties.

UNIT–II

    Political System: Union Government: President – Prime Minister – Parliament – Supreme Court – Electoral System

    State Government: Governor – Chief Minister – Center State Relations.

    Local Government: Urban Administrative System – Panchayat Raj System.

UNIT–III

    Ecosystems: Fundamental concepts and Principles – structure and function classification – modern concept of Ecosystem – Energy flow – ecological indicators.

UNIT–IV

    Environment: Definition – Natural Resources – classification – conservation – Development of public water supply – Need for protected water supply – per capita

consumption – Sanitation – Sewerage system – disposal of sewage – kinds of pollution – their effects on human beings – Impact of Environment on society.

UNIT–V

Physical Health – Introduction to health – Food, Meaning of balanced diet, sources, Common Nutritional deficiencies and prevention.

Personal Health – Cleanliness of body, Care of Skin, Nails, Eyes, hair, Oral Health, Clothing, Body posture and good habits such as exercises – Importance of avoiding smoking, alcoholism, drugs etc.,

Population explosion and Family Planning – Importance, Common methods of family planning for Men and Women.

Mothers and Children – Immunization of Children (importance, schedule) care of mothers during Pregnancy and after delivery.

Communicable Diseases – Symptoms and Prevention.

UNIT–VI

1. Mental Health – Factors for Maintenance of Good Mental Health.

2. Adolescent Problems.

3. First Aid.

Environment – Ventilation, Lighting, Simple Methods of purification of water, sanitary latrine, prevention of worm infestation (round worm, hook worm)

TEXT AND REFERENCE BOOKS

1. Fadia, B.L. "*Indian Government and Politics*", Sahitya Bhawan Publication, Agra, 1999.

2. Maheswari, S.R. "*Local Government in India*", Lakshmi Narain Agarwal, Agra, 1996.

3. Agarwal, R.C. "*Indian Political System*", New Delhi S.Chand of Company, 2000.

4. James H. Mccrocklin, "*Building Citizenship*", USA, Allyn and Bacon, INC, 1961.

5. Agarwal & Rana, S.V.S. 1985. "*Environment & Natural Resources, Society of Biosciences*".

6. Duggal, K.N. 1994. "*A Text Book on Public Health Engineering*", S.Chand & Co, Ram Nagar, New Delhi.

19IMAC14: ALLIED-I MATHEMATICS–I

LEARNING OBJECTIVES

To acquaint the student with the concepts in

LO1. Matrices

LO2. Differential Calculus

LO3. Integral calculus

LO4. Differential Equations

LO5. Vector differentiation

UNIT–I: Matrices

Rank of a matrix – Computation of the inverse of a matrix by elementary transformation – Characteristic equations – Eigen values and Eigen vectors and their properties–inverse of a matrix using Cayley – Hamilton theorem – real quadratic forms – Reduction to canonical form by elementary congruent transformations – Nature of quadratic forms.

UNIT–II: Differential Calculus

Curvature – radius of curvature – centre and circle of curvature – Evolutes – Envelopes – Taylor and Maclaurin series of functions of two variables – Jacobians – Maxima and minima of functions of two variables – constrained maxima and minima – Lagrange's method of multipliers.

Analytical Geometry of three dimensions.

UNIT–III: Integral Calculus

Methods of integration (Revision) – Integration by parts – properties of definite integrals – Reduction formulae – Evaluation of double and triple integrals – Change of order of integration – Application of multiple integrals for finding areas and volumes – Beta and Gamma functions.

UNIT–IV: Differential Equations

Linear differential equations of second order with constant coefficients. Simultaneous linear differential equations – Linear differential equations of second order with variable coefficients – Euler's homogeneous differential equations – Legendre's differential equations.

UNIT–V

Vector differentiation – Scalar and vector point functions – Differentiation of vectors – gradient of a scalar function – simple applications – Divergence and curl of vector functions – solenoidal and irrolational fields – simple applications – Laplacian operator – Expansion formulae of first and second order differential operators.

TEXT BOOK

1. Venkataraman, M.K. "Engineering Mathematics – Series", National Publishing Company, Chennai.

REFERENCE BOOKS

1. Kreyszig, E. *"Advanced Engineering Mathematics", (8th Edition)*, John Wiley & Sons (Asia) Pvt. Edition, Singapore, 2001.

2. Kandasamy P., Thilagavathy K. and Gunavathy K., *"Engineering Mathematics"*, Series (4th Revised Edition) S. Chand & Co., New Delhi, 2000.

COURSE OUTCOMES

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

CO1. Handle matrix applications.

CO2. Understand the calculus, differential calculus, integral calculus and vector differentiation.

CO3. To solve problems related to computer science and applications.

19ISET15: PROGRAMMING IN C

LEARNING OBJECTIVES

LO1. To impart adequate knowledge on the need of programming languages and problem involving techniques

LO2. To develop programming skills using the fundamentals and constructs.

LO3. To enable effective usage of arrays, attributes, functions, pointers and to implement the memory management concepts.

LO4. To teach the issues in file organization and the usage of file systems.

LO5. To develop logics which will help them to create programs, applications in C.

UNIT - I

C fundamentals Character set - Identifier and keywords - data types - constants - Variables - Declarations - Expressions - Statements - Arithmetic, Unary, Relational and logical, Assignment and Conditional Operators - Library functions.

UNIT - II

Data input output functions - Simple C programs - Flow of control - if, if-else, while, do-while, for loop, Nested control structures - Switch, break and continue, go to statements - Comma operator.

UNIT - III

Functions -Definition - proto-types - Passing arguments - Recursions. Storage Classes - Automatic, External, Static, Register Variables - Multi-file programs.

UNIT - IV

Arrays - Defining and Processing - Passing arrays to functions - Multi-dimension arrays - Arrays and String. Structures - User defined data types - Passing structures to functions - Self-referential structures - Unions - Bit wise operations.

UNIT - V

Pointers - Declarations - Passing pointers to Functions - Operation in Pointers - Pointer and Arrays - Arrays of Pointers - Structures and Pointers - Files: Creating Processing, Opening and Closing a data file.

TEXT BOOK

1. E.Balagurusamy, "Programming in ANSI C", Fifth Edition, Tata McGraw Hill.

REFERENCE BOOKS

1. B.W. Kernighan and D M.Ritchie, "The C Programming Language", 2nd Edition, PHI, 1988.
2. H. Schildt, "C: The Complete Reference", 4th Edition. TMH Edition, 2000.
3. Gottfried B.S, "Programming with C", Second Edition, TMH Pub. Co. Ltd., New Delhi 1996.
4. Kanetkar Y., "Let us C", BPB Pub., New Delhi, 1999.

COURSE OUTCOMES

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

CO1. Develop programs using the basic elements like control statements, arrays and strings

CO2. Understand about the code reusability with the help of user defined functions.

CO3. Develop advanced applications using enumerated data types, function pointer, nested structures, pre-processors and various header file directories.

CO4. Learn the basics of the handling mechanism that is essential for understanding the concepts in systems develop applications.

CO5. Handle the arrays, structures, pointers and more importantly files.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔		✔	✔	✔						✔	✔	✔	✔	✔	✔	✔	
CO2	✔	✔	✔	✔	✔	✔	✔					✔	✔	✔	✔	✔	✔	
CO3	✔		✔	✔	✔	✔	✔			✔		✔	✔	✔	✔	✔	✔	
CO4	✔		✔	✔	✔	✔	✔			✔	✔	✔	✔	✔	✔	✔	✔	✔
CO5	✔		✔	✔	✔					✔		✔	✔	✔	✔	✔	✔	

FIRST YEAR: SECOND SEMESTER

PART - I   LANGUAGE – தமிழ்-II
19ITAC21   பக்தி இலக்கியமும் சிற்றிலக்கியமும்

மதிப்பெண்: 75

கிரடிட்: 3

நோக்கம் : தமிழ்ப் பக்தி இலக்கியங்களையும் சிற்றிலக்கியங்களை அறிமுகம் செய்தல். பக்தி இலக்கியத்தின் செல்வாக்கு - தோற்றம் வளர்ச்சி - பாகுபாடு - தமிழின் தனித்தன்மையை உணர்த்திய பாங்கு போன்றவற்றை வரலாற்றுடன் விளக்குதல். இலக்கியங்களையும் அவை தொடர்பான இலக்கிய வரலாற்றையும் இணைத்;துப் படித்தல்.

அலகு - 1   பக்தி இலக்கியம்

    1. திருஞான சம்பந்தர்   -   திருநள்ளாறு - பச்சை பதிகம்
                                        (முதல் 5 பாடல்கள்)

    2. திருமூலர்   -   திருமந்திரம் (உடம்பினை முன்னை,
                                        யாவர்க்குமாம், ஒன்றே குலமும்,
                                        உள்ளம் பெருங்கோயில்,
                                        ஆர்க்கும் எனத் தொடங்கும் பாடல்கள்)

    3. சிவவாக்கியர்   -   அறிவுநிலை (5 பாடல்கள்)

அலகு - 2   பக்தி இலக்கியம்

    1. ஆண்டாள்   -   திருப்பாவை (முதல் 5 பாடல்கள்)
    2. வள்ளலார்   -   திருவருட்பா - பிள்ளைச் சிறு
                                        விண்ணப்பம்

அலகு - 3   பக்தி இலக்கியம்

    1. தேம்பாவணி   -   குழவிகள் வதைப்படலம்
    2. சீறாப்புராணம்   -   மானுக்குப் பிணை நின்ற படலம்

அலகு - 4   சிற்றிலக்கியம்

    1. குற்றாலக் குறவஞ்சி   - மலை வளம் (வானரங்கள்... பாடல் முதல்)
    2. முக்கூடற்பள்ளு   - நாட்டு வளம்

அலகு - 5   இலக்கிய வரலாறு

பக்தி சிற்றிலக்கிய வரலாறு - இடைக்காலத் தமிழகச் சூழல் - சைவ வைண சமயங்களின் செல்வாக்கு - சமண பௌத்த சமய இலக்கியங்கள் - கிறித்துவ இசுலாம் இலக்கியங்கள் - நாயக்கர் காலச் சிற்றிலக்கியங்கள் தோற்ற பின்னணி - சிற்றிலக்கிய வகை.

பாட நூல் :

1. ச.வே.சுப்பிரமணியன் - தமிழ் இலக்கிய வரலாறு
மணிவாசகர் பதிப்பகம், சென்னை.

2. சோ.நா.கந்தசாமி - தமிழ் இலக்கிய வரலாறு
மணிவாசகர் பதிப்பகம், சென்னை.

3. ந.வீ.செயராமன் - சிற்றிலக்கியச் செல்வம்
மணிவாசகர் பதிப்பகம், சென்னை.

4. ந.வீ. செயராமன் - பள்ளு இலக்கியம்
மணிவாசகர் பதிப்பகம், சென்னை.

5. க.ப.அறவாணன் - கலிங்கத்துப்பரணி ஒரு மதிப்பீடு
ஜைன இளைஞர் மன்றம், சென்னை

6. கோ.கேசவன் - பள்ளு இலக்கியம் ஒரு சமூகவியல்
பார்வை அன்னம் வெளியீடு, தஞ்சாவூர்

7. வேங்கடராமன் -பள்ளு இலக்கியங்களில் மள்ளர் மரபுகள்
தேவேந்திர மன்றம், கோயம்புத்தூர்

8. ந.சேதுரகுநாதன், ப.ஆ., - முக்கூடற்பள்ளு கழகம் வெளியீடு,
சென்னை

19ITAC21: HINDI – II (Option)

TEXT BOOK

I NAVEEN HINDI PATMAALA-II

First 10 lessons (including poems) Pub. by DBHP Sabha, Chennai-17.

II MANOHAR KAHANIYAM – PART-II

First 10 stories only Pub. by DBHP Sabha, Chennai-17.

19IENC 22: ENGLISH THROUGH LITERATURE II: POETRY

LEARNING OBJECTIVES:

By introducing the course, it is intended to:

LO1.   Develop the ability of the learner to comprehend and appreciate poems in English

LO2.   Enhance the competence of the learner in using the English language

LO3.   Improve the interest of the learner in human values and perceptions

LO4.   Enable students to study and analyze the use of language in poetry

LO5.   Provide learners with the theoretical and practical understanding of grammar

UNIT-I

William Shakespeare "Sonnet 116"

William Blake   "Lamb"

Robert Burns   "A Red, Red Rose"

Grammar   Finite & Non-finite verbs

UNIT-II

PB Shelley   "To Wordsworth"

John Keats   "Sonnet to Sleep"

Thomas Hardy   "Neutral Tones"

Grammar   Strong and Weak Verbs, Auxiliaries and Modals

UNIT-III

Robert Frost   "Stopping By Woods on a Snowy Evening"

Wilfred Owen   "Anthem for Doomed Youth"

Emily Dickinson   "A Narrow Fellow in the Grass"

Grammar   Transitive, Intransitive Verbs, Active and Passive Voice

UNIT-IV

Sri Aurobindo   "The Tiger and the Deer"

AK Ramanujan   "Obituary"

Sarojini Naidu   "Queen's Rival"

Grammar   Concord

UNIT-V

Roger Mc Gough   "My Bus Conductor"

Maya Angelou   "Still I Rise"

Langston Hughes   "The Negro Speaks of Rivers"

Grammar   Tenses and their forms

SUPPLEMENTARY READING

- Hydes, Jack.*Touched With Fire.* London: Cambridge UP, 1985.

- Narasimhaiah, C. D. *An Anthology of Common Wealth Literature.* New Delhi: Macmillan, 2006.

- Thomas, C. T. *Twentieth Century Verse: An Anglo-American Anthology.* New Delhi: Macmillan, 2006.

- Gates, Henry Louis, and Nellie Y. McKay.*The Norton Anthology of African American Literature.*New York: W.W. Norton & Co, 2004.

- Ramachandran. C. N. and Radha Achar. *Five Centuries of Poetry.* New Delhi: Laxmi, 1998.

COURSE OUTCOMES:

At the end of the course, the students will be able to:

CO1: Competency in communication, both in written and oral skills

CO2: Fluency in English language

CO3: Knowledge about construction of sentence structures

CO4: Vocabulary to use the English language effectively

CO5: Acquire the aesthetic sense for appreciating poetry

19IMAC23: ALLIED-II DISCRETE MATHEMATICS

LEARNING OBJECTIVES

LO1. To study various finite structures of mathematics.
LO2. To understand the concepts of sets, functions and groups.
LO3. To understand the relations and digraphs.

UNIT–I : Fundamentals

Sets and Subsets – Operations on Sets – Sequences – Division in the integers – Matrices – Mathematical Structures – Logic: Propositions and Logical Operations – Conditional Statements – Methods of Proof – Mathematical Induction Counting: Permutations – Combinations – The Pigeonhole Principle – Elements of Probability – Recurrence Relations.

UNIT–II : Relations and Digraphs

Product Sets and Partitions – Relations and Digraphs – Paths in Relations and Digraphs – Properties of Relations – Equivalence Relations – Computer Representation of Relations and Digraphs – Manipulation of Relations – Transitive Closure and Warshall's Algorithm.

UNIT–III : Functions

Functions – Functions for Computer Science – Permutation Functions – Growth of Functions Topics in Graph Theory: Graphs – Euler Paths and Circuits – Hamiltonian Paths and Circuits – Coloring Graphs .

UNIT–IV : Order Relations and Structures

Partially Ordered Sets – External Elements of Partially Ordered Sets – Lattices – Finite Boolean Algebras – Functions on Boolean Algebras – Boolean Functions as Boolean Polynomials Trees: Trees – Labeled Trees – Tree Searching – Undirected Trees – Minimal Spanning Trees.

UNIT–V : Semigroups and Groups

Binary Operations Revisited – semigroups – Products and Quotients of Semigroups – Groups – Products and Quotients of Groups ,Groups and coding : Coding of Binary Information and Error Detection – Decoding and Error Correction.

TEXT BOOK

1. Bernard Kolman, Robert C. Busby and Sharon Ross, "*Discrete Mathematical Structures*", Prentice Hall of India Pvt. Ltd., 1997.

REFERENCE BOOKS

1. Trembley, J.P. and R.P. Manohar, "*Discrete Mathematical Structures with Applications to Computer Science*", Tata McGraw Hill, 1975.

2. Preparata, F.P., R.T. Yeh, "*Introduction to Discrete Structures*", Addison–Wesley, 1973. Korthage, R.R., "*Discrete Computational Structures*", Academic Press, 1974.

COURSE OUTCOMES

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

   CO1. Acquire the basic concepts in mathematical logic and theory of inferences.
   CO2. Understand the concepts of set theory, relations and equivalence classes with matrix representation
   CO3. Formalities lattice theory, Boolean algebra and group theory
   CO4. Understand the basic concepts of graph theory, Eulerian and Hamiltonian graphs.

19ISET24: DATA STRUCTURES AND ALGORITHMS

LEARNING OBJECTIVES

   LO1. To impart the basic concepts of data structures and algorithms.
   LO2. To understand the concepts of about stacks, queues, lists trees and graphs.
   LO3. To gain knowledge on hashing/symbol tables and study various sorting algorithms
   LO4. To Study various sorting algorithms
   LO5. To develop applications using data structures.

UNIT-I

Introduction of algorithms, analyzing algorithms, Arrays : Representation of Arrays, Implementation of Stacks and queues, Application of Stack: Evaluation of Expression - Infix to postfix Conversion - Multiple stacks and Queues, Sparse Matrices.

UNIT-II

Linked list : Singly Linked list - Linked stacks and queues - polynomial addition - More on linked Lists - Doubly linked List and Dynamic Storage Management - Garbage collection and compaction.

UNIT-III

Trees: Basic Terminology - Binary Trees - Binary Tree representations - Binary trees - Traversal - More on Binary Trees - Threaded Binary trees - counting Binary trees. Graphs: Terminology and Representations - Traversals, connected components and spanning Trees, Single Source Shortest path problem.

UNIT-IV

Symbol Tables : Static Tree Tables - Dynamic Tree Tables - Hash Tables : Hashing Functions - overflow Handling. External sorting : Storage Devices - sorting with Disks : K-way merging - sorting with tapes.

UNIT-V

Internal sorting : Insertion sort - Quick sort - 2 way Merge sort - Heap sort - shell sort - sorting on keys. Files: Files, Queries and sequential organizations - Index Techniques - File organization.

TEXT BOOK

1. Ellis Horowitz, Sartaj Shani, Data Structures, Galgotia publication.

REFERENCE BOOKS

1. Data structures Using C Aaron M. Tenenbaum, Yedidyah Langsam, Moshe J. Augenstein, Kindersley (India) Pvt. Ltd.,

2. Data structure and Algorithms, Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman, Pearson Education Pvt. Ltd.

COURSE OUTCOMES

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

CO1. Implement suitable data structures for various applications.
CO2. Use appropriate sorting techniques.
CO3. Handle different file organizations.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓		✓	✓	✓							✓	✓	✓	✓	✓	✓	
CO2	✓		✓	✓	✓	✓						✓	✓					
CO3	✓	✓	✓	✓	✓	✓						✓	✓		✓	✓		

19ISET25: DIGITAL COMPUTER FUNDAMENTALS

LEARNING OBJECTIVES

LO1. It aims to train the student to the basic concepts of Digital Computer Fundamentals

LO2. To impart the in-depth knowledge of logic gates, Boolean algebra,

LO3. To provide basic ideas about combinational circuits and sequential circuits.

UNIT – I

Number Systems and Codes: Number System – Base Conversion – Binary Codes – Code Conversion. Digital Logic: Logic Gates – Truth Tables – Universal Gates.

UNIT – II

Boolean Algebra: Laws and Theorems – SOP, POS Methods – Simplification of Boolean Functions – Using Theorems, K-Map, Prime – Implicant Method – Binary Arithmetic: Binary Addition – Subtraction – Various Representations of Binary Numbers – Arithmetic Building Blocks – Adder – Subtractor.

UNIT – III

Combinational Logic: Multiplexers – Demultiplexers – Decoders – Encoders – Code Converters – Parity Generators and Checkers.

UNIT – IV

Sequential Logic: RS, JK, D, and T Flip-Flops – Master-Slave Flip-Flops. Registers: Shift Registers – Types of Shift Registers.

UNIT – V

Counters: Asynchronous and Synchronous Counters - Ripple, Mod, Up-Down Counters– Ring Counters. Memory: Basic Terms and Ideas –Types of ROMs – Types of RAMs.

TEXT BOOKS

1. V.Rajaraman and T.Radhakrishnan, *Digital Computer Design*, Prentice Hall of India, 2001

2. D.P.Leach and A.P.Malvino, *Digital Principles and Applications* – TMH – Fifth Edition – 2002.

3. M. Moris Mano, *Digital Logic and Computer Design*, PHI, 2001.

4. T.C.Bartee, *Digital Computer Fundamentals*, 6th Edition, Tata McGraw Hill, 1991.

COURSE OUTCOMES

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

CO1. Convert different type of codes and number systems which are used in digital communication and computer systems.

CO2. Form different digital circuits and analyse different types of digital electronic circuit

CO3. Implement logical operations using combinational logic circuits.

CO4. Understand the counters

CO5. Know the basic terms and ideas of ROM and RAM

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔		✔		✔			✔			✔	✔	✔	✔		✔	✔	✔
CO2	✔		✔	✔	✔						✔	✔	✔	✔	✔		✔	✔
CO3	✔	✔	✔		✔						✔		✔	✔			✔	✔
CO4	✔										✔							
CO5	✔	✔									✔	✔				✔		

19ISEP26: PRACTICAL – I: C PROGRAMMING

LEARNING OBJECTIVES

LO1. The course is oriented to those who want to advance structured and procedural programming understating and to improve C programming skills.

LO2. The course is designed to provide complete knowledge of C language.

LO3. Students will be able to develop logics which will help them to create programs, applications in C.

LO4. Also by learning the basic programming constructs they can easily switch over to any other language in future.

LO5. The major objective is to provide students with understanding of code organization and functional hierarchical decomposition with using complex data types

LIST OF EXERCISES

I Summation of Series

1. Sin(x), Cos(x), and Exp(x) (Comparison with built in functions)

II String Manipulation

1. Counting the number of vowels, consonants, words, white spaces in a line of text and array of lines.

2. Reverse a string and check for palindrome.

3. Sub string detection, count and removal.

4. Finding and replacing substrings.

III Recursion

1. ^nP_r, ^nC_r
2. GCD of two numbers
3. Fibonacci sequence
4. Maximum & Minimum

IV Matrix Manipulation

1. Addition and Subtraction
2. Multiplication
3. Transpose, and trace of a matrix
4. Determinant of a Matrix

V Sorting and Searching

1. Insertion Sort
2. Bubble Sort
3. Linear Search
4. Binary Search

Course Outcomes

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

CO1. Know concepts in problem solving and understand the fundamentals of C programming.

CO2. Choose the loops and decision making statements to solve the problem.

CO3. Implement different Operations on arrays.

CO4. Ability to work with textual information, characters and strings.

CO5. Ability to understand the different sorting algorithm and their complexity.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔		✔	✔	✔							✔	✔	✔	✔	✔	✔	
CO2	✔		✔	✔	✔							✔	✔		✔	✔		
CO3	✔		✔	✔	✔	✔						✔	✔	✔	✔	✔		
CO4	✔		✔	✔	✔	✔					✔	✔	✔	✔	✔	✔		
CO5	✔		✔	✔	✔	✔					✔		✔	✔	✔	✔		

19ISEP27: PRACTICAL – II: DATA STRUCTURES USING C

LEARNING OBJECTIVES

LO1. To develop skills to design and analyse simple linear and non-linear data structures.
LO2. It enables them to gain knowledge in practical application of data structures.
LO3. To Understand concepts about searching and sorting techniques
LO4. To understand basic concepts about Stacks, Queues, List, Tree and Graphs.
LO5. To understanding about writing algorithm and step by step approach in solving with the help of fundamental data structures.

LIST OF EXERCISES

- Write a C program to create two array list of integers. Sort and store the elements of both of them in third list.
- Write a C program to multiply two matrices A and B and store the resultant matrix in C using arrays.
- Write a C program to experiment the operation of STACK using array.
- Write a C program to create menu driven options to implement QUEUE to perform the following
  - (i) Insertion   (ii) Deletion   (iii) Modification   (iv) Listing of elements
- Write a C program to create Linked list representations of employee records and do the following operations using pointers.

  - To add a new record.
  - To delete an existing record.
  - To print the details about an employee.
  - To find the number of employees in the structure.

- Write a C Program to count the total nodes of the linked list.
- Write a C program to insert an element at the end of the linked list.
- Write a C program to insert an element at the beginning of a doubly linked list.
- Write a C program to display the hash table, using the mid square method.
- Write a program to demonstrate Binary Search.
- Write a C program to insert nodes into a Binary tree and to traverse in pre order.
- Write a C program to traverse the given binary tree using all traversal methods.
- Write a C program to arrange a set of numbers in ascending order using QUICK SORT.

COURSE OUTCOMES

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

CO1. Analyse the problem and develop the mathematical logic and algorithm.
CO2. Analyse the problem and implement the dynamic memory concepts.

CO3. Analyse the problem and should have the implementation of the non-linear data structures like Tree and Graph.

CO4. Implement the various Searching and Sorting Techniques with Time complexity.

CO5. Analyse and implement the appropriate data structures with optimized memory and computational time complexity.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓						✓				✓		✓	✓				✓
CO2			✓			✓		✓				✓	✓			✓		
CO3				✓							✓		✓	✓	✓		✓	✓
CO4	✓		✓							✓	✓					✓		✓
CO5	✓									✓	✓			✓				

SECOND YEAR: THIRD SEMESTER

PART - I   LANGUAGE – தமிழ்-III
19ITAC31   அற இலக்கியமும் காப்பியமும்

<div align="right">மதிப்பெண்கள் : 75</div>

<div align="right">கிரடிட் : 3</div>

நோக்கம்: தமிழில் தோன்றி அற இலக்கியங்களையும் காப்பிய இலக்கியங்களையும் அறிமுகம் செய்தல். அவற்றின் வகைகளை வரலாற்றுடன் விளக்குதல். இலக்கியங்களையும் அவை தொடர்பான இலக்கிய வரலாற்றையும் இணைத்;துப் படித்தல்.

அலகு - 1   அற இலக்கியம்

        1. திருக்குறள் -   உழவு, ஒழுக்கமுடைமை, காலமறிதல், நட்பு, பிரிவாற்றாமை

அலகு - 2   அற இலக்கியம்

        1. நாலடியார்   -   பெரியாரைப் பிழையாமை

        2. பழமொழி நானூறு   -   கல்வி

அலகு - 3   காப்பியம்

        1. சிலப்பதிகாரம்   -   இந்திர விழவு ஊரெடுத்த காதை

        2. ;மணிமேகலை   -   ஆபுத்திரன் திறன் அறிவித்த காதை

அலகு - 4   காப்பியம்

        1. பெரிய புராணம்   -   அப்பு+தி அடிகள் புராணம்

        2. கம்பராமாயணம் -   வாலி வதைப்படலம்

அலகு - 5   இலக்கிய வரலாறு

        சங்க மருவிய கால அற இலக்கியங்கள் - திருக்குறளின் பெருமை - அற இலக்கியங்களின் வளர்ச்சி - காப்பிய இலக்கணம் - பகுப்புகள் - காலந்தோறும் தோன்றிய காப்பியங்கள் - வரலாறு.

பாட நூல்கள்

    1. ச.வே.சுப்பிரமணியன்   -தமிழ் இலக்கிய வரலாறு

                            மணிவாசகர் பதிப்பகம், சென்னை.

    2. சோ.ந.கந்தசாமி   - தமிழ் இலக்கிய வரலாறு

                            மணிவாசகர் பதிப்பகம், சென்னை.

UNIT I

William Shakespeare	*The Tempest* (Act I)
Grammar	"Phrases and Clauses"

UNIT II

William Shakespeare	*The Tempest* (Act II)
Grammar	"Simple, Compound, and Complex
Sentences"	

UNIT III

William Shakespeare	*The Tempest* (Act III)
Grammar	"Transformation of Sentences"

UNIT IV

William Shakespeare	*The Tempest* (Act IV)
Grammar	"Sequence of Tenses and Reported
Speech"	

UNIT V

William Shakespeare	*The Tempest* (Act V)
Grammar	"Punctuation and Capitals"

TEXT BOOKS:

1. Shakespeare, William. *The Tempest.* Ed. W. Turner. New Delhi: S. Chand & Co., 2008.

2. Green, David. *Contemporary English Grammar, Structures, and Composition.* Chennai: MacMillan, 2010.

REFERENCE BOOKS:

- Cahn, L Victor. *Shakespeare the Playwright: A Companion to the Complete Tragedies Histories, Comedies, and Romances.* London: Praeger, 1996.

- Crystal, David. *Shakespeare's Words: A Glossary and Language Companion.* London: Penguin, 2009.

- Greenbaum , Sidney. *Oxford English Grammar.* London: Oxford UP, 2005.

- McCarthy. *Cambridge Grammar of English.* London: Cambridge UP, 2018.

- Quirk, Randolph. *A Comprehensive Grammar of the English Language.* London: Pearson, 2010.

COURSE OUTCOMES:

At the end of the course, the students will be able to:

CO1: Obtain a literary acumen to answer MCQs of NET/SET Examinations and other competitive examination

CO2: Appreciate conversational English

CO3: Recognize the dramatic elements of Shakespearean dramas

CO4: Use punctuations and capitals effectively in their composition

CO5: Recognize the elements of the spoken discourses

19IMAC33: ALLIED-III RESOURCE MANAGEMENT TECHNIQUE

LEARNING OBJECTIVES

Resource management techniques to finds applications in diverse fields including Engineering, Management Science, Computer Science and Economics. In this course, the general linear programming problem, simplex computation procedure, revised simplex method, duality problems in linear programming and some nonlinear programming problems, Integer programming problem, transportation and assignment problems, PERT and CPM are also covered. The main objective is to solve varieties of problems.

UNIT–I

Linear programming (LP) – principle components of decision problem – operations research (OR) modelling – phases of OR study – LP formulation and graphical solution – resource allocation problem – the simplex method – sensitivity analysis – revised simplex method.

UNIT–II

Duality and networks – definition of dual problem – primal – dual relationships – dual simplex method – post optimality analysis – transportation and assignment models – transhipment models – network minimization – shortest route problems – maximal flow problem.

UNIT–III

Integer programming – cutting plane algorithm, branch and bound method – multistage (dynamic) – programming solution of LP by dynamic programming.

UNIT–IV

Classical optimization theory: unconstrained external problem – newton raphson method – equality constraints – jacobian method – lagrangian method – kuhn tucker conditions – simple problems.

UNIT–V

Project scheduling. network diagram representation – critical path method – time charts and resources levelling – PERT.

TEXT BOOK

1. Taha, A.H., *"Operations Research an Introduction"*, Macmillan Publishing Company, Newyork, 1997.

REFERENCE

1. Billey E. Gillet, *"Introduction to Operations Research A Computer Oriented Algorithmic Approach"*, Tata McGraw Hill, New Delhi, 1979.

COURSE OUTCOMES

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

CO1. Model any real life situation into a mathematical model,
CO2. Solve the problem for the required demand,
CO3. Optimize the transportation and assignment of jobs,
CO4. Upgrade their ability in production management through project scheduling and allocation of resources,
CO5. Develop their personnel management through manpower planning and salary administration.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓				✓		✓				✓		✓	✓	✓	✓		
CO2	✓		✓	✓		✓		✓		✓		✓		✓	✓	✓	✓	
CO3			✓		✓								✓	✓	✓			✓
CO4	✓			✓			✓				✓	✓	✓			✓	✓	
CO5				✓			✓										✓	

19ISET34: RELATIONAL DATA BASE MANAGEMENT SYSTEMS

LEARNING OBJECTIVES

LO1. Understand the basic database concepts, including the database languages, Structure, Architecture and operations of the Relational database.
LO2. Construct simple and moderately advanced database queries using Structured Query Language (SQL).
LO3. To apply Relational Database design principles
LO4. To Understand the concepts of Indexing and Hashing,
LO5. To understand the concepts of serializability, concurrency and Deadlock handling.

UNIT - I

Introduction: Database System Applications-DBMS Vs. File System - View of Data- Data Model Database Languages - Database users and Administrators - Transaction Management - Database System Structure - Application Architecture.

Data Models: Basic Concepts - Constraint- Keys- ER Diagram - Weak Entity - Extended ER Features - UML; Relational Model: Structure of Relational Databases - Relational Algebra - Views.

UNIT – II

SQL: Background-Basic Structure-Set Operation-Aggregate Function-Null Values-Nested Sub Queries - Views - Modification of the Database - Data Definition Language - Embedded SQL - Dynamic SQL.

UNIT-III

Advance SQL : Integrity and Security: Domain - Constraint - Referential Integrity - assertions - Triggers - Security and Authorization - Authorization in SQL - Encryption and Authentication.

UNIT - IV

Relational Database Design: First Normal Form - Pitfalls in Relational Database Design-Functional Dependencies (Second Normal Form) - Boyce-Codd Normal Form - Third Normal Form - Fourth Normal Form - Overall Database Design Process.

UNIT-V

Transaction Management: Transaction concepts - States - Serializability. Lock based concurrency control: Locks - Granting - Two-Phase Locking protocol. Time stamp based protocol: Timestamps - Timestamp ordering protocol - Dead lock handling.

TEXT BOOK

1. A Silberschatz, H Korth, S Sudarshan, "Database System and Concepts", 5th Edition McGraw-Hill, 2005.

REFERENCE BOOKS

1. Alexix Leon & Mathews Leon, "Essential of DBMS", 2nd reprint, Vijay Nicole Publications, 2009.

2. Alexix Leon & Mathews Leon, "Fundamentals of DBMS", 2nd Edition, Vijay Nicole Publications, 2014.

WEBSITES:

1. http://engineeringppt.net/database-management-system-ppt-pdf-lecture-notes

COURSE OUTCOMES

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

CO1. Analyse and design required tables with appropriate forms.
CO2. Analyse the problem at various subsystem level with appropriate data types and marshalling.
CO3. To design the relational database with appropriate features using various normalization.
CO4. Design basic database storage structures and access techniques.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1			✔	✔		✔			✔		✔	✔	✔	✔	✔	✔	✔	
CO2		✔					✔		✔		✔		✔	✔	✔	✔		
CO3			✔			✔	✔		✔		✔		✔	✔	✔	✔		
CO4	✔			✔					✔		✔		✔	✔	✔	✔		

19ISET35: INTERNET PROGRAMMING

LEARNING OBJECTIVES

LO1. To understand different Internet Technologies.
LO2. To learn java-specific web services architecture

UNIT I

Web Essentials: Clients, Servers and Communication – The Internet – Basic Internet protocols – World wide web – HTTP Request Message – HTTP Response Message – Web Clients – Web Servers – HTML5 – Tables – Lists – Image – HTML5 control elements – Semantic elements – Drag and Drop – Audio – Video controls – CSS3 – Inline, embedded and external style sheets – Rule cascading – Inheritance – Backgrounds – Border Images – Colors – Shadows – Text – Transformations – Transitions – Animations.

UNIT II

Java Script: An introduction to JavaScript–JavaScript DOM Model-Date and Objects,-Regular Expressions- Exception Handling-Validation-Built-in objects-Event Handling- DHTML with JavaScript- JSON introduction – Syntax – Function Files – Http Request – SQL.

UNIT III

Servlets: Java Servlet Architecture- Servlet Life Cycle- Form GET and POST actions- Session Handling- Understanding Cookies- Installing and Configuring Apache Tomcat Web Server- DATABASE CONNECTIVITY: JDBC perspectives, JDBC program example – JSP: Understanding Java Server Pages-JSP Standard Tag Library (JSTL)-Creating HTML forms by embedding JSP code.

UNIT IV

An introduction to PHP: PHP- Using PHP- Variables- Program control- Built-in functions- Form Validation- Regular Expressions – File handling – Cookies – Connecting to Database. XML: Basic XML- Document Type Definition- XML Schema

DOM and Presenting XML, XML Parsers and Validation, XSL and XSLT Transformation, News Feed (RSS and ATOM).

UNIT V

AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods; Web Services: Introduction- Java web services Basics – Creating, Publishing, Testing and Describing a Web services (WSDL)-Consuming a web service, Database Driven web service from an application –SOAP.

TEXT BOOK
1. Deitel and Deitel and Nieto, Internet and World Wide Web – How to Program‖, Prentice Hall, 5th Edition, 2011.

REFERENCES BOOKS
1. Stephen Wynkoop and John Burke ―Running a Perfect Website‖, QUE, 2nd Edition,1999.
2. Chris Bates, Web Programming – Building Intranet Applications, 3rd Edition, Wiley Publications, 2009.
3. Jeffrey C and Jackson, ―Web Technologies A Computer Science Perspective‖, Pearson Education, 2011.
4. Gopalan N.P. and Akilandeswari J., ―Web Technology‖, Prentice Hall of India, 2011.

COURSE OUTCOMES

On successful completion of the course, the students will be able to
  CO1. Understand the concepts of elements in the web.
  CO2. Write programs in Javascript and servelets.
  CO3. Design and implement webpages.
  CO4. Deploy web services.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓	✓	✓						✓		✓						
CO2	✓		✓	✓	✓	✓						✓	✓	✓	✓	✓	✓	✓
CO3	✓		✓	✓	✓	✓						✓	✓	✓	✓	✓	✓	✓
CO4	✓				✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓

19ISEP36: PRACTICAL – III: SQL AND PL/SQL

LEARNING OBJECTIVES

  LO1. To describe a sound introduction to the discipline of database management systems.
  LO2. To give a good formal foundation on the relational model of data and usage of Relational Algebra.
  LO3. To introduce the concepts of basic SQL as a universal Database language.

LO4. To enhance knowledge in DDL, DML and DCL commands
LO5. To gain knowledge in aggregate functions.

LIST OF EXERCISES

1. Data Definition of Base Tables.
2. DDL with Primary key constraints
3. DDL with constraints and verification by insert command
4. Data Manipulation of Base Tables and Views
5. Demonstrate the Query commands
6. Write a PL/SQL code block that will accept an account number from the user and debit an amount of Rs. 2000 from the account if the account has a minimum balance of 500after the amount is debited. The Process is to fired on the Accounts table.
7. Write a PL/SQL code block to calculate the area of the circle for a value of radius varying from 3 to 7. Store the radius and the corresponding values of calculated area in a table Areas. Areas – radius, area.
8. Write a PL/SQL block of code for reversing a number. (Example : 1234 as 4321).
9. Create a transparent audit system for a table Client_master (client_no, name, address, Bal_due). The system must keep track of the records that are being deleted or updated. The functionality being when a record is deleted or modified the original record details and the date of operation are stored in the auditclient(client_no, name, bal_due, operation, userid, opdate) table, then the delete or update is allowed to go through.

COURSE OUTCOMES

On successful completion of the course, the students will be able to
CO1. Identify the data types, draw appropriate conceptual models, design database structure, and forms.
CO2. Implement different types of queries.
CO3. Develop the PL/SQL program for scientific problems and business data models.
CO4. Implement the DDL, DML and DCL methods in Business data models.
CO5. Normalize the business data model and should have the ability of implement the object oriented database concepts.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔		✔		✔	✔	✔		✔		✔	✔		✔		✔	✔	
CO2	✔		✔	✔		✔		✔		✔		✔		✔		✔	✔	
CO3		✔		✔				✔				✔	✔	✔		✔		
CO4			✔	✔		✔		✔	✔	✔		✔		✔		✔	✔	
CO5	✔		✔	✔	✔	✔	✔	✔										✔

SECOND YEAR : FOURTH SEMESTER

PART – I LANGUAGE தமிழ்-IV
19ITAC-41 – சங்க இலக்கியமும் செம்மொழி வரலாறும்

மதிப்பெண்கள் : 75

கிரடிட் : 3

நோக்கம்: உலகச் செம்மொழியின் வரலாற்றைக் கூறுதல். தமிழ்ச் செம்மொழியின் தனிச் சிறப்புக்களையும் செம்மொழி இலக்கியங்களையும் விவரித்தல் - சங்க இலக்கியங்களின் தனித்தன்மைகளை வரலாற்றுடன் விளக்குதல்.

அலகு – 1   அக இலக்கியங்கள்

1. குறுந்தொகை	-	125, 129, 177, 302, 397	(நெய்தல்)
2. நற்றிணை	-	206, 217, 304, 334, 382	(குறிஞ்சி)
3. ஐங்குறுநூறு	-	17, 18, 71, 75, 96,	(மருதம்)
4. அகநானூறு	-	147, 303, 370	(பாலை)
5. கலித்தொகை	-	104, 105	(முல்லை)

அலகு - 2   புற இலக்கியங்கள்

1. புறநானூறு   -   பெண்பாற்புலவர;கள்

76, 83, 133, 146, 178, 188, 227, 261, 264, 278

அலகு - 3   பத்துப்பாட்டு

1. நெடுநெல்வாடை

அலகு - 4   சங்க இலக்கிய வரலாறு

தொல்காப்பியம் - சங்க காலம் - முற்சங்கங்கள் - பாட்டும் தொகையும் - தொகுப்புமுறை - தனித்தன்மைகள்.

அலகு - 5   பயன்பாட்டுத் தமிழும் செம்மொழி வரலாறும்

மொழி விளக்கம் - மொழிக்குடும்பங்கள் - உலகச் செம்மொழிகள் - இந்தியச் செம்மொழிகள் - செம்மொழித் தகுதிகள் - வரையறைகள் - வாழும் செம்மொழித் தமிழ் - தமிழின் தொன்மை - தமிழின் சிறப்புக்கள் - தமிழ்ச் செம்மொழி நூல்கள் - தமிழ் செம்மொழி அறிந்தேற்பு - பரிதிமாற்கலைஞர் முதல் தற்கால அறிஞர்கள் வரை (அறிஞர்கள் - அமைப்புகள் - நிறுவனங்கள் - இயக்கங்கள் தொடர்முயற்சிகள் - அறப்போராட்டங்கள் - உலத் தமிழ்ச் செம்மொழி மாநாடு, கோவை-2010)

பாட நூல் :

1.   ச.வே.சுப்பிரமணியன்   -   சங்க இலக்கியம், மணிவாசகர் பதிப்பகம்.

பார்வை நூல்கள் :

1. மு.வரதராசன்   -   தமிழ் இலக்கிய வரலாறு,
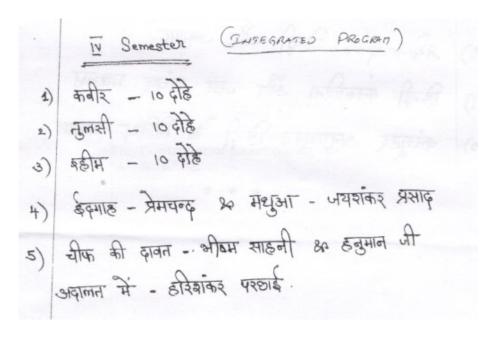
சாகித்திய அகாதெமி வெளியீடு 1998.

2. பூவண்ணன்   -   தமிழ் இலக்கிய வரலாறு,

கழக வெளியீடு சென்னை.

3. தமிழண்ணல்	-	புதிய நோக்கில் தமிழ் இலக்கிய வரலாறு
	மீனாட்சி புத்தக நிலையம், மதுரை 1998.

4. சி.பாலசுப்பிரமணியன்	-	தமிழ் இலக்கிய வரலாறு,
	பாரிநிலையம், சென்னை - 1987

5. எம்.ஆர்.அடைக்கலசாமி	-	தமிழ் இலக்கிய வரலாறு
	கழக வெளியீடு, சென்னை - 1994.

6. மது.ச.விமலானந்தம்	-	தமிழ் இலக்கிய வரலாற்றுக் களஞ்சியம், 1987.

7. கண்ணன் ப.ஆ.	-	புறப்பாடல்களில் பெண்பாற்புலவர்கள்
	பரதன் பதிப்பகம். சென்னை - 117

19ITAC41: HINDI – IV (Option)

IV Semester (INTEGRATED PROGRAM)

1) कबीर - १० दोहे
2) तुलसी - १० दोहे
3) रहीम - १० दोहे
4) ईदगाह - प्रेमचन्द & मधुआ - जयशंकर प्रसाद
5) चीफ की दावत - भीष्म साहनी & हनुमान जी अदालत में - हरिशंकर परसाई.

19IENC 42: ENGLISH THROUGH LITERATURE IV: SHORT STORY

LEARNING OBJECTIVES

By introducing the course, it is intended to

LO1. Develop the communicative competence of learners in the English Language through training them in the skills of listening, speaking, reading, and writing

LO2. Enable the students to know about the origin and development of short story

LO3. Write objectively, avoiding vague, prejudice, and exaggeration

LO4. The broad aim of this course is to enable the learner to function through the written mode of English language in all situations including classroom, library, laboratory etc.

LO5. It also aims at different levels of a short story, such as discovering an author's purpose, drawing conclusions about certain events, evaluating cause and effect, and understanding point of view.

UNIT I

1.	O' Henry	"The Gift of The Magi"
2.	Ken Liu	"The Paper Menagerie"
	Grammar	Synonyms and Antonyms

UNIT II

1.	Flora Annie Steel	"Valiant Vicky"
2.	Oscar Wilde	"Happy Prince"
	Grammar	Words often confused

UNIT III

1.	R. K. Narayan	"The Martyr's Corner"
2.	Mahasweta Devi	"Draupati"
	Grammar	Paragraph-Writing

UNIT IV

1.	Leo Tolstoy	"How much Land Does a Man Need?"
2.	Somerset Maugham	"The Verger"
	Grammar	Letter-Writing

UNIT V

1.	Langston Hughes	"On the Road"
2.	Premchand	"BakthiMarg"
	Grammar	Precis-Writing

SUPPLEMENTARY READING:

- Srinivasa Iyengar, K.R. *Indian Writingin English*. Sterling Publ., 1996.

- Swan, Michael. *Practical English Usage:* Oxford University Press, 2016.

- Palmer, Frank Robert. *Grammar: (by) Frank Palmer*. Penguin Books, 1975.

- Browns, Julie, ed., *Ethnicity and the American Short Story*. Garland, 1997.

- *Patea, Viorica, ed., Short Story Theories: A Twenty-First-Century Perspective.* Rodopi, 2012.

COURSE OUTCOMES:

At the end of the course, the students will be able to:

CO1. Use more vocabularies while writing

CO2. Learner can ensure about the history and development

CO3. The learner has a development in flow of writing

CO4. Students can come up with new ideas while reading stories from different perspectives.

CO5. Write in a style appropriate for communicative purposes

19ISET43: OBJECT ORIENTED PROGRAMMING USING C++

LEARNING OBJECTIVES

LO1. To explain the advantages of object oriented programming over procedure oriented programming.

LO2. Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism.

LO3. To learn how to implement constructors, function, pointes and class member functions.

LO4. Explain array handing, function overloading, operator overloading and virtual functions.

LO5. Helps in implementing some important features of C++ including templates, utilizing the I/O classes in C++ and exception handling.

UNIT I

Principles of Object- Oriented Programming – Beginning with C++ - Tokens, Expressions and Control Structures – Functions in C++

UNIT II

Classes and Objects – Constructors and Destructors – New Operator – Operator Overloading and Type Conversions.

UNIT III

Inheritance: Extending Classes – Pointers- Virtual Functions and Polymorphism

UNIT IV

Managing Console I/O Operations – Working with Files – Templates – Exception Handling

UNIT V

Standard Template Library – Manipulating Strings – Object Oriented Systems Development

TEXT BOOK

1. Balagursamy E, Object Oriented Programming with C++, Tata McGraw Hill Publications, Sixth Edition, 2013

REFERENCE BOOK

1. Ashok Kamthane, Programming in C++, Pearson Education, 2013.

COURSE OUTCOMES

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

CO1. Describe the principles of object-oriented problem solving and programming.
CO2. Explain programming fundamentals, including statement and control flow.
CO3. Apply the concepts of class, method, constructor, pointers, data abstraction, function abstraction, inheritance, overriding, overloading, polymorphism, IO streams, Templates.
CO4. Design program with basic data structure like array.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔			✔					✔		✔	✔					✔	
CO2			✔				✔			✔				✔	✔			
CO3	✔			✔					✔		✔		✔	✔				✔
CO4						✔				✔						✔		

19ISET44: WEB TECHNOLOGY

LEARNING OBJECTIVES

LO1. To learn about HTML, DHTML concepts.
LO2. To implement a variety of presentation effects in HTML.
LO3. To know about appropriate client-side applications.
LO4. To gain the Knowledge of XML and its applications.
LO5. To know about java scripts and create adaptive web pages

UNIT – I

Structuring Documents for the Web: Introducing HTML and XHTML, Basic Text Formatting, Presentational Elements, Phrase Elements, Lists, Editing Text, Core Elements and Attributes, Attribute Groups. Links and Navigation: Basic Links, Creating Links with the <a> Element, Advanced E- mail Links. Images, Audio, and Video: Adding Images Using the <img> Element, Using Images as Links Image Maps, Choosing the Right Image Format, Adding Flash, Video and Audio to your web pages.

UNIT – II

Tables: Introducing Tables, Grouping Section of a Table, Nested Tables, Accessing Tables. Forms: Introducing Forms, Form Controls, Sending Form Data to the Server. Frames: Introducing Frameset, <frame> Element, Creating Links Between Frames, Setting a Default Target Frame Using <base> Element, Nested Framesets, Inline or Floating Frames with <iframe>.

UNIT – III

Cascading Style Sheets: Introducing CSS, Where you can Add CSS Rules. CSS Properties: Controlling Text, Text Formatting, Text Pseudo Classes, Selectors, Lengths, Introducing the Box Model. More Cascading Style Sheets: Links, Lists, Tables, Outlines, The :focus and :activate Pseudo classes Generated Content, Miscellaneous Properties, Additional Rules, Positioning and Layout wit, Page Layout CSS , Design Issues.

UNIT - IV

Java Script: How to Add Script to Your Pages, Variables and Data Types – Statements and Operators, Control Structures, Conditional Statements, Loop Statements – Functions - Message box, Dialog Boxes, Alert Boxes, Confirm Boxes, Prompt Boxes.

UNIT – V

Working with JavaScript: Practical Tips for Writing Scripts, JavaScript Objects: Window Object - Document object - Browser Object - Form Object - Navigator object Screen object - Events, Event Handlers, Forms – Validations, Form Enhancements, JavaScript Libraries.

TEXT BOOK

1. Jon Duckett, Beginning HTML, XTML, CSS and   Java script **,** Wiley Publishing

REFERENCES BOOKS

1.Chris Bates, "Web Programming", Wiley Publishing 3d Edition.

2. M. Srinivasan, "Web Technology: Theory and Practice", Pearson Publication

COURSE OUTCOMES

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

- CO1. Analyze a web page and identify its elements and attribute.
- CO2. Create web pages using HTML and CSS.
- CO3. Validate the web data using java Script
- CO4. Develop applications using JSP.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓					✓		✓		✓	✓	✓	✓	✓		✓	✓	✓
CO2			✓	✓		✓	✓		✓		✓	✓	✓	✓		✓	✓	✓
CO3				✓	✓		✓	✓		✓		✓		✓		✓		
CO4	✓	✓				✓		✓			✓	✓	✓	✓			✓	✓

19ISET45: COMPUTER GRAPHICS

LEARNING OBJECTIVES

    LO1. To understand the basic concepts of Computer Graphics
    LO2. To apply geometric transformations, viewing and clipping on graphical objects
    LO3. To understand visible surface detection techniques and illumination models
    LO4. To familiarize input and output devices of computer graphics system.

UNIT - I

Overview of graphics Systems: Video Display Device - Refresh Cathode-Ray tubes Raster - Scan Displays Random - Scan Displays - Color CRT Monitors - Direct view Storage tubes Flat - Panel Displays Three - Dimensional Viewing Devices, Stereoscopic and Virtual - Reality Systems.

UNIT - II

Raster - Scan Systems Video Controller - Random - Scan Systems Video Controller - Random-Scan Systems - Input device – Keyboard- Mouse - Trackball - Space ball and Joysticks - Data Glove – Digitizers Image Scanners - Touch Panels - Light pens. Voice Systems - Hard-Copy Devices - Line Drawing Algorithms-DDA Algorithms - Circle generating Algorithm Properties of Ellipses.

UNIT - III

Two Dimensional Geometric Transformation: Basic Transformations - Translation - Rotation - Scaling - Matrix Representations and Homogeneous Coordinates - Other Transformations Reflections Two Dimensional Viewing : Windows to view point coordinate Transformations - Clipping Operations - Point Clipping - Line Clipping - Curve Clipping - Text Clipping - Exterior Clipping.

UNIT - IV

Three Dimensional Concepts: Three Dimensional Display method - Parallel projection - Depth cueing visible line and surface - Three Dimensional Geometric and modelling Transformations: Translation - Rotation - Scaling - Composite Transformations. Three Dimensional Viewing: Viewing pipeline - Viewing Coordinates - Projections - Parallel Projections - Perspective Projections.

UNIT – V

Visible Surface Detection Methods : Classification Visible Surface Detection Algorithms - Back Face Detection - Depth - Buffer Method - A-Buffer Method - Scan line method - Depth sorting method - BSP tree method - Area Subdivision Method.

TEXT BOOK

    1. Donald Hearn and M. Pauline Baker , "Computer Graphics", 2nd Edition, 1996

REFERENCE BOOK

1. John f. Hughes, Andries Van Dam, Morgan Mcguire, David F. Sklar, James D. Foley, Steven K. Feiner, Kurt Akeley, "Computer Graphics Principles and Practice" 3rd Edition, Pearson Education,2014.

COURSE OUTCOMES

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

CO1. Understand the concepts of computer graphics system
CO2. Handle the devices related to computer graphics.
CO3. Develop algorithms for geometric transformation.
CO4. Detect visible surfaces using various techniques.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔		✔							✔		✔					✔	✔
CO2	✔		✔		✔		✔	✔	✔		✔	✔			✔	✔		✔
CO3		✔		✔			✔			✔	✔	✔		✔	✔	✔		✔
CO4	✔				✔		✔				✔	✔	✔	✔			✔	

19ISEP46: Practical – IV: C++ Programming

LEARNING OBJECTIVES

LO1. To develop solutions to problems demonstrating usage of control structures, modularity, I/O. and other standard language constructs.
LO2. To demonstrate the usage of data abstraction, encapsulation, and inheritance.
LO3. To implement the abstract interface and polymorphism
LO4. To learn syntax, features of, and how to utilize the Standard Template Library.
LO5. To learn other features of the C++ language including templates, exceptions, forms of casting, conversions, covering all features of the language.

LIST OF EXERCISES

1. Write a program in C++ to swap two numbers?
2. Write a C++ program to find the largest three elements in an array?
3. Write a program in C++ to calculate the series?
   (1) + (1+2) + (1+2+3) + (1+2+3+4) + ... + (1+2+3+4+...+n)?
4. Write a C++ program to find the Transpose of a Matrix?
5. Write a C++ program to convert binary number to decimal?
6. Write a C++ program to calculate area of a circle,a rectangle or a triangle depending upon user's choice?

7. Write a C++ program to do Addition, subtraction and multiplication of two numbers using function?
8. Write a C++ program to overload unary operators that is increment and decrement.
9. Write a C++ program to read and print student's information using two classes and simple inheritance?

COURSE OUTCOMES

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

CO1. Demonstrate the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects.
CO2. Implement dynamic memory management techniques using pointers, constructors, destructors, etc
CO3. Write programs using concept of function overloading, operator overloading, virtual functions and polymorphism.
CO4. Implement early and late binding, usage of exception handling and generic programming.
CO5. Implement the use of various OOPs concepts with the help of program.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1						✓				✓	✓			✓				✓
CO2	✓		✓								✓				✓	✓	✓	
CO3			✓			✓				✓		✓		✓		✓		✓
CO4		✓						✓							✓		✓	
CO5				✓			✓			✓		✓						✓

19ISEP47: PRACTICAL-V: Web Technology Lab

LEARNING OBJECTIVES

LO1. To design web pages using various HTML tags
LO2. To write simple programs in Java Script to create forms.
LO3. To understand the importance of cascade style sheets in creating a web application.
LO4. To understand the use of XML in Document type Definition.

LIST OF EXERCISES

1. Create a form having number of elements (Textboxes, Radio buttons, Checkboxes, and so on). Write JavaScript code to count the number of elements in a form.
2. Create a HTML form that has number of Textboxes. When the form runs in the Browser fill the textboxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textboxes has been left empty, popup an alert indicating which textbox has been left empty.

3. Develop a HTML Form, which accepts any Mathematical expression. Write JavaScript code to Evaluates the expression and Displays the result.

4. Create a page with dynamic effects. Write the code to include layers and basic animation.

5. Write a JavaScript code to find the sum of N natural Numbers. (Use user-defined function)

6. Write a JavaScript code block using arrays and generate the current date in words, this should include the day, month and year.

7. Create a form for Student information. Write JavaScript code to find Total, Average, Result and Grade.

8. Create a form for Employee information. Write JavaScript code to find DA, HRA, PF, TAX, Gross pay, Deduction and Net pay.

9. Create a form consists of a two Multiple choice lists and one single choice list

10. (a)The first multiple choice list, displays the Major dishes available
    (b)The second multiple choice list, displays the Starters available.
    (c)The single choice list, displays the Soft drinks available.

11. Create a web page using two image files, which switch between one another as the mouse pointer moves over the image. Use the on Mouse Over and on Mouse Out event handlers.

COURSE OUTCOMES

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

CO1. Develop to build a complete website using HTML
CO2. Create web pages using DHTML and Cascading Style Sheets.
CO3. Able to include JavaScript for form validations and email validations.
CO4. Develop a simple web application using server side PHP programing and Database Connectivity using MySQL.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔	✔			✔	✔						✔	✔				✔	✔
CO2	✔	✔		✔			✔			✔		✔	✔	✔		✔	✔	✔
CO3	✔		✔		✔	✔						✔	✔	✔		✔	✔	✔
CO4	✔	✔	✔				✔				✔	✔					✔	✔

THIRD YEAR: FIFTH SEMESTER

19ISET51: OPERATING SYSTEMS

LEARNING OBJECTIVES

LO1. To understand the concepts, operation, design, implementation and services of an operating system.

LO2. To understand the structure and computing environment of the system.

LO3. To understand the concepts of process and its operations and how to synchronize and schedule the process. The methods of deadlock and its characterization were taught.

LO4. To understand the different approaches to memory management.

LO5. To understand the mass storage structure and how to schedule the disk. The structure and organization of the file

LO6. Students should understand the data structures and algorithms used to implement an operating system.

UNIT - I

Introduction - History of operating system- Different kinds of operating system – Operating system concepts - System calls-Operating system structure.

UNIT - II

Processes and Threads: Processes - threads - thread model and usage - inter process communication.

UNIT - III

Scheduling - Memory Management: Memory Abstraction - Virtual Memory - Page replacement algorithms.

UNIT - IV

Deadlocks: Resources- introduction to deadlocks - deadlock detection and recovery - deadlocks avoidance - deadlock prevention. Multiple processor system: multiprocessors - multi computers.

UNIT - V

Input / Output: principles of I/O hardware - principles of I/O software. Files systems: Files - directories - files systems implementation - File System Management and Optimization.

TEXT BOOK

- Andrew S. Tanenbaum, "Modern Operating Systems", 2nd Edition, PHI private Limited, New Delhi, 2008.

REFERENCE BOOKS

- William Stallings, "Operating Systems - Internals & Design Principles",5thEdition, Prentice - Hall of India private Ltd, New Delhi, 2004.

- Sridhar Vaidyanathan, "Operating System", 1st Edition,Vijay Nicole Publications, 2014.

COURSE OUTCOMES

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

CO1. Understand the structure the OS and basic architectural components involved in OS design.

CO2. Understands the concepts of operating structure and how to design and implement the system.

CO3. Understands the concept of scheduling for process and how to avoid the dead lock situations for the process.

CO4. Finding the ways to manage the memory and how to utilize the memory effectively.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔	✔		✔		✔			✔			✔				✔	✔	
CO2	✔		✔		✔							✔	✔	✔	✔	✔		
CO3	✔					✔						✔			✔			✔
CO4	✔	✔			✔						✔	✔	✔	✔		✔		

19ISET52: PROGRAMMING IN JAVA

LEARNING OBJECTIVES

LO1. To introduce the basic features of Java
LO2. To educate JAVA Programming structure, Virtual Machine concept etc.,
LO3. To introduce java classes and java applets
LO4. To educate inheritance, exception handlings and Threads.
LO5. To educate the design of web pages.

UNIT I

Genesis of Java: Creation of Java – why java is important to internet – The Java Buzz words – An overview of Java Object Oriented Programming. Data types – Variables – Type conversion and casting – Automatic type promotion in Expressions – Strings. Arrays: One Dimensional Array – Multi Dimensional Array – Operators – Control statements.

UNIT II

Class Fundamentals – Declaring objects – Assigning object Reference variables – Introducing Methods – Constructors – Garbage collection – Finalize () Method – Stack class. A Closer Look at Methods and classes: Overloading Methods – Argument passing – Nested and Inner classes – String class – Using command line arguments. Inheritance Basics & Types - Method overriding – Dynamic Method Dispatch – Using Abstract class – Using final with inheritance.

UNIT III

Packages & Interface - Exception Handling - Creating your own Exception subclasses. Multithreaded Programming: Java Thread Model – Main Thread – Creating a Thread - Creating Multiple Threads–Using is Alive () and join () – Thread priorities – Synchronization – Inter thread Communication.

UNIT IV

I/O & Applets : I/O Basics Reading console Input – writing console output – The Print Writer class – Reading and Writing Files. The Applet class: - Applet Architecture – Applet Skeleton – Applet Display method – Requesting Repainting – HTML APPLET tag- Passing Parameters to Applet – Audio Clip Interface. Event Handling Mechanisms – Delegation Event Model – Event classes – Sources of Events – Event Listener Interfaces – Adapter Classes.

UNIT V

AWT Classes – Window fundamentals – working with Frame Windows - working with Graphic Using AWT controls: Controls fundamentals – Labels – using Buttons – Applying check Boxes – Check Box group – Choice controls – Using a Text field – Using a Text Area – Understanding Layout Managers (Flow Layout only) – Menu Bars and Menus.

TEXT BOOK

1. Herbert Schildt, "Java - The Complete Reference", Ninth Edition, McGraw-Hill Education, 2014

REFERENCE BOOKS

1. E. Balagurusamy, "Programming with Java", Tata McGraw-Hill Education India, 2014.
2. Sachin Malhotra & Saurabh Choudhary, "Programming in JAVA", 2nd Ed, Oxford Press.
3. Sagayaraj, Denis, Karthik and Gajalakshmi, "JAVA Programming for Core and Advanced Learners", 2018.

COURSE OUTCOMES

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

CO1. Identify, declare and define the data type with scope of the variables and methods.
CO2. Identify and define the modules, classes, subclasses and methods.
CO3. To develop a package using inheritance and interface.
CO4. To identify and divide the system into various subsystems and apply the multithreading concepts. Also the student can be able to operate file handling mechanisms.
CO5. To develop GUI based applications using Applet and Swing.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1			✓			✓				✓		✓		✓	✓	✓		✓
CO2	✓	✓		✓				✓	✓			✓		✓	✓	✓		
CO3				✓			✓		✓			✓		✓	✓	✓		✓
CO4		✓				✓				✓	✓	✓	✓	✓	✓	✓		
CO5		✓		✓			✓				✓	✓		✓	✓	✓		

19ISET53: COMPUTER NETWORKS

LEARNING OBJECTIVES

LO1. Study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
LO2. Acquire knowledge of Application layer and Presentation layer paradigms and protocols.
LO3. Study Session layer design issues, Transport layer services, and protocols.
LO4. Gain core knowledge of Network layer routing protocols and IP addressing.
LO5. Study data link layer concepts, design issues, and protocols.

UNIT-I

Introduction: The uses of computer networks-Network hardware-Network software-Reference models-Example of networks-Network standardization.
The physical layer: The theoretical basis for data communication–Guided Transmission media –Wireless transmission– PSTN-Mobile telephone-Communication satellite.

UNIT-II

The Data Link Layer: Data link layer design issues-Error detection and correction – Elementary data link protocols- Sliding window protocols- Example of data link protocols-ETHERNET–802.11-802.16-Bluetooth-Data link layer Switching.

UNIT-III

The network layer: Network layer design issues- Routing algorithms- Congestion control algorithms-Internetworking-Network layer in Internet. Network Services

BOOTP and DHCP-Domain Name Service-WINS-Web Serving and Surfing Web servers-Web clients (browsers).

UNIT-IV

The transport layer: Transport layer design issues-Transport protocols-Simple transport protocol-Internet transport protocols UDP-TCP.

UNIT-V

The application layer: Domain name system- Electronic mail- World wide web–Multimedia–Cryptography-Digital signature-Communication Security.

TEXT BOOK:

1. Andrew S.Tanenbaum, "Computer networks", PHI, 4thedition,2002.

REFERENCES BOOKS

1. William Stallings," Data and computercommunications",PHI-2001.
2. DouglasE. comer,"Internet working with TCP/IP-Volume-I",PHI,1997.
3. Larry L. Peterson and Bruce S. Davie, "Computer Networks: A Systems Approach", Fifth Edition, Morgan Kaufmann Publishers, 2012.
4. William Stallings, "Data and Computer Communications", Tenth Edition, Pearson, 2013.
5. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-DownApproach", Fifth Edition, Pearson Education,2012
6. Teresa C.Piliouras, "Network Design Management and Technical Perspectives, Second Edition", Auerbach Publishers, 2015.

COURSE OUTCOMES:

On successful completion of the course, the student will be able to
  CO1. To master the terminology and concepts of the OSI reference model and the TCP-IP reference model.
  CO2. To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.
  CO3. To be familiar with wireless networking concepts.
  CO4. To be familiar with contemporary issues in networking technologies.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1				✓			✓					✓		✓			✓	
CO2					✓						✓							
CO3	✓								✓					✓			✓	
CO4		✓			✓						✓				✓			✓

19ISET54: MULTIMEDIA SYSTEMS

LEARNING OBJECTIVES:
LO1. To understand the standards available for different audio, video and text applications
LO2. To learn various multimedia authoring systems in multimedia production team

UNIT I

Multimedia Definition - Use Of Multimedia - Delivering Multimedia - Text: About Fonts and Faces - Using Text in Multimedia - Computers and Text - Font Editing and Design Tools - Hypermedia and Hypertext.

UNIT II

Images: Plan Approach - Organize Tools - Configure Computer Workspace - Making Still Images - Color - Image File Formats. Sound: The Power of Sound - Digital Audio - Midi Audio - Midi vs. Digital Audio - Multimedia System Sounds - Audio File Formats -Vaughan's Law of Multimedia Minimums - Adding Sound to Multimedia Project.

UNIT III

Animation: The Power of Motion - Principles of Animation - Animation by Computer - Making Animations that Work. Video: Using Video - Working with Video and Displays - Digital Video Containers - Obtaining Video Clips - Shooting and Editing Video.

UNIT IV

Making Multimedia: The Stage of Multimedia Project - The Intangible Needs - The Hardware Needs - The Software Needs - An Authoring Systems Needs- Multimedia Production Team.

UNIT V

Planning and Costing: The Process of Making Multimedia - Scheduling - Estimating - RFPs and Bid Proposals. Designing and Producing - Content and Talent: Acquiring Content - Ownership of Content Created for Project - Acquiring Talent.

TEXT BOOK
1. Tay Vaughan, "Multimedia: Making It Work", 8th Edition, Osborne/McGraw-Hill, 2001.

REFERENCE BOOK
1. Ralf Steinmetz & Klara Nahrstedt "Multimedia Computing, Communication & Applications", Pearson Education, 2012.

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

CO1. Work on multimedia.
CO2. Handle various multimedia softwares
CO3. Develop multimedia projects.
CO4. Deploy multimedia projects.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓		✓		✓			✓		✓	✓		✓	✓	✓	✓		✓
CO2	✓	✓		✓		✓			✓		✓				✓			✓
CO3	✓	✓		✓	✓		✓			✓	✓	✓	✓	✓	✓		✓	✓
CO4	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

19ISEP55: PRACTICAL – VI: JAVA PROGRAMMING

LEARNING OBJECTIVES

LO1. To teach the basics of JAVA programs and its execution.
LO2. To teach the differences between C++ and Java programming.
LO3. To educate learn concepts like packages, applets and interfaces.
LO4. To understand the life cycle of the applets and its functionality.
LO5. To develop java programs using interfaces.

LIST OF EXERCISES

1. Define a class called Student with the attributes name, reg_number and marks obtained in four subjects(m1,m2,m3,m4).Write a suitable constructor and methods to find the total mark obtained by the student and display the details of the student.
2. Write a Java program to find the area of a square, rectangle and triangle by

    a. (i) Overloading Constructor   (ii) Overloading Method.

3. Write a java program to add two complex numbers. [Use passing object as argument and return object].
4. Define a class called Student_super with data members name, roll number and age. Write a suitable constructor and a method output () to display the details.
5. Derive another class Student from Student_super with data members height and weight. Write a constructor and a method output () to display the details which overrides the super class method output().[Apply method Overriding concept].
6. Write a java program to create an interface called Demo, which contains a double type constant, and a method called area () with one double type argument. Implement the interface to find the area of a circle.
7. Write a java program to create a thread using Thread class.
8. Demonstrate Java inheritance using extends keyword.

9. Create an applet with four Checkboxes with labels MARUTI-800, ZEN, ALTO and ESTEEM and a Text area object. The program must display the details of the car while clicking a particular Checkbox.
10. Write a Java program to throw the following exception,

       1) Negative Array Size 2) Array Index out of Bounds

11. Write a java program to create a file menu with option New, Save and Close, Edit menu with option cut, copy, and paste.
12. Write a java programming to illustrate Mouse Event Handling
13. Write a Java program to practice String class and its methods

COURSE OUTCOMES

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

CO1. Understand Android platform, Architecture and features.
CO2. Design User Interface and develop activity for Android App.
CO3. Use Intent, Broadcast receivers and Internet services in Android App.
CO4. Design and implement Database Application and Content providers.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓		✓			✓				✓	✓	✓		✓			✓	
CO2	✓	✓		✓				✓	✓			✓					✓	✓
CO3	✓			✓					✓			✓	✓				✓	✓
CO4		✓				✓				✓	✓	✓	✓	✓		✓	✓	✓

19ISEP56: PRACTICAL – VII: OPEN SOURCE TECHNOLOGY LAB

LEARNING OBJECTIVES

    LO1. To develop technical solutions for problems using the open source software readily available at free of cost.

    LO2. To install Wamp Server.

    LO3. Learn programming in PHP.

LIST OF EXERCISES

1. Create a simple HTML form and accept the user name and display the name through PHP echo statement.
2. Write a PHP script to redirect a user to a different page.
3. Write a PHP function to test whether a number is greater than 30, 20 or 10 using ternary operator.
4. Create a PHP script which display the capital and country name from the given array. Sort the list by the name of the country
5. Write a PHP script to calculate and display average temperature, five lowest and highest temperatures.
6. Create a script using a for loop to add all the integers between 0 and 30 and display the total**.**
7. Write a PHP script using nested for loop that creates a chess board.
8. Write a PHP function that checks if a string is all lower case.
9. Write a PHP script to calculate the difference between two dates**.**
10. Write a PHP script to display time in a specified time zone.

COURSE OUTCOMES

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

    CO1. Write PHP scripts to find various solutions.

    CO2. Write PHP functions to develop the programs

    CO3. Implement various open source technologies.

    CO4. Design and deploy the product.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔		✔		✔		
CO2	✔	✔	✔	✔	✔		✔			✔		✔	✔		✔		✔	✔
CO3	✔	✔	✔		✔		✔			✔		✔		✔	✔	✔		✔
CO4	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

THIRD YEAR: SIXTH SEMESTER
19ISET61: PROGRAMMING IN PYTHON

LEARNING OBJECTIVES

LO1. To introduce the programming concepts and techniques.
LO2. To introduce the Python language syntax.
LO3. To learn control statements, loops, functions, and lists.
LO4. To write programs for wide variety problems in maths, science, finance, and games.
LO5. To analyze and design programs.

UNIT-I

Introduction to Python - Why Python - Installing in various Operating Systems - Executing Python Programs - Basic Programming concepts - Variables, expressions and statements - Input/ Output – Operators.

UNIT-II

Conditions - Functions - Arguments - Return values - Iteration - Loops - Strings -Data Structures - Lists - Dictionaries - Tuples - Sequences - Exception Handling.

UNIT-III

File Handling - Modules - Regular Expressions - Text handling - **O**bject Oriented Programming - Classes - Objects - Inheritance - Overloading - Polymorphism Interacting with Databases - Introduction to MySQL - interacting with MySQL - Building a address book with add/edit/delete/search features.

UNIT-IV

Introduction to Graphics programming - Introduction to GTK - PyGTK - Developing GUI applications using pyGTK - Scientific Programming using NumPy / SciPy - Image Processing - Processing multimedia files -Network Programming, Web services using SOAP, Introduction to Graphics programming - PyGame

UNIT-V

Introduction to Version Control Systems - Subversion/Git, Writing Unit Tests, Creating Documentation, Contributing to Open Source Projects

TEXT BOOK

1. Allen B. Downey, ”Think Python: How to Think Like a Computer Scientist“,1st Edition 2012, O’Reilly.

REFERENCE BOOKS

1. Jeff McNeil ,”Python 2.6 Text Processing: Beginners Guide”, 2010 ,Packet Publications

2. Mark Pilgrim ,”Dive Into Python “ , 2nd edition 2009, A press

WEBSITE

1. https://swayam.gov.in/course/4178-spoken-tutorial-python-english

COURSE OUTCOMES

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

CO1. analyze and design strategies for solving basic programming problems.
CO2. use primitive data types, selection statements, loops, functions to write programs.
CO3. develop programs to solve a variety of problems in math, science, business, and games.
CO4. use the step-wise refinement approach.
CO5. use lists to store, process, and sort data.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔	✔	✔	✔	✔	✔	✔			✔		✔	✔	✔	✔	✔		✔
CO2	✔	✔										✔	✔	✔	✔	✔	✔	
CO3	✔	✔	✔	✔	✔			✔				✔		✔				✔
CO4	✔	✔									✔	✔		✔	✔	✔		✔
CO5	✔	✔		✔	✔													

19ISET62: SOFTWARE ENGINEERING

LEARNING OBJECTIVES

LO1. To understand the various software engineering models.
LO2. To understand the approaches of developing software.
LO3. To identify the risks in software development.
LO4. To understand and collect the requirements of software engineering.
LO5. To understand the design concepts, testing methods and strategies.

UNIT - I

Introduction - Software Engineering Discipline - Evolution and Impact - Programs Vs Software Products. Software Life Cycle Models: Use of a Life Cycle Models - Classical Waterfall Model -Iterative Waterfall Model - Prototyping Model - Evolutionary Model - Spiral Model. Software Project Management: Responsibilities of a Software Project Manager - Project Planning - Metrics for Project Size Estimation - Project Estimation Techniques -Risk Management.

UNIT - II

Requirements Analysis and Specification: Requirements Gathering and Analysis -Software Requirements Specification (SRS) - Formal System Development Techniques. Software Design: Characteristics of a Good Software Design - Cohesion and Coupling -Neat Arrangement - Software Design Approaches.

UNIT - III

Function-Oriented Software Design: Overview of SA/SD Methodology - Structured Analysis - Data Flow Diagrams (DFDs).Object Modeling Using UML: Overview of Object-Oriented Concepts - UML Diagrams - Use Case Model - Class Diagrams - Interaction Diagrams - Activity Diagrams - State Chart Diagram.

UNIT - IV

User Interface Design: Characteristics of a Good User Interface - Basic Concepts - Types of User Interfaces - Component-Based GUI Development; Coding and Testing: Coding - Testing - UNIT Testing - Black-Box Testing - White-Box Testing - Debugging -Integration Testing - System Testing.

UNIT - V

Software Reliability and Quality Management: Software Reliability - Statistical Testing -Software Quality - Software Quality Management System - ISO 9000.Computer Aided Software Engineering: CASE Environment - CASE support in Software Life Cycle - Characteristics of CASE Tools - Architecture of a CASE Environment. Software Maintenance: Characteristics of Software Maintenance - Software Reverse Engineering - Software Maintenance Process Models - Estimation of Maintenance Cost. Software Reuse: Issues in any Reuse Program - Reuse Approach.

TEXT BOOK

1. Rajib Mall, "Fundamentals of Software Engineering",3rd Edition, Prentice Hall of India Private Limited, 2008.

REFERENCE BOOKS

1. Rajib Mall, "Fundamentals of Software Engineering", 4thEdition, Prentice Hall of India Private Limited, 2014.
2. Richard Fairley, "Software Engineering Concepts", TMGH Publications, 2004.

COURSE OUTCOMES

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

CO1. Analyse the problem, estimate cost, time and risk and model the problem.
CO2. Gather information about the project and validate the requirements.
CO3. Design and develop various design tools.
CO4. Understand the various testing techniques and how to test the system with various approaches.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔			✔						✔	✔	✔	✔	✔	✔	✔	✔	✔
CO2			✔		✔		✔				✔	✔	✔			✔	✔	✔
CO3	✔	✔			✔				✔			✔				✔	✔	✔
CO4				✔						✔		✔				✔	✔	

19ISET63: LINUX AND SHELL PROGRAMMING

LEARNING OBJECTIVES

LO1. To understand the Linux OS
LO2. To Study shell programming.
LO3. To learn text formatting.
LO4. To handle files.
LO5. To write scripts.

UNIT I

Introduction to Linux: operating system and Linux - History of Linux and Unix - Linux overview - Linux Distributions - Vi editors.

UNIT II

Shell - comparison of Shells - working in the shell - Learning Basic Commands - Compiler and interpreter differences - various directories - Drilling deep into process management, job control and Automation.

UNIT III

Text processing - Text filtering Tools - working with commands. - Logical operators. - local variables and its scope - working with arrays.

UNIT IV

Tricks with shell scripting - interactive shell scripts - The here document and << operator - sort command - WC command - file handling - Debugging -

UNIT V

Automating Decision - Making in scripts - Automating repetitive tasks - working with Functions.

TEXT BOOK

1. The Complete Reference LINUX - Richard L. Petersen, McGraw Hill,

2. LINUX shell scripting by Ganesh Naik, Packt Publishing Ltd.,

COURSE OUTCOMES

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

CO1. Posses good knowledge in script writing.
CO2. Process the text in the Linux environment.
CO3. Solve the practical issues in Linux shell scripting.
CO4. Able to write scripts with functions.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓	✓	✓				✓			✓	✓			✓	✓		
CO2	✓				✓							✓	✓		✓			✓
CO3	✓	✓			✓					✓		✓	✓	✓	✓		✓	✓
CO4	✓	✓	✓	✓	✓	✓			✓	✓		✓	✓	✓	✓	✓	✓	

19ISET64: MOBILE COMPUTING

LEARNING OBJECTIVES

LO1. To understand of mobile computer systems particularly in the context of wireless network systems
LO2. To emphasises how to interface hardware to mobile computing devices
LO3. To learn the concepts of Mobile computing
LO4. To explore theoretical issues of Mobile computing
LO5. To develop skills of finding solutions and build software for Mobile computing applications.
LO6. To study the specifications and functionalities of various protocols/standards of mobile networks
LO7. To learn Android and IOS platform and its architecture

UNIT-I

Mobile Communications, Mobile Computing – Paradigm, Promises/Novel Applications and Impediments and Architecture; Mobile and Handheld Devices, Limitations of Mobile and Handheld Devices.GSM – Services, System Architecture, Radio Interfaces, Protocols, Localization, Calling, Handover, Security, New Data Services, GPRS.

UNIT - II

Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA, Wireless LAN/(IEEE 802.11)-Mobile Network Layer IP and Mobile IP Network Layers, Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, DHCP.

UNIT –III

Conventional TCP/IP Protocols, Indirect TCP, Snooping TCP, Mobile TCP, Other Transport Layer Protocols for Mobile Networks. Database Issues: Database Hoarding and Caching Techniques, Client-Server Computing & Adaptation, Transactional Models, Query processing, Data Recovery Process & QoS Issues.

UNIT IV

Communications Asymmetry, Classification of Data Delivery Mechanisms, Data Dissemination, Broadcast Models, Selective Tuning and Indexing Methods, Data Synchronization.

UNIT V

Introduction, Applications & Challenges of a MANET, Routing, Classification of Routing Algorithms, Algorithms such as DSR, AODV, DSDV, Mobile Agents, Service Discovery. Protocols and Platforms for Mobile Computing: WAP, Bluetooth, J2ME, iOS/Windows CE, Android-Security.

TEXT BOOKS

1. Jochen Schiller, "Mobile Communications", Addison-Wesley, Second Edition, 2009.

2. Raj Kamal, "Mobile Computing", Oxford University Press, 2007, ISBN: 0195686772

Websites

1. http://www.nettech.in/e-books/Wireless-networks-and-mobile-computing.pdf

2. http://ebooks.cambridge.org/ebook.jsf?bid=CBO9780511546969

COURSE OUTCOMES

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

    CO1. Have knowledge on the concepts and features of mobile computing technologies and applications.
    CO2. Have a good understanding of wireless and mobile communication networks and their applications.
    CO3. Identify the important issues of developing mobile computing systems and applications.
    CO4. Possess good knowledge on Android platform and Architecture designing User Interface and developing Android App.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔		✔		✔	✔	✔	✔	✔			✔	✔	✔		✔	✔	✔
CO2	✔	✔		✔		✔		✔		✔		✔	✔			✔	✔	✔
CO3	✔		✔	✔		✔		✔		✔		✔	✔	✔		✔	✔	✔
CO4	✔		✔		✔	✔	✔	✔		✔	✔	✔				✔	✔	✔

19ISET65: WIRELESS NETWORK

LEARNING OBJECTIVES

LO1. To Study about Wireless Networks, Protocol Stack and Standards.

LO2. To Study about Fundamentals of 3G Services, Its Protocols and Applications.

LO3. To Study about Evolution of 4G Networks, its Architecture and Applications.

UNIT-I

WIRELESS LAN - Introduction-WLAN Technologies: Infrared, UHF Narrowband, Spread Spectrum -IEEE802.11: System Architecture, Protocol Architecture, Physical Layer, MAC Layer, 802.11b, 802.11a – Hiper LAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband Layer, Link Manager Protocol, Security – IEEE802.16-WIMAX: Physical Layer, MAC, Spectrum Allocation For WIMAX

UNIT-II

MOBILE NETWORK LAYER - Introduction – Mobile IP: IP Packet Delivery, Agent Discovery, Tunneling And Encapsulation, IPV6-Network Layer In The Internet-Mobile IP Session Initiation Protocol – Mobile Ad-Hoc Network: Routing, Destination Sequence Distance Vector, Dynamic Source Routing.

UNIT-III

MOBILE TRANSPORT LAYER - TCP Enhancements For Wireless Protocols – Traditional TCP: Congestion Control, Fast Retransmit/Fast Recovery, Implications Of Mobility – Classical TCP Improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time Out Freezing, Selective Retransmission, Transaction Oriented TCP – TCP Over 3G Wireless Networks.

UNIT-IV

WIRELESS WIDE AREA NETWORK - Overview Of UTMS Terrestrial Radio Access Network-UMTS Core Network Architecture: 3G-MSC, 3G-SGSN, 3G-GGSN, SMS-GMSC/SMS-IWMSC, Firewall, DNS/DHCP-High Speed Downlink Packet Access (HSDPA)- LTE Network Architecture And Protocol.

UNIT-V

4G NETWORKS - Introduction – 4G Vision – 4G Features And Challenges – Applications Of 4G – 4G Technologies: Multicarrier Modulation, Smart Antenna Techniques, OFDM-MIMO Systems, Adaptive Modulation And Coding With Time Slot Scheduler, Cognitive Radio.

TEXT BOOK

1. Jochen Schiller, "Mobile Communications", Second Edition, Pearson Education 2012.(Unit I,II,III)

2. Vijay Garg , "Wireless Communications And Networking", First Edition, Elsevier 2014.(Unit IV,V)

REFERENCE BOOKS:

1. Erik Dahlman, Stefan Parkvall, Johan Skold And Per Beming, "3G Evolution HSPA And LTE For Mobile Broadband", Second Edition, Academic Press, 2008.

2. Anurag Kumar, D.Manjunath, Joy Kuri, "Wireless Networking", First Edition, Elsevier 2011.

3. Simon Haykin , Michael Moher, David Koilpillai, "Modern Wireless Communications", First Edition, Pearson Education 2013.

4. David G. Messerschmitt, "Understanding Networked Applications", Elsevier, 2010.

COURSE OUTCOMES

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

CO1. Conversant With The Latest 3G/4G And WiMAX Networks And Its Architecture.

CO2. Design and Implement Wireless Network Environment For Any Application Using Latest Wireless Protocols And Standards.

CO3. Implement Different Type of Applications For Smart Phones And Mobile Devices With Latest Network Strategies.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1			✔		✔	✔	✔	✔					✔		✔			
CO2	✔	✔		✔		✔		✔		✔		✔		✔	✔	✔	✔	
CO3	✔	✔		✔		✔		✔		✔	✔	✔				✔	✔	

19ISEP66: PRACTICAL - VIII: PYTHON PROGRAMMING

LEARNING OBJECTIVES

LO1. To understand the programming basics in Python Programming

LO2. To understand the object-oriented program design and development in Python Programming

LO3. To understand and be able to use the basic programming principles such as data types, variable, conditionals, loops, array, recursion and function calls.

LO4. To learn how to use basic mathematical problems are evaluated and be able to manipulate text files and file operations.

LO5. To understand the process and will acquire skills necessary to effectively attempt a programming problem and implement it with a specific programming language - Python.

LIST OF EXERCISES

1. Create a simple calculator to do all the arithmetic operations
2. Write a program to use control flow tools like if.
3. Write a program to use for loop
4. Data structures

   a. use list as stack
   b. use list as queue
   c. tuple, sequence

5. Create new module for mathematical operations and use in your program
6. Write a program to read and write files, create and delete directories
7. Write a program with exception handling
8. Write a program using classes
9. Connect with MySQL and create address book
10. Write a program using string handling and regular expressions
11. Program to parse apache log file
12. Create a GUI program using python.

COURSE OUTCOMES

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

CO1. Enable to understand the usage of the Mathematical and Statistical function; and image processing related functions and incorporation of the same functions.
CO2. Enable to develop applications related to business and scientific data in Python.
CO3. Enable to create comprehensive package for data processing methods.
CO4. To search and retrieve the image object and business data from website.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓	✓	✓	✓		✓	✓		✓		✓	✓	✓	✓	✓		
CO2	✓					✓	✓					✓				✓		
CO3	✓	✓	✓		✓						✓	✓				✓		
CO4	✓				✓		✓	✓			✓	✓	✓			✓		

19ISEP67: PRACTICAL –IX: SHELL PROGRAMMING

LEARNING OBJECTIVES

LO1. To Simulate the file commands
LO2. To write shell program for handling files.

LO3. To write programs for familiarising control statements.
LO4. To write programs for handling strings.

LIST OF EXERCISES

1. Write a shell script to stimulate the file commands: rm, cp, cat, mv, cmp, wc, split, diff.
2. Write a shell script to show the following system configuration:
   a. currently logged user and his log name.
   b. current shell, home directory, Operating System type, current Path setting, current working directory.
   c. show currently logged number of users, show all available shells
   d. show CPU information like processor type, speed
   e. show memory information.
3. Write a Shell Script to implement the following: pipes, Redirection and tee commands.
4. Write a shell script for displaying current date, user name, file listing and directories by getting user choice.
5. Write a shell script to implement the filter commands.
6. Write a shell script to remove the files which has file size as zero bytes.
7. Write a shell script to find the sum of the individual digits of a given number.
8. Write a shell script to find the greatest among the given set of numbers using command line arguments.
9. Write a shell script for palindrome checking.
10. Write a shell script to print the multiplication table of the given argument using for-loop.

COURSE OUTCOMES

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

CO1. Write shell script for implementing control structures.
CO2. Write shell script for handling strings.
CO3. Write shell script for simulating file commands.
CO4. Write shell scripts for solving various problems.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔	✔	✔	✔			✔	✔			✔	✔	✔		✔	✔		
CO2	✔	✔	✔		✔							✔	✔		✔		✔	✔
CO3	✔	✔			✔	✔				✔		✔	✔	✔		✔	✔	✔
CO4	✔	✔	✔	✔	✔	✔			✔	✔		✔	✔	✔	✔	✔	✔	✔

FOURTH YEAR: SEVENTH SEMESTER

19ISET71: DESIGN AND ANALYSIS OF ALGORITHMS

LEARNING OBJECTIVES

LO1.   To learn about Algorithm Specification and Performance Analysis
LO2.   To Understand the Divide and conquer Method
LO3.   To learn Greedy Methods and problems.
LO4.   To familiarize with Dynamic Programming Techniques
LO5.   To posses the Knowledge of algorithm design strategies

LO6.   To learn effective problem solving in Computing applications and analyze the algorithmic procedure to determine the computational complexity of algorithms.

UNIT I

Introduction: Algorithm Definition – Algorithm Specification – Performance Analysis-Asymptotic Notations. Elementary Data Structures: Stacks and Queues – Trees – Dictionaries – Priority Queues – Sets and Disjoint Set Union – Graphs

UNIT II

Divide and Conquer: The General Method – Defective Chessboard – Binary Search – Finding The Maximum And Minimum – Merge Sort – Quick Sort – Selection - Strassen's Matrix Multiplication.

UNIT III

The Greedy Method: General Method - Container Loading - Knapsack Problem - Tree Vertex Splitting – Job Sequencing With Deadlines - Minimum Cost Spanning Trees - Optimal Storage On Tapes – Optimal Merge Patterns - Single Source Shortest Paths.

UNIT IV

Dynamic Programming: The General Method – Multistage Graphs – All-Pairs Shortest Paths – Single-Source Shortest Paths - Optimal Binary Search Trees - String Editing - 0/1 Knapsack - Reliability Design - The Traveling Salesperson Problem - Flow Shop Scheduling. Basic Traversal and Search Techniques: Techniques for Binary Trees – Techniques for Graphs – Connected Components and Spanning Trees – Biconnected Components and DFS.

UNIT V

Backtracking: The General Method – The 8-Queens Problem – Sum of Subsets – Graph Coloring – Hamiltonian Cycles – Knapsack Problem Branch and Bound: Least Cost searchhod - 0/1 Knapsack Problem.

TEXT BOOK:

1.Ellis Horowitz, Satraj Sahni and Sanguthevar Rajasekaran, Fundamentals of Computer Algorithms, Universities Press, Second Edition, Reprint 2009.

REFERENCES BOOKS:

1. Data Structures Using C - Langsam, Augenstien, Tenenbaum, PHI
2. Data structures and Algorithms, V.Aho, Hopcropft, Ullman , LPE
3. Introduction to design and Analysis of Algorithms - S.E. Goodman, ST. Hedetniem- TMH.
4. Carlos A.Coello Coello, Gary B.Lamont, David A.Van Veldhuizen, "Evolutionary Algorithms for Solving Multi-Objective Problems", Springer 2nd Edition, 2007.

COURSE OUTCOMES

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

CO1. Apply design principles and concepts to algorithm design.
CO2. Acquire the mathematical foundation in analysis of algorithms.
CO3. Understand the different algorithmic design strategies.
CO4. Analyze the efficiency of algorithms using various Problems and solve them.
CO5. It implement stepwise procedure to solve problems.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓	✓	✓
CO2			✓	✓			✓	✓	✓	✓		✓		✓	✓		✓	✓
CO3	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓		✓	✓	✓	✓
CO4			✓	✓		✓	✓	✓	✓			✓	✓		✓	✓	✓	✓
CO5	✓	✓	✓	✓	✓	✓		✓	✓	✓								

19ISET72: ADVANCED WEB TECHNOLOGY

LEARNING OBJECTIVES

LO1. Explore the backbone of web page creation by developing .NET skill.
LO2. Enrich knowledge about HTML control and web control classes
LO3. Provide depth knowledge about ADO.NET
LO4. Understand the need of usability, evaluation methods for web services

UNIT - I

Overview of Asp.Net - The .NET framework – Learning the .NET languages : Data types – Declaring variables- Scope and Accessibility- Variable operations- Object Based manipulation- Conditional Structures- Loop Structures- Functions and Subroutines. Types, Objects and Namespaces : The Basics about Classes- Value types and Reference types- Advanced class programming- Understanding name spaces and assemblies. Setting Up ASP.NET and IIS .

UNIT – II

Developing ASP.NET Applications - ASP.NET Applications: ASP.NET applications– Code behind- The Global.asax application file- Understanding ASP.NET Classes- ASP.NET Configuration. Web Form fundamentals: A simple page applet- Improving the currency converter- HTML control classes- The page class- Accessing HTML server controls. Web controls: Web Control Classes – Auto PostBack and Web Control events- Accessing web controls. Using Visual Studio.NET: Starting a Visual Studio.NET Project- Web form Designer- Writing code- Visual studio.NET debugging. Validation and Rich Controls: Validation- A simple Validation example- Understanding regular expressions- A validated customer form. State management - Tracing, Logging, and Error Handling.

UNIT – III

Working with Data - Overview of ADO.NET - ADO.NET and data management- Characteristics of ADO.NET-ADO.NET object model. ADO.NET data access : SQL basics– Select , Update, Insert, Delete statements- Accessing data- Creating a connection- Using a command with a DataReader - Accessing Disconnected data - Selecting multiple tables – Updating Disconnected data. Data binding: Single value Data Binding- Repeated value data binding- Data binding with data bases. Data list – Data grid – Repeater – Files, Streams and Email – Using XML

UNIT - IV

Web Services - Web services Architecture : Internet programming then and now- WSDL–SOAP- Communicating with a web service-Web service discovery and UDDI. Creating Web services : Web service basics- The StockQuote web service – Documenting the web service- Testing the web service- Web service Data types- ASP.NET intrinsic objects. Using web services: Consuming a web service- Using the proxy class- An example with TerraService.

UNIT – V

Advanced ASP.NET - Component Based Programming: Creating a simple component – Properties and state- Database components- Using COM components. Custom controls: User Controls- Deriving Custom controls. Caching and Performance Tuning: Designing and scalability– Profiling- Catching- Output catching- Data catching. Implementing security: Determining security requirements- The ASP.NET security model- Forms authentication- Windows authentication.

TEXT BOOK

1 Mathew Mac Donald, "ASP.NET Complete Reference", TMH 2005.

REFERENCE BOOKS:

1. Crouch Matt J, "ASP.NET and VB.NET Web Programming", Addison Wesley 2002.

2. J.Liberty, D.Hurwitz, "Programming ASP.NET", Third Edition, O'REILLY, 2006.

COURSE OUTCOMES

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

CO1. Design a web page with Web form fundamentals and web control classes
CO2. Recognize the importance of validation control, cookies and session
CO3. Apply the knowledge of ASP.NET object, ADO.NET data access and SQL to develop a client server model.
CO4. Recognize the difference between Data list and Data grid controls in accessing data.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓			✓			✓
CO2				✓			✓	✓	✓	✓		✓	✓	✓		✓		
CO3	✓	✓	✓	✓		✓	✓	✓		✓		✓		✓	✓	✓	✓	✓
CO4			✓				✓	✓			✓	✓	✓	✓	✓	✓		✓

19ISET73: ADVANCED DATABASE MANAGEMENT SYSTEMS

LEARNING OBJECTIVES

LO1. To acquire Knowledge of Database Models.
LO2. To understand distributed database architecture.
LO3. To learn the concepts of spatial database.
LO4. To familiar with temporal database.

UNIT-I:

Relational and parallel Database Design: Basics, Entity Types, Relationship Types, ER Model, ER-to-Relational Mapping algorithm. Normalization: Functional Dependency, 1NF, 2NF, 3NF, BCNF,4NF and 5NF. Architecture, I/O Parallelism, Interquery Parallelism, Intraquery Parallelism, Intraoperation Parallelism, Interoperation Parallelism.

UNIT-II:

Distributed and Object based Databases: Architecture, Distributed data storage, Distributed transactions, Commit protocols, Concurrency control, Query Processing. Complex Data Types, Structured Types and Inheritance, Table Inheritance, array and Multiset, Object Identity and Reference Types, Object Oriented versus Object Relational.

UNIT-III:

Spatial Database: Spatial Database Characteristics, Spatial Data Model, Spatial Database Queries, Techniques of Spatial Database Query, Logic based Databases: Introduction, Overview, Propositional Calculus, Predicate Calculus, Deductive Database Systems, Recursive Query Processing.

UNIT-IV:

XML Databases: XML Hierarchical data model, XML Documents, DTD, XML Schema, XML Querying, XHTML, Illustrative Experiments.

UNIT-V:

Temporal Databases: Introduction, Intervals, Packing and Unpacking Relations, Generalizing the relational Operators, Database Design, Integrity Constraints, Multimedia Databases: Multimedia Sources, Multimedia Database Queries, Multimedia Database Applications.

TEXT BOOKS

1. Abraham Silberschatz, Henry F Korth , S Sudarshan, "Database System Concepts", 6th edition , McGraw-Hill International Edition , 2011

2. C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8th Edition, Pearson Education Reprint 2016.

REFERENCE BOOKS:

1. Ramez Elmasri, Shamkant B Navathe, "Fundamental of Database Systems", Pearson, 7th edition, 2016.

2. Thomas Connolly, Carolyn Begg., "Database Systems a practical approach to Design, Implementation and Management ", Pearson Education, 2014.

COURSE OUTCOMES

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

CO1. Know about the Various data models
CO2. Works on Database Architecture
CO3. Analyze data patterns
CO4. Handle object oriented databases.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓				✓		✓		✓		✓	✓		✓		✓	✓	
CO2	✓	✓	✓				✓			✓		✓		✓		✓	✓	
CO3	✓			✓		✓		✓		✓		✓	✓	✓		✓		
CO4		✓		✓		✓	✓	✓	✓			✓		✓		✓	✓	

19ISET74: SOFTWARE PROJECT MANAGEMENT

LEARNING OBJECTIVES

This course will enable students to

LO1. Understand the framework of project management.
LO2. Learn to monitor and control the project.
LO3. Know the sound knowledge in Agile method.
LO4. Know the team, cost, quality and resource management.
LO5. Identify and control the risk in the projects.

UNIT I
Project Management Framework: Introduction: Project - Project management - Relationship among Project, Program and Portfolio management - Project and operations management- Role of project manager - Project management body of knowledge - Enterprise Environmental factors. Project life cycle and Organization: Overview of project life cycle - Projects vs Operational Work - Stakeholders - Organizational influences on project management. The Standard for Project Management of a Project: Project management processes for a project: Common project management process interactions - Projects management process groups - Initiating process group - planning process group - Executing process group - Monitoring and controlling process group - Closing process group.

UNIT II
Choosing Methodologies and Technologies – Software Processes and Process Models – Choice of Process Models – The Waterfall Model– Prototyping – other ways of categorizing prototype - Agile Methods – Extreme Programming Selecting the Most Appropriate Process Model- Need of Agile - Iterative vs Incremental-Agile Manifesto and Mindset – Lean, Scrum and Kanban methods-uncertainty, Risk, and lifecycle selection-Scrum Elements overview-5 levels of planning-Scrum Process overview-Agile Team-roles and responsibilities- Epic-feature-User Stories-PBI-The Sprint.

UNIT III
The Project Management Knowledge Areas: Project integration management: Develop project charter - Develop project management plan - Direct and manage project execution - Monitor and control project work - Perform integrated change control - Close project or phase. Project scope management: Collect requirements - Define Scope - Create WBS - Verify Scope - Control Scope. Project team management: Define activities - Sequence activities - Estimate activity resources - Estimate Activity Durations - Develop Schedule - Control Schedule.

UNIT IV
Project cost management: Estimate costs - Determine budget - Control costs. Project Quality Management: Plan quality - perform quality assurance - Perform quality control. Project Human Resource Management: Develop human resource plan - Acquire project team - Develop project team - Manage project team. Project Communications Management: Identify stakeholders - Plan communications - Distribute information - Manage stakeholder expectations - report performance.

UNIT V
Project Risk Management: Plan risk management - Identify risks - Perform qualitative risk analysis - Perform quantitative risk analysis - plan risk responses - Monitor and control risks. Project Procurement Management: Plan - Conduct - Administer - Close procurements.

TEXT BOOKS
1. "A guide to the Project management Body of Knowledge (PMBOK Guide)" Fouth Edition, Project Management Institute, Pennsylvania, 2008
2. BOB Huges, Mike Cotterell, Rajib Mall "Software Project Management", McGraw Hill, Fifth Edition,2011.
3. Emerson, "Agile Handbook," Philosophie

REFERENCE BOOKS
1. Futrell, "Quality Software Project Management", Pearson Education India.
2. Royce, "Software Project Management", Pearson Education India.
3. C.Ravindranath Pandian, "Applied Software Risk Management-A Guide for Software Project Managers", Auerbach Publications, 2015.
4. Benjamin A. Lieberman, "The Art of Software Modeling", Auerbach Publications, 2010.

COURSE OUTCOMES
CO1. Analyze the scope, cost, timing, and quality of the project, at all times focused on project success as defined by project stakeholders.
CO2. Align the project to the organization's strategic plans and business justification throughout its lifecycle.
CO3. Identify project goals, constraints, deliverables, performance criteria, control needs, and resource requirements in consultation with stakeholders.
CO4. Implement project management knowledge, processes, lifecycle and the embodied concepts, tools and techniques in order to achieve project success.
CO5. Adapt projects in response to issues that arise internally and externally.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓	✓		✓	✓			✓			✓	✓	✓			✓	✓
CO2	✓		✓					✓		✓		✓		✓		✓	✓	
CO3	✓			✓	✓	✓		✓				✓	✓	✓	✓		✓	✓
CO4	✓		✓			✓		✓		✓	✓		✓			✓		✓
CO5	✓	✓		✓		✓		✓		✓	✓		✓			✓		✓

19ISEP75: PRACTICAL – X: ADVANCED WEB TECHNOLOGY LAB

LEARNING OBJECTIVES

LO1. To design web pages using ASP.NET
LO2. To write scripting to validate the webpages.
LO3. To connect with databases using LINQ.
LO4. To create web services.

LIST OF EXERCISES

1. Create a welcome Cookie (Hit for a page) and display different image and text content each time when the user hit the page
2. List a table of content and navigate within the pages.
3. Demonstrate Request and Response object using HTML Form.
4. Database Connection to display all the values in the table in a webpage using ADO.NET.
5. Query textbox and Displaying records & Display records by using database
6. Write LINQ queries to access the database.
7. Create a web service using ASP.NET
8. Write a component based programming using advanced ASP.NET

COURSE OUTCOMES

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

CO1. Develop to build a complete web application using .NET Framework
CO2. Create interactive web pages using web controls.
CO3. Able to connect with databases using ADO.NET and ASP.NET.
CO4. Develop a simple web application using servicer side PHP programming and database connectivity using MySQL.
CO5. Able to create a complete web application with all the required modules.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔		✔		✔				✔	✔		✔	✔				✔	✔
CO2			✔	✔	✔	✔	✔	✔		✔		✔	✔	✔		✔	✔	✔
CO3	✔	✔		✔		✔		✔				✔	✔	✔		✔	✔	✔
CO4			✔	✔		✔		✔	✔			✔		✔		✔	✔	
CO5						✔		✔	✔			✔				✔	✔	✔

19ISEP76: PRACTICAL – XI: ALGORITHM LAB

LEARNING OBJECTIVES

LO1. Design and development the algorithms for different types of problems; and implement through JAVA
LO2. Employ various design strategies for problem solving.
LO3. Measure the computational complexity and compare the performance of different algorithms

LIST OF EXERCISES

1. A. Create a Java class called Student with the following details as variables within it.

(i) USN (ii)Name (iii)Branch (iv)Phone

Write a Java program to create nStudent objects and print the USN, Name, Branch, and Phoneof these objects with suitable headings.

B. Write a Java program to implement the Stack using arrays. Write Push(), Pop(), and Display() methods to demonstrate its working.

2. A. Design a superclass called Staff with details as StaffId, Name, Phone, Salary. Extend this class by writing three subclasses namely Teaching (domain, publications), Technical (skills), and Contract (period). Write a Java program to read and display at least 3 staff objects of all three categories.

B. Write a Java class called Customer to store their name and date_of_birth. The date_of_birth format should be dd/mm/yyyy. Write methods to read customer data as <name, dd/mm/yyyy> and display as <name, dd, mm, yyyy> using StringTokenizer class considering the delimiter character as "/".

3. A. Write a Java program to read two integers a and b. Compute a/b and print, when b is not zero. Raise an exception when b is equal to zero.

B. Write a Java program that implements a multi-thread application that has three threads. First thread generates a random integer for every 1 second; second thread computes the square of the number and prints; third thread will print the value of cube of the number.

4. Sort a given set of n integer elements using Quick Sort method and compute its time complexity. Run the program for varied values of n> 5000 and record the time taken to sort. Plot a graph of the time taken versus non graph sheet. The elements can be read from a file or can be generated using the random number generator. Demonstrate using Java how the divide and- conquer method works along with its time complexity analysis: worst case, average case and best case.

5. Sort a given set of n integer elements using Merge Sort method and compute its time complexity. Run the program for varied values of n> 5000, and record the time taken to sort. Plot a graph of the time taken versus non graph sheet. The elements can be read from a file or can be generated using the Random number generator. Demonstrate using Java how the divide and- conquer method works along with its time complexity analysis: worst case, average case and best case.

6. Implement in Java, the 0/1 Knapsack problem using (a) Dynamic Programming method (b) Greedy method.

7 .From a given vertex in a weighted connected graph, find shortest paths to other vertices using Dijkstra's algorithm. Write the program in Java.

8. Find Minimum Cost Spanning Tree of a given connected undirected graph using Kruskal's algorithm. Use Union-Find algorithms in your program.

9. Find Minimum Cost Spanning Tree of a given undirected graph using Prim's algorithm.

10.   (A)Write Java programs to (a) Implement All-Pairs Shortest Paths problem using Floyd's algorithm.

(B) Implement Travelling Sales Person problem using Dynamic programming.

11. Design and implement in Java to find a subset of a given set S = {Sl, S2,.....,Sn} of n positive integers whose SUM is equal to a given positive integer d. For example, if S ={1, 2, 5, 6, 8} and d= 9, there are two solutions {1,2,6}and {1,8}. Display a suitable message, if the given problem instance doesn't have a solution.

12. Design and implement in Java to find all Hamiltonian Cycles in a connected undirected Graph G of n vertices using backtracking principle

COURSE OUTCOMES

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

- CO1. Design and implement the algorithms using appropriate techniques like brute-force, greedy, dynamic programming, etc.
- CO2. Implement a variety of algorithm, such as sorting, searching and Tree traverse, combinatorial, with minimum time complexity.
- CO3. Analyze and compare the performance of the algorithms in terms of time complexity and accuracy.
- CO4. Apply and implement learned algorithm design techniques and data structures to solve real world problems

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔		✔		✔				✔	✔		✔	✔			✔	✔	
CO2			✔	✔	✔	✔	✔	✔		✔		✔		✔		✔	✔	
CO3	✔	✔		✔		✔	✔	✔			✔	✔	✔	✔	✔	✔	✔	
CO4				✔		✔		✔	✔	✔		✔		✔				

FOURTH YEAR: EIGHTH SEMESTER

19ISET81: DISTRIBUTED OPERATING SYSTEM

LEARNING OBJECTIVES

LO1. To study Distributed operating system concepts
LO2. To understand hardware, software and communication in distributed OS
LO3. To learn the distributed resource management components.
LO4. Practices to learn concepts of OS and Program the principles of Operating Systems

UNIT I

Introduction – Operating System Definition – Functions of Operating System – Types of Advanced Operating System – Design Approaches – Synchronization Mechanisms – concepts of a Process – Critical Section Problem – Process Deadlock – Models of Deadlock – Conditions for Deadlock – System with single-unit requests, Consumable Resources , Reusable Resources.

UNIT II

Distributed Operating Systems: Introduction- Issues – Communication Primitives – Inherent Limitations –Lamport's Logical Clock , Vector Clock, Global State , Cuts – Termination Detection – Distributed Mutual Exclusion – Non Token Based Algorithms – Lamport's Algorithm - Token Based Algorithms –Distributed Deadlock Detection – Distributed Deadlock Detection Algorithms – Agreement Protocols

UNIT III

Distributed Resource Management – Distributed File Systems – Architecture – Mechanisms – Design Issues – Distributed shared Memory – Architecture – Algorithm – Protocols – Design Issues – Distributed Scheduling – Issues – Components – Algorithms.

UNIT IV

Failure Recovery and Fault Tolerance – Concepts – Failure Classifications – Approaches to Recovery – Recovery in Concurrent Systems – Synchronous and Asynchronous Check pointing and Recovery –Check pointing in Distributed Database Systems – Fault Tolerance Issues – Two-Phase and Nonblocking Commit Protocols – Voting Protocols – Dynamic Voting Protocols.

UNIT V

Multiprocessor and Database Operating Systems –Structures – Design Issues – Threads – Process Synchronization – Processor Scheduling – Memory management – Reliability/Fault Tolerance – Database Operating Systems – concepts – Features of Android OS, Ubuntu, Google Chrome OS and Linux operating systems.

TEXT BOOKS

1. Mukesh Singhal N.G. Shivaratri, "Advanced Concepts in Operating Systems", McGraw Hill 2000.

2. Distributed Operating System – Andrew S. Tanenbaum, PHI.

REFERENCE BOOKS

1. Abraham Silberschatz, Peter B.Galvin, G.Gagne, "Operating Concepts", 6th Edition Addison Wesley publications 2003.

2. Andrew S. Tanenbaum, "Modern Operating Systems", 2nd Edition Addison Wesley 2001

COURSE OUTCOMES

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

CO1. Analyze the structure of OS and basic architectural components involved in OS design.

CO2. Analyze and design the applications to run in parallel either using process or
thread models of different OS.

CO3. Analyze the various device and resource management techniques for timesharing and distributed systems.

CO4. Understand the Mutual exclusion, Deadlock detection, agreement protocols of Distributed operating system and Interpret the mechanisms adopted for file sharing in distributed Applications.

CO5. Conceptualize the components involved in Real time Operating systems.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔		✔		✔		✔		✔	✔		✔	✔			✔	✔	
CO2			✔		✔	✔	✔			✔		✔		✔		✔		
CO3	✔	✔		✔		✔		✔		✔	✔	✔	✔	✔		✔	✔	
CO4			✔	✔		✔		✔	✔			✔		✔		✔	✔	
CO5	✔	✔	✔			✔		✔	✔					✔		✔	✔	

19ISET82: ADVANCED JAVA PROGRAMMING

LEARNING OBJECTIVES

LO1. To deepen student's programming skills by analyzing the real world problem in a programmer's point of view and implement the concepts in real time projects

LO2. To enable the students to learn the ethical, historical, environmental and technological aspects of Advanced Java Programming and how it impacts the social and economic development of society

UNIT-I

Design Patterns: Introduction to Design patterns - Catalogue for Design Pattern - Factory Method Pattern, Prototype Pattern, Singleton Pattern- Adapter Pattern- Proxy Pattern-Decorator Pattern- Command Pattern- Template Pattern-Mediator Pattern-Collection Framework – Array List class – Linked List class – Array List vs. Linked List - List Iterator interface - Hash Set class- Linked Hash Set class-Tree Set class Priority Queue class - Map interface-Hash Map class- Linked Hash Map class –Tree Map class - Comparable interface -Comparator interface-Comparable vs. Comparator

UNIT-II

Applet Fundamentals- Applet Class - Applet lifecycle- Steps for Developing Applet Programs- Passing Values through Parameters- Graphics in Applets- GUI Application **-** Dialog Boxes - Creating Windows - Layout Managers – AWT Component classes – Swing component classes- Borders – Event handling with AWT components - AWT Graphics classes - File Choosers - Color Choosers – Tree – Table –Tabbed panels–Progressive bar - Sliders.

UNIT-III

JDBC **-**Introduction - JDBC Architecture - JDBC Classes and Interfaces – Database Access with MySQL -Steps in Developing JDBC application - Creating a New Database and Table with JDBC - Working with Database Metadata; Java Networking Basics of Networking - Networking in Java- Socket Program using TCP/IP - Socket Program using UDP- URL and Inet address classes.

UNIT–IV

Servlet: Advantages over Applets - Servlet Alternatives - Servlet Strengths - Servlet Architecture - Servlet Life Cycle – Generic Servlet, Http Servlet - First Servlet - Invoking Servlet - Passing Parameters to Servlets - Retrieving Parameters - Server-Side Include – Cookies- JSP Engines - Working with JSP - JSP and Servlet - Anatomy of a JSP Page- Database Connectivity using Servlets and JSP.

UNIT-V

Lambda Expressions- Method Reference- Functional Interface- Streams API, Filters- Optional Class- Nashorn- Base 64 Encode Decode- JShell(RPEL)- Collection Factory Methods- Private Interface Methods- Inner Class Diamond Operator-Multiresolution Image API.

TEXTBOOKS:

1. Bert Bates, Karthy Sierra , Eric Freeman, Elisabeth Robson, "Head First Design Patterns", O'REILLY Media Publishers.(1st-Unit).

2. Herbert Schildt, "Java: A Beginner Guide", Oracle Pres-Seventh Edition. (2nd and 3rd Unit).

3. Murach's, "Java Servlets and JSP", 2nd Edition, Mike Murach & Associates Publishers; 3rd Edition. (4th Unit).

4. Warburton Richard, "Java 8 Lambdas", Shroff Publishers & Distributors Pvt Ltd. (5th Unit).

REFERENCES BOOKS:

1. Paul Deitel and Harvey Deitel, "Java: How to Program", Prentice Hall Publishers; 9th Edition.

2. Jan Graba, "An Introduction to Network Programming with Java-Java 7 Compatible", 3rd Edition, Springer.

COURSE OUTCOMES

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

CO1. Learn the Internet Programming, using Java Applets and create a full set of UI widgets using Abstract Windowing Toolkit (AWT) & Swings

CO2. Learn to access database through Java programs, using Java Data Base Connectivity (JDBC)

CO3. Create dynamic web pages using Servlets and JSP

CO4. Invoke the remote methods and multitier application using Remote Method Invocation (RMI) and EJB

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔	✔	✔	✔	✔	✔			✔	✔		✔	✔	✔		✔	✔	✔
CO2			✔	✔			✔	✔		✔	✔	✔	✔	✔		✔	✔	✔
CO3	✔	✔		✔		✔	✔	✔			✔	✔					✔	✔
CO4			✔	✔		✔		✔	✔			✔	✔			✔	✔	✔

19ISET83: DOT NET PROGRAMMING

LEARNING OBJECTIVES

LO1. To explore the backbone of web page creation by developing .NET skill.
LO2. To Familiar with Application, session and view state management
LO3. To Provide depth knowledge about ADO.NET
LO4. To Understand the need of usability, evaluation methods for web services
LO5. To acquire knowledge on the usage of recent platforms in developing web applications

UNIT – I - The .NET Framework - Learning the .NET languages - Introduction - Net revolution - .Net framework and its architecture – CLR – What is Assembly – Components of Assembly – DLL hell and Assembly Versioning- O Objects and Namespaces - Setting Up ASP.NET and IIS

UNIT – II - Developing VB.NET Applications - Introduction to VB.Net, The .Net Frame work and Common language runtime, Building VB. Net Application, VB IDE, forms, properties, events, VB language-console application and 46 windows application, data type, declaring variable, scope of variable, operators and statements - Windows Applications-forms, adding controls to forms, handling events, MsgBox, Input Box, multiple forms, handling mouse and Keyboard events, object oriented programmingcreating and using classes and objects, Handling Exceptions- on Error Goto

UNIT – III - Developing - ASP.NET Applications - ASP.NET Applications – Understanding ASP.NET Controls - Overview of ASP.NET framework, Web Form fundamentals - Web control classes – Using Visual Stdio.NET - Validation and Rich Controls -State management – Tracing, Logging, and Error Handling.

UNIT – IV - Developing C#.NET Applications - Introducing C# - overview of C# - Literals,Variables- Data Types, -Operators, -checked and unchecked operators – Expressions – Branching -Looping-*Object Oriented Aspects Of C#:* Class – Objects - Constructors and its types- inheritance, properties, indexers, index overloading – polymorphism - sealed class and methods - interface, - abstract class, operator overloading, - delegates, events, errors and exception - Threading.

UNIT – V - ADO.NET - Overview of ADO.NET - ADO.NET data access – Connected and Disconnected Database, Create Connection using ADO.NET Object Model, Connection Class, Command Class Data binding – Data list – Data grid – Repeater – Files, Streams and Email – Using XML.

TEXT BOOKS
1. Struts: The Complete Reference,James Holmes 2nd Edition 2007 McGraw Hill Professional
2. Mathew Mac Donald, "ASP.NET Complete Reference", TMH 2005
3. Herbert Schildt, "The Complete Reference: C# 4.0", Tata McGraw Hill, 2012.
4. Christian Nagel et al. "Professional C# 2012 with .NET 4.5", Wiley India, 2012
5. ASP.NET Unleashed, C# programming – Wrox publication
6. Visual Basic. NET Black Book, by Steven Holzner

REFERENCE BOOKS
1. Jesse Liberty , 'Programming C#, " , 4th Edition, O'Reilly Media.
2. Mario Szpuszta, Matthew MacDonald , "Pro ASP.NET 4 in C# 2010: Includes Silverlight
   2,"Apress, Third Edition
 3. J.Liberty, D.Hurwitz, "Programming ASP.NET", Third Edition, O'REILLY, 2006.
 4. Visual Basic. Net programming in easy steps by Tim
Anderson,
COURSE OUTCOMES
CO1. Learn major programming paradigms and techniques involved in design and
       implementation of modern programming languages.
CO2. Learn about Microsoft .NET framework

CO3. By the end students can develop, implement and creating Applications with C#. VB.NET and ASP.NET.
CO4. Creating ASP.Net applications using standard .net controls.
CO5. An ability to use current techniques, skills, and tools necessary for computing practice.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1			✓		✓		✓	✓	✓			✓		✓			✓	
CO2			✓		✓		✓			✓			✓	✓		✓	✓	
CO3	✓			✓		✓		✓		✓	✓		✓		✓			✓
CO4		✓		✓		✓		✓	✓			✓	✓			✓		
CO5	✓		✓		✓	✓		✓	✓		✓	✓	✓			✓		✓

19ISEP84: PRACTICAL – XII: ADVANCED JAVA- LAB

LEARNING OBJECTIVES

LO1. To provide the ability to design game based applications using graphics and animations

LO2. To understand abstract window toolkit (AWT), swing and event handling to create GUI applications

LO3. To understand client-server technologies to design and develop web applications and to know about server side programming such as Servlet and JSP

LO4. To develop applications using RMI and Beans

LO5. To be familiar with enterprise based applications

LIST OF EXERCISES

1. Generation of random numbers using Java utilities.

2. Implementation of file operations using I/O streams.

3. Implementation of two way communication between client and server.

4. Creation of animation and playing audio clip using Applet.

5. Demonstrating the mouse events in event handling using Frame.

6. Implementation of database handling using MySql and JDBC.

7. Demonstrating cookies in Java Servlet using NetBeans IDE.

8. Reading and Displaying the parameters in JSP using NetBeans IDE.

9. Designing a simple calculator using JavaScript.

10. Demonstrating the frames and web page validation using JavaScript.

11. Implementing RMI concepts using NetBeans IDE.

12. Adding two variables by Session Bean in EJB using NetBeans IDE.

COURSE OUTCOMES

On completion of this course the students will be able to

CO1. Create a full set of UI widgets using Abstract Windowing Toolkit (AWT) & Swings.

CO2. Learn to access database through Java programs, using Java Data Base Connectivity (JDBC).

CO3. Create dynamic web pages using Servlets and JSP.

CO4. Invoke the remote methods in an application using Remote Method Invocation (RMI) and EJB.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓
CO2	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓		✓		✓	✓	✓
CO3	✓	✓		✓	✓	✓	✓				✓	✓		✓		✓	✓	✓
CO4	✓	✓	✓	✓	✓	✓	✓			✓		✓	✓	✓		✓		

19ISEP85: PRACTICAL – XIII: DOT NET PROGRAMMING LAB

LEARNING OBJECTIVES

LO1. To impart basic knowledge of different control statements and array associated with C # programming.
LO2. To learn various C# elements and OOPS concepts.
LO3. To learn interface, delegates, event and error handling concepts in C#.
LO4. To impart knowledge on networking including socket programming and reflection.
LO5. To acquire a working knowledge of windows and web based applications.

LIST OF EXERCISE

1. Finding Prime number using Classes and Objects
2. Separating Odd/Even Number into Different Arrays
3. String Manipulations
4. Jagged Array manipulation
5. Implementing 'ref' and 'out' keywords
6. Implementing 'Params ' keyword
7. Boxing and Unboxing
8. Constructor Overloading

9. Implementing property
10. Implementing indexer
11. Implementing Multiple inheritance using Interface
12. Implementing Abstract Class
13. Exception Handling Using Try, Catch, and Finally
14. Demonstrating multicast Delegates
15. Implementing the Concept of Reflection
16. Socket Programming
17. Simple Calculator-A Window Application
18. Student Profile-A Window Application
19. Palindrome-A Web Application
20. Formatting Text-A Web Application

COURSE OUTCOMES

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

CO1. Develop correct, well-documented C# programs using control statements.
CO2. Develop object oriented programming using C# classes and objects.
CO3. Handle the exception and event-driven programs.
CO4. Perform network based programming including chat applications.
CO5. Develop windows and web based applications.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔		✔		✔	✔	✔		✔	✔		✔		✔			✔	✔
CO2			✔	✔	✔	✔	✔	✔		✔				✔		✔	✔	
CO3		✔		✔		✔		✔				✔			✔			✔
CO4			✔	✔		✔		✔		✔			✔			✔		
CO5	✔					✔		✔				✔	✔				✔	✔

FIFTH YEAR: NINETH SEMESTER

19ISET91: DIGITAL IMAGE PROCESSING

LEARNING OBJECTIVES

To provide complete knowledge on Digital Image Processing methods, such as image processing methods in Spatial domain and Frequency domain, Edge detection, Compression, Segmentation, and Morphological concepts, which enable the students to understand the concepts and implement them empirically.

UNIT–I

Fundamentals: Image Sensing and Acquisition, Image Sampling and Quantization, relationship between Pixels; Random noise; Gaussian Markov Random Field, σ-field, Linear and Non-linear Operations; Image processing models: Causal, Semi-causal, Non-causal models.

Color Models: Color Fundamentals, Color Models, Pseudo-color Image Processing, Full Color Image Processing, Color Transformation, Noise in Color Images.

UNIT–II

Spatial Domain: Enhancement in spatial domain: Point processing; Mask processing; Smoothing Spatial Filters; Sharpening Spatial Filters; Combining Spatial Enhancement Methods.

Frequency Domain: Image transforms: FFT, DCT, Karhunen-Loeve transform,Hotlling's T^2 transform, Wavelet transforms and their properties. Image filtering in frequency domain.

UNIT–III

Edge Detection: Types of edges; threshold; zero-crossing; Gradient operators: Roberts, Prewitt, and Sobel operators; residual analysis based technique; Canny edge detection. Edge features and their applications.

UNIT–IV

Image Compression: Fundamentals, Image Compression Models, Elements of Information Theory. Error Free Compression: Huff-man coding; Arithmetic coding; Wavelet transform basedcoding; Lossy Compression: FFT; DCT; KLT; DPCM; MRFM based compression; Wavelet transform based; Image Compression standards.

UNIT–V

Image Segmentation: Detection and Discontinuities: Edge Linking and Boundary Deduction; Threshold; Region-Based Segmentation. Segmentation by Morphological watersheds. The use of motion in segmentation, Image Segmentation based on Color.

Morphological Image Processing: Erosion and Dilation, Opening and Closing, Hit-Or-Miss Transformation, Basic Morphological Algorithms, Gray-Scale Morphology.

TEXT BOOKS:

1. Rafael Gonzalez, Richard E. Woods, "Digital Image Processing", Fourth Edition, PHI/Pearson Education, 2013.

2. K. Jain, Fundamentals of Image Processing, Second Ed., PHI, New Delhi, 2015.

REFERENCE BOOKS:

1. B. Chan la, D. Dutta Majumder, "Digital Image Processing and Analysis", PHI, 2003.

2. Nick Elford, "Digital Image Processing a practical introducing using Java", Pearson Education, 2004.

3. Todd R.Reed, "Digital Image Sequence Processing, Compression, and Analysis", CRC Press, 2015.

4. L.Prasad, S.S.Iyengar, "Wavelet Analysis with Applications to Image Processing", CRC Press, 2015.

COURSE OUTCOMES

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

CO1. Analyze general terminology of digital image processing.
CO2. Examine various types of images, intensity transformations and spatial filtering.
CO3. Analyze images in the frequency domain using various transforms.
CO4. Evaluate the methodologies for image compression and segmentation techniques.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1			✓		✓	✓	✓		✓			✓	✓		✓	✓	✓	
CO2			✓	✓		✓		✓		✓		✓				✓		
CO3		✓		✓				✓				✓			✓	✓	✓	✓
CO4			✓	✓		✓		✓	✓	✓		✓	✓		✓	✓	✓	

19ISET92: MACHINE LEARNING

LEARNING OBJECTIVES

LO1. To Learn about Machine Intelligence and Machine Learning applications
LO2. To implement and apply machine learning algorithms to real-world applications.
LO3. To identify and apply the appropriate machine learning technique to classification, pattern recognition, optimization and decision problems.
LO4. To understand how to perform evaluation of learning algorithms and model selection.

UNIT I

INTRODUCTION Learning Problems – Perspectives and Issues – Concept Learning – Version Spaces and Candidate Eliminations – Inductive bias – Decision Tree learning – Representation – Algorithm – Heuristic Space Search.

UNIT II

NEURAL NETWORKS AND GENETIC ALGORITHMS : Neural Network Representation – Problems – Perceptrons – Multilayer Networks and Back Propagation Algorithms – Advanced Topics – Genetic Algorithms – Hypothesis Space Search – Genetic Programming – Models of Evaluation and Learning.

UNIT III

BAYESIAN AND COMPUTATIONAL LEARNING : Bayes Theorem – Concept Learning – Maximum Likelihood – Minimum Description Length Principle – Bayes Optimal Classifier – Gibbs Algorithm – Naïve Bayes Classifier – Bayesian Belief Network – EM Algorithm – Probability Learning – Sample Complexity – Finite and Infinite Hypothesis Spaces – Mistake Bound Model.

UNIT IV

INSTANT BASED LEARNING : K- Nearest Neighbour Learning – Locally weighted Regression – Radial Basis Functions – Case Based Learning.

UNIT V

ADVANCED LEARNING : Learning Sets of Rules – Sequential Covering Algorithm – Learning Rule Set – First Order Rules – Sets of First Order Rules – Induction on Inverted Deduction – Inverting Resolution – Analytical Learning – Perfect Domain Theories – Explanation Base Learning – FOCL Algorithm – Reinforcement Learning – Task – Q-Learning – Temporal Difference Learning

TEXT BOOK

1. Tom M. Mitchell, ―Machine Learning, McGraw-Hill Education (India) Private Limited, 2013.

REFERENCE BOOKS

1. EthemAlpaydin, ―Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press 2004.

2. Stephen Marsland, ―Machine Learning: An Algorithmic Perspective, CRC Press, 2009.

3. Michael Affenzeller, Stephan Winkler, Stefan Wagner, Andreas Beham, "Genetic Algorithms and Genetic Programming", CRC Press Taylor and Francis Group.

COURSE OUTCOMES

On completion of the course students will be expected to:

CO1. Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc.

CO2. Have an understanding of the strengths and weaknesses of many popular machine learning approaches.

CO3. Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning.

CO4. Be able to design and implement various machine learning algorithms in a range of real-world applications.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔	✔	✔	✔		
CO2	✔	✔	✔		✔		✔	✔			✔		✔	✔	✔	✔	✔	✔
CO3	✔	✔	✔		✔	✔		✔					✔	✔	✔		✔	
CO4	✔	✔	✔		✔			✔			✔	✔	✔	✔	✔	✔		

19ISET93: INTERNET OF THINGS

LEARNING OBJECTIVES

LO1. To provide an understanding of the technologies and the standards relating to the Internet of Things

LO2. To develop skills on IoT technical planning.

LO3. To Implement Data and Knowledge Management and use of Devices in IoT Technology.

LO4. To Understand State of the Art IoT Architecture.

LO5. To study Real World IoT Design Constraints, Industrial Automations in IoT.

UNIT I INTRODUCTION TO IoT

Internet of Things - Physical Design- Logical Design- IoT Enabling Technologies - IoT Levels & Deployment Templates - Domain Specific IoTs - IoT and M2M - IoT System Management with NETCONF-YANG- IoT Platforms Design Methodology.

UNIT II IoT ARCHITECTURE

M2M high-level ETSI architecture - IETF architecture for IoT - OGC architecture - IoT reference model - Domain model - information model - functional model - communication model - IoT reference architecture

UNIT III IoT PROTOCOLS

Protocol Standardization for IoT – Efforts – M2M and WSN Protocols – SCADA and RFID Protocols – Unified Data Standards – Protocols – IEEE 802.15.4 – BACNet

Protocol – Modbus– Zigbee Architecture – Network layer – 6LowPAN - CoAP - Security

UNIT IV WEB OF THINGS

Web of Things versus Internet of Things – Two Pillars of the Web – Architecture Standardization for WoT– Platform Middleware for WoT – Unified Multitier WoT Architecture – WoT Portals and Business Intelligence. Cloud of Things: Grid/SOA and Cloud Computing – Cloud Middleware – Cloud Standards – Cloud Providers and Systems – Mobile Cloud Computing – The Cloud of Things Architecture.

UNIT V APPLICATIONS

The Role of the Internet of Things for Increased Autonomy and Agility in Collaborative Production Environments - Resource Management in the Internet of Things: Clustering, Synchronisation and Software Agents. Applications - Smart Grid – Electrical Vehicle Charging.

REFERENCE BOOKS:

1. Arshdeep Bahga, Vijay Madisetti, "Internet of Things – A hands-on approach", Universities Press, 2015.

2. Dieter Uckelmann, Mark Harrison, Michahelles, Florian (Eds), "Architecting the Internet of Things", Springer, 2011.

3. Jan Ho¨ ller, Vlasios Tsiatsis , Catherine Mulligan, Stamatis , Karnouskos, Stefan Avesand. David Boyle, "From Machine-to-Machine to the Internet of Things - Introduction to a New Age of Intelligence", Elsevier, 2014.

4. Networks, Crowds, and Markets: Reasoning About a Highly Connected World - David Easley and Jon Kleinberg, Cambridge University Press - 2010.

5. Olivier Hersent, David Boswarthick, Omar Elloumi , "The Internet of Things – Key applications and Protocols", Wiley, 2012.

COURSE OUTCOMES

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

CO1. Understand the technology and standards relating to IoTs
CO2. Understand the critical parts of the ICT ecosystem required to mainstream IoTs
CO3. Acquire skills on developing their own national and enterprise level technical strategies;
CO4. Interpret the vision of IoT from a global context
CO5. Determine the Market perspective of IoT.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1		✔			✔	✔		✔	✔			✔	✔	✔		✔	✔	✔
CO2			✔	✔		✔		✔			✔	✔	✔	✔		✔	✔	✔
CO3	✔	✔		✔				✔			✔	✔	✔	✔			✔	✔
CO4				✔		✔		✔	✔	✔		✔	✔	✔		✔	✔	✔
CO5	✔	✔	✔			✔			✔	✔	✔	✔	✔	✔		✔	✔	✔

19ISEP94: PRACTICAL – XIV: IMAGE PROCESSING - LAB

LEARNING OBJECTIVES

LO1. To impart skills on the processing the digital images.

LO2. To learn the transform of the image from spatial domain to frequency domain.

LO3. To perform edge deduction techniques.

LO4. To gain knowledge on compressing the images using suitable techniques.

LO5. To study the segmentation methods.

LIST OF EXERCISES

1. To perform linear and non linear operations on images.

2. To perform smoothing operations on an image in spatial domain.

3. To perform sharpening operations on an image in spatial domain.

4. To transform the image into DCT, FFT and wavelet.

5. To implement canny edge deduction.

6. To study the performance of gradiant operators.

7. To implement huff-man coding technique.

8. To perform DCT compression method.

9. To implement image segmentation based on color.

10. To implement erosion and dilation.

COURSE OUTCOMES

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

CO1. Read and display the image

CO2. Transform the domain from spatial to frequency.

CO3. Apply suitable operators to detect the edge.

CO4. Perform compression and segmentation methods.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓	✓		✓	✓			✓			✓			✓		✓	
CO2	✓		✓			✓		✓		✓	✓	✓	✓	✓	✓			✓
CO3	✓			✓	✓	✓		✓				✓		✓	✓	✓	✓	✓
CO4	✓			✓		✓		✓		✓	✓	✓	✓			✓	✓	✓

19ISEP95: PRACTICAL – XV: MACHINE LEARNING - LAB

LEARNING OBJECTIVES

LO1. To expose the students in emerging technologies in the areas of machine learning.

LO2. To make use of Data sets in implementing the machine learning algorithms

LO3. To implement the machine learning concepts and algorithms.

LO4. To develop a basic understanding of the principles of machine learning

LO5. To derive practical solutions using predictive analytics.

LO6. To Understand which techniques are more appropriate for which problems.

LIST OF EXERCISES

1. Reading and writing into .csv files

2. Implement the Find –S algorithm.

3. Implement the Candidate-Elimination algorithm.

4. Classify a sample using ID3 algorithm.

5. Build an artificial neural network by implementing backpropagation algorithm.

6. Construct the naïve Bayesian classifier for classification.

7. Construct a naïve Bayesian classifier and evaluate the classifier with accuracy, precision, and recall metrics

8. Applying EM algorithm for clustering using K-means algorithm.

9. Implement the k-Nearest Neighbour algorithm to classify the data set.

10. Implement the non-parametric Locally Weighted Regression algorithm.

COURSE OUTCOMES

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

CO1. Understand components of a machine learning algorithm.
CO2. Apply machine learning tools to build and evaluate predictors
CO3. Comprehend how machine learning uses computer algorithms to search for patterns in data.
CO4. Familiarize in using data patterns to make decisions and predictions with real-world examples.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔	✔	✔		✔	✔			✔	✔		✔	✔	✔	✔	✔		
CO2	✔		✔			✔		✔		✔	✔	✔	✔	✔	✔	✔		
CO3	✔			✔	✔	✔		✔				✔	✔	✔	✔	✔	✔	
CO4	✔		✔	✔		✔		✔	✔	✔		✔	✔	✔	✔	✔		

FIFTH YEAR: TENTH SEMESTER

19ISET101: SOFTWARE TESTING AND QUALITY ASSURANCE

LEARNING OBJECTIVES:
LO1. Develop methods and procedures for software development that can scale up for large systems.
LO2. It can be used to consistently produce high-quality software at low cost and with a small cycle time.
LO3. Student learns systematic approach to the development, operation, maintenance, and retirement of software.
LO4. Student learns how to use available resources to develop software, reduce cost of software and how to maintain quality of software.
LO5. Methods and tools of testing and maintenance of software's.

UNIT- I
Testing Environment and Test Processes: World-Class Software Testing Model – Building a Software Testing Environment - Overview of Software Testing Process – Organizing for Testing – Developing the Test Plan – Verification Testing –Analyzing and Reporting Test Results – Acceptance Testing – Operational Testing – Post Implementation Analysis

UNIT-II
Testing Techniques and Levels of testing: Using White Box Approach to Test design - Static Testing Vs. Structural Testing – Code Functional Testing – Coverage and Control Flow Graphs –Using Black Box Approaches to Test Case Design – Random Testing – Requirements based testing –Decision tables –State-based testing – Cause-effect graphing – Error guessing – Compatibility testing – Levels of Testing - Unit Testing – Integration Testing - Defect Bash Elimination. System Testing - Usability and Accessibility Testing – Configuration Testing - Compatibility Testing - Case study for White box testing and Black box testing Techniques.

UNIT- III
Incorporating Specialized Testing Responsibilities: Testing Client/Server Systems – Rapid Application Development Testing – Testing in a Multiplatform Environment – Testing Software System Security - Testing Object-Oriented Software – Object Oriented Testing – Testing Web based systems – Web based system – Web Technology Evolution – Traditional Software and Web based Software – Challenges in Testing for Web-based Software – Testing a Data Warehouse - Case Study for Web Application Testing.

UNIT-IV
Test Automation: Selecting and Installing Software Testing Tools - Software Test Automation – Skills needed for Automation – Scope of Automation – Design and Architecture for Automation – Requirements for a Test Tool – Challenges in Automation – Tracking the Bug – Debugging – Case study using Bug Tracking Tool.

UNIT-V
Software Testing and Quality Metrics: Testing Software System Security - Six-Sigma – TQM - Complexity Metrics and Models – Quality Management Metrics - Availability Metrics - Defect Removal Effectiveness - FMEA - Quality Function Deployment – Taguchi Quality Loss Function – Cost of Quality. Case Study for Complexity and Object Oriented Metrics.

TEXT BOOKS:

1. William Perry, "Effective Methods of Software Testing", Third Edition, Wiley Publishing 2007.
2. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2007.
3. Naresh Chauhan , "Software Testing Principles and Practices " Oxford University Press , New Delhi , 2010.
4. Dale H. Besterfiled et al., "Total Quality Management", Pearson Education Asia, Third   Edition, Indian Reprint (2006).
5. Stephen Kan, "Metrics and Models in Software Quality", Addison – Wesley, Second Edition,   2004.

REFERENCE BOOKS

1. Llene Burnstein, "Practical Software Testing", Springer International Edition, Chennai, 2003
2. Renu Rajani,Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill,2004.
3. Edward Kit, "Software Testing in the Real World – Improving the Process", Pearson Education,1995.
4. Boris Beizer, "Software Testing Techniques" – 2nd Edition, Van Nostrand Reinhold, New York,1990.
5. Adithya P. Mathur, "Foundations of Software Testing – Fundamentals algorithms and

  Techniques", Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

COURSE OUTCOMES:

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

CO1. Apply modern software testing processes in relation to software development and project management.
CO2. Create test strategies and plans, design test cases, prioritize and execute them.
CO3. Manage incidents and risks within a project.
CO4. Contribute to efficient delivery of software solutions and implement improvements in the software development processes.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1		✓			✓						✓			✓		✓		✓
CO2						✓								✓				
CO3	✓			✓				✓			✓					✓		✓
CO4			✓						✓			✓			✓			✓

19ISET102: DATA SCIENCE AND BIG DATA ANALYTICS

LEARNING OBJECTIVES

LO1.   To understand the basic and advanced methods to big data technology and tools.

LO2.   To learn MapReduce and Hadoop and its ecosystem.

LO3.   To acquire skills on R programming.

LO4.   To analyse different classification methods.

LO5.   To study data visualization tools.

UNIT I : Introduction to Big Data Analytics : Big Data Overview – Data Structures – Analyst Perspective on Data Repositories - State of the Practice in Analytics – BI Versus Data Science - Current Analytical Architecture – Drivers of Big Data – Big Data Ecosystem - Data Ana lytics Lifecycle – Data Discovery – Data Preparation – Model Planning – Model Building – Communicate Results – Operationalize.

UNIT II : Basic Data Analytic Methods Using R : Introduction to R programming – R Graphical User Interfaces – Data Import and Export – Attribute and Data Types – Descriptive Statistics Exploratory Data Analysis : Visualization Befor Analysis – Dirty Data – Visualizing a Single Variable – Examining Multiple Variables Data Exploration Versus Presentation -– Statistical Methods of Evaluation : Hypothesis Testing – Difference of Means – Wilcoxon Rank-Sum Test – Type I and Type II Errors – Power and Sample Size – ANOVA..

UNIT III : Advanced Analytical Theory and Methods: Clustering – K Means – Use Cases – Overview – Determining number of clusters – Diagnostics – Reasons to choose and cautions – Additional Algorithms - Association Rules : A Priori Algorithm – Evaluation of Candidate Rules – Applications of Association Rules – Validation and Testing – Diagnostics. Regression : Linear Regrression and Logistic Regression :– Use cases – Model Description – Diagnostics - Additional Regression Models.

UNIT IV : Classification : Decision Trees – Overview – Genetic Algorithm – Decision Tree Algorithms – Evaluating Decision Tree – Decision Trees in R - Na'ive Bayes – Bayes Theorem – Naïve Bayes Clasifier – Smoothing – Diagnostics – Naïve Bayes in R – Diagnostics of Classifiers – Additional Classification Methods - Time Series Analysis : : Overview – Box – Jenkins Methodology – ARIMA Model – Autocorrelation Function – Autoregressive Models – Moving Average Models – ARMA and ARIMA Models – Building and Evaluating and ARIMA Model - Text Analysis : Text Analysis Steps – Example – Collecting – Representing Term Frequency – Categorizing – Determining Sentiments – Gaining Insights.

UNIT V : Advanced Analytics-Technology And Tools: Mapreduce And Hadoop : Analytics for Unstructured Data .- *UseCases - MapReduce* - Apache Hadoop – The Hadoop Ecosystem – pig – Hive – Hbase – Manout – NoSQL - Tools in Database Analytics : SQL Essentials – Joins – Set operations – Grouping Extensions – In Database Text Analysis - Advanced SQL – Windows Functions – User Defined Functions and Aggregates – ordered aggregates- MADiib - Analytics

       Reports Consolidation – Communicating and operationalizing and Analytics Project – Creating the Final Deliverables : Developing Core Material for Multiple Audiences – Project Goals – Main Findings – Approach Model Description – Key points support with Data - Model details – Recommendations – Data Visualization

TEXT BOOK

1. Data Science & Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data", EMC Education Services Published by John Wiley & Sons, Inc. 2015

REFERENCE BOOKS

1. Noreen Burlingame , "The little book on Big Data", New Street publishers, 2012.

2. Anil Maheshwari, " Data Analytics", McGraw Hill Education, 2017.

3. Norman Matloff, "The Art of R Programming: A Tour of Statistical Software Design",Starch Press; 1 edition , 2011.

4. Sandip Rakshit, "R for Beginners", McGraw Hill Education, 2017

5. http://www.johndcook.com/R_language_for_programmers.html.

6. http://bigdatauniversity.com/.

7. http://home.ubalt.edu/ntsbarsh/stat-data/topics.htm#rintroduction.

COURSE OUTCOMES

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

CO1. Identify the characteristics of datasets for various applications.
CO2. Select environment for the applications.
CO3. Solve problems associated with big data characteristics.
CO4. Integrate mathematical and statistical tools with modern technologies like Hadoop and Mapreduce thereby provide better solution.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1		✔	✔	✔	✔		✔	✔		✔		✔	✔	✔	✔	✔		
CO2	✔		✔	✔		✔		✔		✔	✔	✔	✔	✔	✔	✔	✔	
CO3		✔		✔	✔	✔	✔			✔		✔	✔	✔	✔	✔		
CO4		✔		✔		✔		✔				✔	✔	✔	✔	✔	✔	

19ISEP103: PRACTICAL – XVI: SOFTWARE TESTING LAB

LEARNING OBJECTIVES:
LO1. Testing is a process of executing a program with the intent of finding an error.
LO2. A good test case is one that has a high probability of finding an as yet undiscovered error.

LO3. A successful test is one that uncovers an as yet undiscovered error.
LO4. Documenting user requirements using the UML notation.
LO5. Description of the various types of the Use Cases.

LIST OF EXERCISES
1. Understand the automation testing approach
2. Using Selenium IDE, Write a test suite containing minimum 4 test cases
3. Write and test a program to login a specific web page
4. Write the test cases for any known application (e.g. Banking application)
5. Create a test plan document for any application (e.g. Library Management System)
6. Study of any testing tool (e.g. Win runner)
7. Study of any web testing tool (e.g. Selenium)
8. Study of any bug tracking tool (e.g. Bugzilla, bugbit)
9. Study of any test management tool (e.g. Test Director)
10. Study of any open source-testing tool (e.g. Test Link)

COURSE OUTCOMES:
On successful completion of the course, the student will be able to

CO1. Apply modern software testing processes in relation to software development and project management.

CO2. Create test strategies and plans, design test cases, prioritize and execute them.

CO3. Manage incidents and risks within a project.

CO4. Contribute to efficient delivery of software solutions and implement improvements in the software development processes.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓						✓					✓			✓			✓
CO2					✓												✓	
CO3	✓					✓					✓				✓			
CO4				✓					✓				✓					✓

19ISEP104: DISSERTATION AND VIVA-VOCE / IN-PLANT TRAINING

LEARNING OBJECTIVES

LO1. To provide insights into real world challenges and problem those required IT related solutions.

LO2. To empower the students to bring out the IT related solutions for the requirements.

LO3. To expose the students to have a broad ideas of literature related to the project domain.

LO4. To enable students to use all concepts of IT in creating a solution for a problem

LO5. To improve the team building, communication and management skills of the students

COURSE OUTCOMES

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

CO1. Discover the most thrust areas in the field of Information Technology.

CO2. Develop a complete project for a particular problem domain.

CO3. Identify, analyse, design and implement any IT related projects.

CO4. Compare and contrast existing solutions for developing a project.

CO5. Demonstrate an ability to work in a teams and manage with good communication skill.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓	✓		✓		✓	✓		✓		✓			✓		✓	✓
CO2	✓	✓		✓	✓		✓			✓		✓	✓	✓	✓	✓	✓	
CO3	✓	✓		✓	✓		✓			✓		✓	✓	✓		✓	✓	✓
CO4	✓		✓			✓	✓				✓	✓	✓	✓		✓	✓	
CO5	✓	✓	✓			✓	✓				✓	✓	✓	✓		✓	✓	✓

DEPARTMENT ELECTIVE COURSES

19ISEE16.1: Computer Organization and Architecture

Learning Objectives

To understand the Computer Functional Units and the Design Procedure of Computer System.

LO1. To understand the Architecture and Organization of the Computer System.

LO2. To understand what a process is going on the Address modes and Programs.

LO3. To understand different approaches to Memory management Systems.

LO4. Students should be able to how to process going on Input and Output Organizations.

LO5. Students should understand the Computer Instruction, Arithmetic Instruction and Logical Instruction.

Unit-1

Basic of Computer, Von Neumann Architecture, Generation of Computer, Classification of Computers, Instruction Execution. Register Transfer and Micro operations: Register Transfer, Bus and Memory Transfers, Three-State Bus Buffers, Memory Transfer, Micro-Operations, Register Transfer Micro-Operations, Arithmetic Micro-Operations, Logic Micro-Operations, Shift Micro-Operations.

Unit-2

Stack Organization, Register Stack, Memory Stack, Reverse Polish Notation. Instruction Formats, Three- Address Instructions, Two – Address Instructions, One - Address Instructions, Zero - Address Instructions, RISC Instructions, Addressing Modes. RISC & CISC and their characteristics.

Unit-3

Addition And Subtraction With Signed-Magnitude, Multiplication Algorithm, Booth Multiplication Algorithm, Array Multiplier, Division Algorithm, Hardware Algorithm, Divide Overflow, Floating-Point Arithmetic Operations, Decimal Arithmetic Operations, BCD Adder, BCD Subtraction.

Unit-4

Modes Of Transfer, Priority Interrupt, DMA, Input-Output Processor (IOP), CPU-IOP Communication. Memory Organization: Memory Hierarchy, Main Memory, Auxiliary Memory, Cache Memory, Virtual Memory, Associative Memory.

Unit-5

Control memory – Address sequencing – Design of Control unit. Pipelining: Parallel Processing, Pipelining - Arithmetic Pipeline, Instruction Pipeline. Multiprocessors: Characteristics of Multiprocessors, Interconnection Structure: Time-Shared Common Bus, Multi-Port Memory, Crossbar Switch, Multistage Switching Network, Hypercube Interconnection.

Text and Reference Books

1. "Computer System Architecture", M.Morris Mano.

2. "Computer System Architecture", John. P. Hayes.

3. "Computer Organization, C. Hamacher, Z. Vranesic, S.Zaky.

4. "Computer Architecture and parallel Processing ", Hwang K. Briggs.

Course Outcomes

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

CO1. Understand the Organization of Computer and Basic Architecture Components involved in Computer Designs.

CO2. Explain the Central Processing Units system and Address, Arithmetic and Logical Instructions.

CO3. Analyse the various devices and Input / Output Organization Systems.

CO4. Understand the Addressing methods and Programs of Bus Structure in Computer Systems.

Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓		✓									✓	✓					
CO2					✓			✓		✓		✓		✓	✓	✓	✓	✓
CO3	✓						✓					✓	✓			✓	✓	
CO4			✓			✓						✓	✓			✓		

19ISEE16.2 : MICROPROCESSOR AND ITS APPLICATIONS

Learning Objectives

To understand the Computer Functional Units and the Design Procedure of Computer System.

LO1. To introduce basic concepts of interfacing memory and peripheral device of a microprocessor.

LO2. To introduce 8085 Architecture.

LO3. To introduce 8051 Microcontroller.

LO4. To understand and device techniques for faster execution of instructions, improve speed of operations and enhance performance of microprocessors.

LO5. To introduce serial and parallel bus standards.

Unit–I

Microcomputer – microprocessor architecture and its operations – memory input/output – addressing modes – instruction classification, format and timings.

Unit–II

Instruction set – Data Transfer instructions: Arithmetic operations – logic and Branch operation – Looping, counting and indexing – 16 bit arithmetic operations related to memory – logic operations – time delays.

Unit–III

Stack – subroutine – call and Return instruction – parallel input/output – 8255 programmable peripheral interface – 8253 Programmable timer – The 8085 Interrupts: 8259 programmable interrupt controller – Direct Memory Access – 8257 DMA controller.

Unit–IV

Advanced microprocessors – 80 x 87 architecture – Concepts of arithmetic coprocessor – introduction to 80386, 80486 – memory paging mechanism.

Unit–V

Introduction to the Pentium and Pentium pro microprocessor – Applications – Temperature monitoring and Control – Traffic light Control.

Text and Reference Books

1. RameshS. Gaonkar, "Microprocessor Architecture Programming and Applications with 8085", Fourth Edition, Penram International Publishing 2000.

2. Barry B. Brey, "The Intel Microprocessors 8086/8088, 80186/80188, 80286, 80386,80486, Pentium and Pentium Pro Processor Architecture, Programming and Interfacing", 4th Edition, Prentice Hall of India Private Limited, 1997.

Course Outcomes

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

CO1. Understand basic architecture of 8085,8051 microcontroller and 8086 microprocessor.
CO2. Understand interfacing of 8 bit,16 bit,32 bit and 64 bit microprocessor with memory and peripheral device.
CO3. Understand the concept of Pentium processor.
CO4. Distinguish between Microprocessor and Microcontroller.

Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔		✔									✔	✔					
CO2					✔				✔		✔	✔		✔	✔	✔	✔	✔
CO3	✔							✔				✔	✔			✔	✔	
CO4			✔			✔						✔	✔			✔		

19ISEE37.1: SYSTEM SOFTWARE

LEARNING OBJECTIVES

LO1. To introduce software systems with an emphasis on operating system.

LO2. To identify and understand different phases and passes of Assembler and their functioning.

LO3. To understand the basic concepts of linker, loader, interpreter, editor and debugger.

LO4. To understand the basic macro processor functions, Machine-independent macro processor features, macro expansion and MASM macro processor.

LO5. To study System Software Tools.

LO6. To view some of the major tasks of the system software of a computer system

LO7. To focus on internal working of the hardware

UNIT I

The Simplified Instructional Computer (SIC) - Machine architecture - Data and instruction formats - addressing modes - instruction sets - I/O and programming.

UNIT II

A simple SIC assembler – Assembler algorithm and data structures - Machine dependent assembler features - Instruction formats and addressing modes – Program relocation - Machine independent assembler features - Literals – Symbol-defining statements – Expressions - One pass assemblers and Multi pass assemblers - Implementation example - MASM assembler.

UNIT III

Design of an Absolute Loader – A Simple Bootstrap Loader - Machine dependent loader features - Relocation – Program Linking – Algorithm and Data Structures for Linking Loader - Machine-independent loader features - Automatic Library Search – Loader Options - Loader design options - Linkage Editors – Dynamic Linking – Bootstrap Loaders - Implementation example - MSDOS linker

UNIT IV

Macro Definition and Expansion – Macro Processor Algorithm and data structures - Machine-independent macro processor features - Concatenation of Macro Parameters – Generation of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters-Macro within Macro-Implementation example - MASM Macro Processor – ANSI C Macro language.

UNIT V

Overview of the Editing Process - User Interface – Editor Structure - Interactive debugging systems - Debugging functions and capabilities – Relationship with other parts of the system – User-Interface Criteria.

TEXT BOOK

1. Leland L. Beck, "System Software – An Introduction to Systems Programming", 4 th Edition, Pearson Education Asia, 2010.

REFERENCES BOOKS

1. D. M. Dhamdhere, "Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw-Hill, 2009.

2. John J. Donovan, "Systems Programming", Tata McGraw-Hill Edition, 2009.

3. John R. Levine, Linkers & Loaders – Harcourt India Pvt. Ltd., Morgan Kaufmann Publishers, 2009.

COURSE OUTCOMES

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

CO1. Develop the system and program in assembler and lexical analyser.

CO2. Develop SIC assembler functions and algorithm, Program relocation and Machine independent assembler features.

CO3. Understand how linker and loader create an executable program from an object module created by assembler and compiler.

CO4. Understand macro processor functions, definition and expansion, macro processor algorithm, Macro within Macro-Implementation and ANSI C Macro language.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓									✓	✓		✓	✓	✓	✓	✓
CO2	✓	✓					✓			✓		✓				✓	✓	
CO3	✓	✓	✓		✓	✓						✓	✓	✓	✓	✓	✓	✓
CO4	✓	✓	✓				✓					✓			✓	✓	✓	✓

19ISEE37.2: COMPILER DESIGN

Learning Objectives

LO1. Discover principles, algorithms and techniques that can be used to construct various phases of compiler.

LO2. Acquire knowledge about finite automata and regular expressions

LO3. Learn context free grammars, compiler parsing techniques.

LO4. Explore knowledge about Syntax Directed definitions and translation scheme

LO5. Understand intermediate machine representations and actual code generation

Unit-1 - Lexical analysis - Language Processors, The Structure of a Compiler, Parameter passing mechanism – Symbol table - The role of the lexical analyzer - Input buffering - Specification of tokens - Recognition of tokens – Finite automata - Regular expression to automata.

Unit-2 - Syntax Analysis - The role of the parser - Context-free grammars - Writing a grammar - Top down Parsing - Bottom-up Parsing - LR parsers- LALR parsers.

Unit-3 - Semantic Analysis - Inherited and Synthesized attributes – Dependency graphs – Ordering the evaluation of attributes – S-attributed definitions – L-attributed definitions – Applications of Syntax Directed translation – Syntax Directed translations schemes - Storage organization – Stack allocation of space.

Unit-4 - Intermediate Code Generation **-** Variants of Syntax trees – Three Address code – Types and Declarations - Translation of Expressions – Type checking - Control flow - Back patching - Switch Statements - Procedure calls.

Unit-5 - Code Generation and Code Optimization - Issues in the design of a code generator - The target language – Address in the Target Code – Basic Block and Flow graphs – Optimization of Basic Blocks - A simple code generator – Peephole Optimization.

Text Book

1. Alfred V. Aho, Monica S.Lam, Ravi Sethi and Jeffrey D. Ullman, "Compilers-Principles, Techniques and Tools", Second Edition, Pearson Education Asia, 2009.

Reference Books

1. A.V. Aho, Ravi Sethi, J.D. Ullman, Compilers - Principles, Techniques and Tools, Addison- Wesley, 2003.

2. Fischer Leblanc, Crafting Compiler, Benjamin Cummings, Menlo Park, 1988.

3. Kennath C.Louden, Compiler Construction Principles and Practice, Vikas publishing House, 2004.

4. Allen I. Holub, Compiler Design in C, Prentice Hall of India, 2001.

5. S.Godfrey Winster, S.Aruna Devi, R.Sujatha, "Compiler Design", yesdee Publishers, Third Reprint 2019.

Course Outcomes

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

CO1.   Use the knowledge of patterns, tokens & regular expressions

CO2.   Have the knowledge in semantic analysis and syntax directed translation.

CO3.   Design a code generator with a knowledge in code optimization.

CO4.   Learn the new code optimization techniques to improve the performance of a program in terms of speed and space.

Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓		✓	✓	✓	✓		✓	✓	✓				✓	✓			
CO2				✓			✓			✓		✓	✓	✓	✓	✓		✓
CO3	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓	✓				✓	
CO4			✓		✓	✓	✓	✓				✓		✓	✓	✓	✓	✓

19ISEE57.1: OPEN SOURCE TECHNOLOGY

LEARNING OBJECTIVES

LO1. To Introduces Open Source methodologies.
LO2. To make the students to gain experience using open source tools, languages and frameworks to prepare for careers in software development.
LO3. To understand common open source licenses and the impact of choosing a license.
LO4. To understand concepts, strategies, and methodologies related to open source software development.
LO5. To be familiar with open source software products and development tools currently available on the market.

UNIT I

Introduction: Open Source, Free Software, Free Software vs. Open Source software, Public Domain Software, FOSS does not mean no cost. History : BSD, The Free Software Foundation and the GNU Project.

UNIT II

Open Source History, Initiatives, Principle and methodologies. Philosophy : Software Freedom, Open Source Development Model Licences and Patents: What Is A License, Important FOSS Licenses (Apache,BSD,GPL, LGPL), copyrights and copylefts, Patents Economics of FOSS : Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization

UNIT III

Community Building: Importance of Communities in Open Source Movement-JBoss Community- Starting and Maintaining an Open Source Project - Open Source Hardware

UNIT IV

Apache HTTP Server and its flavors- WAMP server (Windows, Apache, MySQL, PHP)- Apache, MySQL, PHP, JAVA as development platform.

UNIT V

Open source vs. closed source Open source government, Open source ethics. Social and Financial impacts of open source technology, Shared software, Shared source.

TEXT BOOKS

1. Sumitabha Das "Unix Concepts and Applications, Tata McGraw Hill Education 006

2. The Official Ubuntu Book, 8th Edition

3. Kailash Vedera, Bhavyesh Gandhi, "Open Source Technology", University Science press, ker

REFERENCE BOOKS

1. Paul Kavanagh, "Open Source Software: Implementation and Management", Elsevier Digital Press.

2. The Linux Documentation Project : http://www.tldp.org

3. Docker Project Home : http://www.docker.com

COURSE OUTCOMES

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

CO1. Access the open source software.
CO2. Handle open source project.
CO3. Operate on different platform.
CO4. Learn receive and process form submission data.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓				✓			✓			✓	✓		✓	✓	✓		✓
CO2	✓	✓		✓	✓		✓			✓	✓	✓	✓	✓			✓	
CO3			✓		✓			✓				✓		✓	✓			✓
CO4	✓	✓					✓			✓								

19ISEE57.2: Cyber Security

Learning Objectives

LO1. To understand the key terms and concepts in cyber law, intellectual property and cyber-crimes, trademarks and domain theft.

LO2. To acquire knowledge about securing both clean and corrupted systems and protection of personal data and computer networks.

LO3. To understand the fundamentals of cryptography, and some key encryption techniques used today.

LO4. To develop an understanding of security policies and protocols to implement such policies.

LO5. To examine secure software development practices and able to incorporate approaches for risk management and best practices.

Unit-1

Introduction to Cyber Security - Introduction -Computer Security - Threats - Harm - Vulnerabilities - Controls - Authentication -Access Control and Cryptography - Web—User Side - Browser Attacks - Web Attacks Targeting Users - Obtaining User or Website Data - Email Attacks.

Unit-2

Risk Management & Planning - Introduction – An overview of Risk Management – Risk Identification – Risk Assessment – Risk control Strategies – Selecting a Risk control Strategy – Quantitative versus qualitative risk control practices - Risk Management Discussion Points – Recommended Risk Control Practices. Planning for Security: Introduction – Information Security Policy, Standards and Practices – The Information Security Blueprint – Security Education, Training and Awareness Program – Continuity Strategies. Security Technology: Firewalls and VPNs: Introduction – Physical Design – Firewalls – Protecting Remote Connections.

Unit-3

Security Technology - INTRUSION DETECTION, ACCESS CONTROL AND OTHER SECURITY TOOLS Introduction – Intrusion Detection and Prevention System (IDS and IPSs) – Honey Pots, Honey Nets and Padded Cell Systems – Scanning and Analysis Tools – Access Control Devices. Cryptography: Introduction – Foundations of Cryptology – Cipher Methods – Cryptographic Algorithms – Cryptographic Tools.

Unit-4

Security Implementation -Physical Security: Introduction – Physical Access Controls – Fire Security and Safety – Failure of Supporting Utilities and Structural Collapse – Interception of Data – Mobile and Portable Systems – Special Considerations for Physical Security Threats. Implementing Information Security: Introduction – Information Security Project Management – Technical Topics of Implementation – Non technical Aspects of Implementation – Information Systems Security Certification and Accreditation.

Unit-5

Information and Human Security- Fundamentals-Employee responsibilities-information classification-Information handling- Tools of information security-Information processing-secure program administration. Organizational and Human Security: Adoption of Information Security Management Standards, Human Factors in Security- Role of information security professionals.

Reference Books

1. Principles and Practices of Information Security – Dr Michael E.Whitman, CISM, CISSP Herbert J.Mattord, CISM, CISSP – Cengage Learning India Private Limited Indian fourth edition Reprint 2010.

2. Charles P. Pfleeger Shari Lawrence Pfleeger Jonathan Margulies, Security in Computing, 5th Edition , Pearson Education , 2015

3. Thomas R. Peltier, "Information Security policies and procedures: A Practitioner's Reference", 2nd Edition Prentice Hall, 2004.

Course Outcomes

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

CO1. Assess cyber security risk management policies in order to adequately protect an organizations critical information and assets.
CO2. Measure the performance of security systems within an enterprise-level information system.
CO3. Troubleshoot, maintain and update an enterprise-level information security system.
CO4. Implement continuous network monitoring and provide real-time security solutions.
CO5. Formulate, update and communicate short- and long-term organizational cyber security strategies and policies.

Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔		✔	✔	✔		✔	✔
CO2		✔		✔	✔		✔			✔	✔	✔					✔	
CO3	✔		✔			✔			✔								✔	
CO4		✔		✔		✔			✔				✔				✔	
CO5	✔		✔		✔	✔	✔		✔				✔					

19ISEE86.1. OBJECT ORIENTED SYSTEM DEVELOPMENT

LEARNING OBJECTIVES

LO1. Introduce the concept of Object-oriented design and understand the fundamentals of OOSD life cycle.
LO2. Familiar with evolution of object-oriented model, classes and it notations
LO3. Practice UML in order to express the design of software projects.
LO4. Specify, analyze and design the use case driven requirements for a particular system.
LO5. Enrich knowledge about DBMS, designing classes and object oriented testing.

UNIT – I - Fundamentals of OOSD - Overview of Object Oriented Systems Development : Two orthogonal view of the software - OOSD methodology - Why an object Object orientation. Object basics: Object Oriented Philosophy- Objects – Attributes – Object respond to messages – Encapsulation and information hiding – class hierarchy – Polymorphism – Object relationship and associations. OOSD life cycle : Software development process – OOSD Use case Driven Approach – Reusability.

UNIT – II - Methodology, Modeling and UML - Object Oriented Methodologies: Rumbaugh et al.'s object modeling technique – The Booch methodology – The Jacobson et al. methodology – Patterns – Frameworks - The Unified approach. Unified Modeling Language : Static and dynamic models – Why modeling - UML diagrams – UML class diagram – Use case diagram - UML dynamic modeling – packages and model organization.

UNIT – III - Object Oriented Analysis - Object Oriented Analysis process : Business Object Analysis - Use case driven object oriented analysis – Business process modeling – Use-Case model – Developing effective documentation . Classification : Classifications theory – Approaches for identifying classes – Noun phrase approach – Common class patterns approach – Use-Case Driven approach – Classes, Responsibilities, and Collaborators - Naming classes. Identifying object relationships, attributes, and methods : Association – Super-Sub class relationship – Aggregation – Class responsibility – Object responsibility.

UNIT – IV - Object Oriented Design - Object Oriented Design Process and Design Axioms - OOD process- OOD axioms – Corollaries – Design patterns. Designing classes : Designing classes – Class visibility – Refining attributes – Designing methods and protocols – Packages and managing classes. Access layer: Object Store and persistence – DBMS – Logical and physical Database Organization and access control – Distributed Databases and Client Server Computing —

Multidatabase Systems – Designing Access layer classes. View Layer : Designing view layer classes – Macro level process – Micro level process – The purpose of view layer interface – Prototyping the user interface.

UNIT – V - Software Quality - Software Quality Assurance : Quality assurance tests – Testing strategies – Impact of Object Orientation on Testing - Test Cases-Test Plan – Continuous testing. System Usability and Measuring User satisfaction: Usability Testing – User satisfaction test – A tool for analyzing user satisfaction. System Usability and Measuring User satisfaction : Introduction – Usability Testing.

TEXT BOOK

1. Ali Bahrami, "Object Oriented Systems Development using UML", McGraw-Hill, 2008.

REFERENCE BOOKS

1. Booch Grady, Rumbaugh James, Jacobson Ivar, "The Unified modeling Language – User Guide, Pearson Education, 2006

2. Brahma Dathan, Sarnath Ramnath, "Object Oriented Analysis, Design and Implementation", Universities Press, 2010.

3. Mahesh P.Matha, "Object-Oriented Analysis and Design Using UML", PHI Learning Private Limited, 2012.

4. Rachita Misra, Chhabi Rani Panigrahi, Bijayalaxmi Panda, "Principles of Software Engineering and System Design", Yesdee Publishing 2019.

COURSE OUTCOMES

On the successful completion of this course, Students will be able to

CO1. Show how the object-oriented approach differs from the traditional approach to systems analysis and design.

CO2. Analyze, design, document the requirements through use case driven approach

CO3. Explain the importance of modeling and how the Unified Modeling Language (UML) represents an object-oriented system using a number of modeling views.

CO4. Recognize the difference between various object relationships: inheritance, association and aggregation.

CO5. Show the role and function of test cases, testing strategies and test plans in developing object- oriented software.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓	✓			✓							✓		✓	✓		✓
CO2	✓			✓			✓	✓		✓			✓					
CO3			✓							✓		✓			✓	✓	✓	✓
CO4		✓			✓	✓				✓				✓	✓			
CO5	✓				✓			✓		✓	✓			✓	✓		✓	✓

19ISEE86.2. ADVANCED DATA STRUCTURE AND ALGORITHM

LEARNING OBJECTIVES

LO1. To teach efficient storage mechanisms of data for an easy access.
LO2. To design and implementation of various basic and advanced data structures.
LO3. To introduce various techniques for representation of the data in the real world.
LO4. To develop application using data structures.
LO5. To teach the concept of protection and management of data.

UNIT-I

Elementary Data Structures - Stacks and Queues - Linked Lists - Implementing pointers and objects - Hash tables - Direct-address tables - Hash functions - Open addressing - Perfect hashing - Binary search trees - Querying binary search trees - Insertion and deletion - Red-Black trees -Properties - Rotations - Insertion - Deletion.

UNIT-II

The Role of algorithm in computing - Analyzing algorithm - Designing algorithm – Divide and Conquer - Maximum-sub array problem - Analyzing the divide-and-conquer algorithm - Strasen's algorithm for matrix multiplication - Substitution method for solving recurrences.

UNIT-III

Sorting and order statistics - Heap sort - Maintaining the heap priority - Building a heap - Heap sort algorithm - Priority queues - Quick sort - Description of quick sort - Performance of quick sort - A randomized version of quick sort - Analysis of quick sort - Sorting in Linear Time – Lower bounds for sorting - Radix sort - Medians and order statistics - Minimum and Maximum

UNIT-IV

Advanced Design and Analysis Techniques - Dynamic Programming - Rod cutting - Elements of dynamic programming - Optimal binary search trees - Greedy algorithms - An activity- selection algorithm - Elements of greedy strategy – Huffman codes - Graph Algorithms – Elementary Graph algorithms – Minimum spanning trees - Single source shortest path – All Pairs shortest path .

UNIT-V

Advanced Data Structures - B- trees - Definition - Basic Operations on B-trees – Deleting a key from B-tree - Fibonacci heaps - Structure of Fibonacci heap - Data structure for disjoint sets - Disjoint set operations - Linked list representation of disjoint sets. NP-Completeness –Basic concept of P and NP – NP-Hard Problem – Polynomial type – NP completeness – approximation and algorithm for some NP complete problems.

TEXT BOOKS

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Cliford Stein, Introduction to Algorithms, Third Edition, The MIT press, 2009.

Reference Books:

1. Timothy Budd, An Introduction to Object Oriented Programming, Pearson Education, Second Edition, 1996.

2. Jean Paul Tremblay and Paul G. Sorenson, An Introduction to Data Structures with Applications, Tata McGraw Hill, Second Edition, 2010.

COURSE OUTCOME

- CO1. Appropriate data structure as applied to specified problem definition.
- CO2. Handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
- CO3. Apply concepts learned in various domains like DBMS, compiler construction etc.
- CO4. Analyse the data structures and their implementation algorithm.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔				✔			✔			✔			✔	✔		✔	
CO2		✔				✔						✔		✔	✔			✔
CO3				✔				✔							✔		✔	
CO4	✔	✔	✔	✔						✔	✔	✔	✔	✔	✔		✔	✔

19ISEE86.3. THEORY OF COMPUTATION

LEARNING OBJECTIVES

LO1.   To introduce students to the mathematical foundations of computation including automata theory; the theory of formal languages and grammars; the notions of algorithm, decidability, complexity, and computability.

LO2.   To enhance/develop students' ability to understand and conduct mathematical proofs for computation and algorithms.

UNIT I

Introduction to formal proof – Additional forms of proof – Inductive proofs –Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions.

UNIT II

Regular Expression – FA and Regular Expressions – Proving languages not to be regular – Closure properties of regular languages – Equivalence and inimization of Automata.

UNIT III

Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Definition of the Pushdown automata – Languages of a Pushdown Automata–Equivalence of Pushdown automata and CFG– Deterministic Pushdown Automata.

UNIT IV

Normal forms for CFG – Pumping Lemma for CFL – Closure Properties of CFL – Turing Machines – Programming Techniques for TM. A language that is not Recursively Enumerable (RE).

UNIT V

An undecidable problem RE – Undecidable problems about Turing Machine – Post's Correspondence Problem – The classes P and NP.

TEXT BOOKS
1. Peter Linz, "An Introduction to Formal Languages and Automata", Third Edition ,Narosa, 2005
2. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", second Edition, Pearson Education, 2007.

REFERENCE BOOKS

1. H.R. Lewis and C.H. Papadimitriou, "Elements of the theory of Computation", Second Edition, Pearson Education, 2003.

2. Thomas A. Sudkamp," An Introduction to the Theory of Computer Science,Languages and Machines", Third Edition, Pearson Education, 2007.
3. Raymond Greenlaw an H.James Hoover, " Fundamentals of Theory of Computation, Principles and Practice", Morgan Kaufmann Publishers, 1998.
4. Micheal Sipser, "Introduction of the Theory and Computation", Thomson Brokecole, 1997.
5. J. Martin, "Introduction to Languages and the Theory of computation," Third Edition, Tata Mc Graw Hill, 2007.

COURSE OUTCOMES

After completing this course, students will be able to:

CO1. Analyse and design finite automata, pushdown automata, Turing machines, formal languages, and grammars.
CO2. Demonstrate their the understanding of key notions, such as algorithm, computability, decidability, and complexity through problem solving.
CO3. Prove the basic results of the Theory of Computation, state and explain the relevance of the Church-Turing thesis.
CO4. Design formal languages and grammars

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓			✓	✓	✓	✓			✓	✓		✓			✓	✓
CO2	✓	✓	✓	✓		✓		✓						✓			✓	
CO3	✓	✓	✓	✓		✓		✓		✓	✓	✓	✓		✓	✓		
CO4	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓		✓	✓

19ISEE87.1. SOCIAL COMPUTING

LEARNING OBJECTIVES:
   LO1. To understand the concepts of social networks.
   LO2. To understand human behaviour in social web related communities.
   LO3. To study the various methods of data analysis.
   LO4. To learn the mining and clustering of social data.
   LO5. To learn the features and constraints of social web applications

UNIT – I

   Online Social Networks (OSNs) Introduction - Types of social networks - Measurement and Collection of Social Network Data - Techniques to study different aspects of OSNs -- Follower-followee dynamics, link farming, spam detection, hashtag popularity and prediction, linguistic styles of tweets - Human Centered Computing - Classes of human-centered computation, Methods of human-centered computation - Incentives for participation, computer supported co-opeartive work,

computer supported collaborative learning – Crowd sourcing as a Model for Problem Solving.

UNIT – II

Models of Opinion Formation Opinion Dynamics - Continuous and Discrete Models - Cultural, Language Dynamics - Axelrod Model and its variant, The Naming game, The Category Game - Crowd Behavior- Flocking, Pedestrian behavior, Applause Dynamics and Mexican Wave - Formation of Hierarchies - The Bonabeau Model, The advancement-decline Model - Social spreading Phenomena- rumor spreading, gossip spreading.

UNIT – III

Fundamentals of Social Data Analytics: Introduction - Working with Social Media Data -Topic Models - Modeling social interactions on the Web - Random Walks - Variants of random walk.

UNIT – IV

Applied Social Data Analytics Application of Topic models - Opinions and Sentiments - Mining, Analysis and Summarization - Recommendation Systems - Language dynamics and influence in online communities - Community identification, link prediction and topical search in social networks - Psychometric analysis.

UNIT – V

Applications A Learning Based Approach for Real Time Emotion Classification of Tweets, A New Linguistic Approach to Assess the Opinion of Users in Social Network Environments, Explaining Scientific and Technical Emergence Forecasting, Social Network Analysis for Biometric Template Protection.

TEXT BOOKS:

1. Danah Boyd, "It's Complicated: The Social Lives of Networked Teens", Yale University Press, 2015.

2. Cioffi-Revilla, Claudio. Introduction to Computational Social Science, Springer, 2014.

REFERENCE BOOKS:

1. Matthew A. Russell. Mining the Social Web: Data Mining Facebook, Twitter, Linkedin, Google+, Github, and More, 2nd Edition, O'Reilly Media, 2013.

2. Robert Hanneman and Mark Riddle. Introduction to social network methods. Online Text Book, 2005.

3. Jennifer Golbeck, Analyzing the social web, Morgan Kaufmann, 2013.

4. Przemyslaw Kazienko, Nitesh Chawla,"Applications of Social Media and Social Network Analysis", Springer,2015.

COURSE OUTCOMES:

On successful completion of the course, the students will be able to
- CO1. Represent knowledge using social networks.
- CO2. Predict human behaviour in social web related communities.
- CO3. Develop the different models of social web.
- CO4. Apply the data analysis methods.
- CO5. Develop social web applications.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓	✓	✓			✓	✓	✓	✓	✓			✓	✓			✓
CO2			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓			✓
CO3			✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓
CO4		✓	✓	✓	✓	✓				✓	✓	✓		✓	✓		✓	✓
CO5			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

19ISEE87.2. CLOUD COMPUTING

LEARNING OBJECTIVES

- LO1. To Acquire the Knowledge of Cloud and computing services
- LO2. To learn the basics of Cloud Architecture and storage technologies.
- LO3. To gain knowledge about the concept of Cloud Deployment Models
- LO4. To Build Cloud based various applications
- LO5. To gain Knowledge on security issues in cloud Environment.

UNIT - I:

Cloud computing definition- Characteristics- Benefit-Challenges- Distributed Systems- Virtualization-Service-oriented computing- Utility-oriented computing-Building Cloud Computing environments- computing platforms & technologies - Cloud Models – Cloud Service Examples - Cloud Based Services & Applications - Cloud concepts and Technologies.

UNIT - II:

Virtualization: Virtualization- Characteristics- taxonomy-types- Pros and Cons- Examples Architecture: Reference model- types of clouds- Compute Service - Storage Services - Cloud Database Services - Application Services - Content Delivery Services - Analytics Services - Deployment And Management Service - Identity And Access Management Services - Open Source Private Cloud Software.

UNIT – III:

Design consideration- Reference Architecture for Cloud Application - Cloud Application Design Methodologies - Data Storage Approaches- Development in Python: Design Approaches – Application: Image Processing - Document Storage - Map Reduce - Social Media Analytics.

UNIT – IV:

Introduction- Installing Python- Data types & Data Structures- Control Flow- Functions- Modules- Packages- File Handling-Date/Time Operations – Classes- Python for Cloud: Amazon Web Services –Google Cloud Platform - Windows Azure – Map Reduced –Packages of Interest – Designing a RESTful Web API.

UNIT – V:

Big Data Analytics: Clustering Big data - Classification of Big Data – Recommendation systems. Multimedia Cloud: Case Study: Live Video Stream App - Streaming Protocols – Case Study: Video Transcoding App-Cloud Security: CSA Cloud Security Architecture - Authentication - Authorization - Identity and Access management - Data Security - Key Management- Auditing- Cloud for Industry, Healthcare & Education.

TEXT BOOKS:

1. Buyya, Vecciola and Selvi, Mastering Cloud Computing: Foundations and Applications Programming, Tata McGraw Hill, 2013.

2. ArshdeepBahga, Vijay Madisetti, "Cloud Computing: A Hands – On Approach"

3. Universities press (India) Pvt. limited 2016.

REFERENCE BOOKS:

1. Rittinghouse and Ransome, Cloud Computing: Implementation, Management, and Security, CRC Press, 2016.

2. Michael Miller "Cloud Computing Web based application that change the way you work and collaborate online". Pearson edition, 2008.

3. Kris Jamsa, Cloud Computing: SaaS, PaaS, IaaS, Virtualization, Business Models, Mobile,Security and More, Jones & Bartlett Learning, 2012.

COURSE OUTCOMES

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

  CO1. Apply different cloud programming model as per need.
  CO2. Introduce the broad perceptive of cloud architecture
  CO3. Learn the economics of outsourcing IT to the Cloud.
  CO4. Explore some important cloud computing driven commercial systems such as Google Apps,   Microsoft Azure and Amazon Web Services and other businesses cloud applications.
  CO5. Learn how DNS works, and how it can be used for service discovery using Cloud.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓	✓	✓	✓		✓	✓		✓		✓	✓	✓		✓	✓	✓
CO2	✓	✓	✓	✓		✓		✓	✓	✓		✓	✓	✓		✓	✓	✓
CO3		✓		✓				✓		✓		✓				✓	✓	✓
CO4		✓		✓		✓		✓			✓	✓				✓	✓	✓
CO5	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	✓			✓	✓	✓

19ISEE87.3.DISTRIBUTED AND PARALLEL COMPUTING

LEARNING OBJECTIVES:

LO1. To learn core ideas behind parallel and distributed computing.

LO2. To explore the methodologies adopted for concurrent and distributed environment.

LO3. To understand the networking aspects of parallel and distributed computing.

LO4. To provide an overview of the computational aspects of parallel and distributed computing.

LO5. To learn parallel and distributed computing models.

UNIT I

Parallel and Distributed Computing — Introduction- Benefits and Needs- Parallel and Distributed Systems- Programming Environment- Theoretical Foundations-Parallel Algorithms— Introduction- Parallel Models and Algorithms- Sorting- Matrix Multiplication- Convex Hull- Pointer Based Data Structures.

UNIT II

Synchronization: Process Parallel Languages- Architecture of Parallel and Distributed Systems- Consistency and Replication- Security- Parallel Operating Systems.

UNIT III

Management of Resources in Parallel Systems: Tools for Parallel Computing-Parallel Database Systems and Multimedia Object Servers.

UNIT IV

Networking Aspects of Distributed and Parallel Computing - Process- Parallel and Distributed Scientific Computing.

UNIT V

High-Performance Computing: Molecular Sciences- Communication- Multimedia Applications for Parallel and Distributed Systems- Distributed File Systems.

TEXTBOOK

1. Jacek Błażewicz, et al., "Handbook on parallel and distributed processing", Springer Science & Business Media, 2013.

REFERENCE BOOKS

1. Andrew S. Tanenbaum, and Maarten Van Steen, "Distributed Systems: Principles and Paradigms". Prentice-Hall, 2007.

2. George F.Coulouris, Jean Dollimore, and Tim Kindberg, "Distributed systems: concepts and design", Pearson Education, 2005.

3. Gregor Kosec and Roman Trobec, "Parallel Scientific Computing: Theory, Algorithms, and Applications of Mesh Based and Meshless Methods", Springer, 2015.

COURSE OUTCOMES:

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

CO1. Explore the methodologies adopted for concurrent and distributed environment.

CO2. Analyse the networking aspects of Distributed and Parallel Computing.

CO3. Design high performance computing.

CO4. Establish effective communication among the network.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		
CO2	✓			✓			✓						✓	✓	✓	✓	✓	✓
CO3	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓		✓	✓
CO4	✓				✓			✓		✓				✓	✓	✓	✓	

19ISEE96.1. EMBEDDED SYSTEMS

LEARNING OBJECTIVES

This course will enable students to:
LO1. Understand the basic hardware components and their selection method based on the characteristics and attributes of an embedded system.
LO2. Describe the hardware software co-design and firmware design approaches
LO3. Know the RTOS internals, multitasking, task scheduling, task communication and synchronisation
LO4. Learn the development life cycle of embedded system

UNIT-I - Introduction to Embedded system - Embedded system vs General computing systems - History - Classification - Major Application Areas - Purpose of Embedded systems - Smart running shoes: The innovative bonding of lifestyle with embedded technology. Characteristics and Quality Attributes of Embedded systems

UNIT-II - Elements of an Embedded system - core of the embedded system: General purpose and domain specific processors, ASICs, PLDs, COTS - Memory - Sensors and Actuators - Communication Interface: Onboard and External Communication Interfaces - Embedded Firmware - Reset circuit, Brown-out protection circuit, Oscillator unit, Real-time clock, and Watchdog timer - PCB and Passive Components

UNIT-III - Embedded Systems - Washing machine: Application-specific - Automotive: Domain specific. Hardware Software Co-Design - Computational Models - Embedded Firmware Design Approaches - Embedded Firmware Development Languages - Integration and testing of Embedded Hardware and firmware.

UNIT-IV - RTOS based Embedded System Design: Operating System Basics - Types of operating Systems - Tasks, process and Threads - Multiprocessing and Multitasking - Task Scheduling- Task Communication - Task Synchronisation - Device Drivers - choosing an RTOS.

UNIT-V - Components in embedded system development environment, Files generated during compilation, simulators, emulators and debugging - Objectives of Embedded product Development Life Cycle - Different Phases of EDLC - EDLC Approaches - Trends in Embedded Industry - Case Study: Digital Clock.

TEXT BOOK
1. K. V. Shibu, "Introduction to embedded systems", TMH education Pvt. Ltd. 2009.

REFERENCE BOOKS:
1. Raj Kamal, "Embedded Systems: Architecture, Programming and Design", TMH. Second Edition 2009
2. Frank Vahid, Tony Givargis, "Embedded System Design", John Wiley. Third Edition 2006
3. Cliff Young, Faraboschi Paolo, and Joseph A. Fisher, "Embedded Computing: A VLIW Approach to Architecture, Compilers and Tools", Morgan Kaufmann Publishers, An imprint of Elsevier, 2005.
4. David E. Simon, "An Embedded Software Primer" Pearson Education, 1999

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

CO1. Describe   the differences between the general computing system and the

embedded system, also recognize the classification of embedded systems.
CO2. Become aware of interrupts, hyper threading and software optimization.
CO3. Design real time embedded systems using the concepts of RTOS.
CO4. Implement real time embedded systems

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓			✓		✓	✓	✓	✓	✓	✓		✓			✓	✓
CO2	✓	✓	✓	✓		✓		✓		✓			✓	✓		✓	✓	
CO3		✓		✓		✓		✓		✓	✓	✓	✓		✓	✓	✓	✓
CO4	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓	✓			✓

19ISEE96.2 CRYPTOGRAPHY AND NETWORK SECURITY

LEARNING OBJECTIVES

LO1. To understand Cryptography Theories, Algorithms and Systems.
LO2. To understand necessary Approaches and Techniques to build protection
mechanisms in order to secure computer networks.
LO3. To know about the malicious software & firewalls.

UNIT I:

   Introduction - Security trends – Legal, Ethical and Professional Aspects of Security, Need for Security at Multiple levels, Security Policies – Model of network security – Security attacks, services and mechanisms – OSI security architecture – Classical encryption techniques: substitution techniques, transposition techniques, steganography- Foundations of modern cryptography: perfect security – information theory – product cryptosystem – cryptanalysis.

UNIT II:

   Symmetric Encryption and Message Confidentiality - Symmetric Encryption Principles, Symmetric Block Encryption Algorithms, Stream Ciphers and RC4 , Chipher Block Modes of Operation, Location of Encryption Devices, Key Distribution. Public-key Cryptography and Message Authentication: Approaches to Message Authentication, Secure Hash Functions and HMAC, Public-Key Cryptography Principles, Public-Key Cryptography Algorithms, Digital Signatures, Key Management.

UNIT III:

   Authentication Applications - Kerberos, x.509 Authentication Service, Public-Key Infrastructure. Electronic Mail Security: Pretty Good Privacy (PGP), S/MIME.

UNIT IV:

IP Security - IP Security Over view, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations. Web Security: Web Security Considerations, Secure Socket Layer(SSL) and Transport Layer Security(TLS), Secure Electronic Transaction(SET).Network Management Security: Basic Concepts of SNMP, SNMPv1 Community Facility, SNMPv3.

UNIT V :

Intruders - Intruders, Intrusion Detection, Password Management. **Malicious Software:** Virus and Related Threats, Virus Countermeasures, Distributed Denial of Service Attacks. **Firewalls:** Firewall Design Principles, Trusted Systems, Common Criteria for Information Technology Security Evaluation.

TEXT BOOKS:

1. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill, 2007, Reprint 2015.

2. Stallings William, "Cryptography and Network Security - Principles and Practice 2017.

3. William Stallings, "Network Security Essentials Applications and Standards "Third Edition, Pearson Education, 2008.

REFERENCE BOOKS:

1. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms And Protocols", Wiley Publications, 2003.

2. Charles Pfleeger, "Security In Computing", 4th Edition, Prentice Hall Of India, 2006.

3. Ulysess Black, "Internet Security Protocols", Pearson Education Asia, 2000.

4. Charlie Kaufman And Radia Perlman, Mike Speciner, "Network Security, Second Edition, Private Communication In Public World", PHI 2002.

5. Bruce Schneier And Neils Ferguson, "Practical Cryptography", First Edition, Wiley Dreamtech India Pvt Ltd, 2003.

6. Douglas R Simson "Cryptography – Theory And Practice", First Edition, CRC Press, 1995.

7. Http://Nptel.Ac.In/.

COURSE OUTCOMES

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

CO1.Understand the fundamentals of networks security, security architecture, threats and vulnerabilities

CO2.Apply the different cryptographic operations of symmetric cryptographic algorithms.

CO3.Apply the different cryptographic operations of public key cryptography.

CO4. Apply the various Authentication schemes to simulate different applications.
CO5. Understand various Security practices and System security standards.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓				✓		✓		✓			✓				✓	✓	
CO2			✓		✓		✓			✓		✓	✓		✓	✓		✓
CO3	✓			✓		✓		✓		✓		✓			✓	✓		
CO4		✓		✓				✓	✓		✓	✓	✓		✓	✓		✓
CO5	✓		✓	✓		✓		✓	✓									

19ISEE96.3 WEB SERVICES

LEARNING OBJECTIVES

LO1. To enable the student to be familiar with distributed services, XML and web services

LO2. To study the use of web services in B2C and B2B applications

UNIT – I

Overview of Distributed Computing. Introduction to web services – Industry standards, Technologies and concepts underlying web services – their support to web services. Applications that consume web services.

UNIT – II

XML – its choice for web services – network protocols to back end databases-technologies – SOAP, WSDL – exchange of information between applications in distributed environment – locating remote web services – its access and usage. UDDI specification – an introduction.

UNIT - III

A brief outline of web services – conversation – static and interactive aspects of system interface and its implementation, work flow – orchestration and refinement, transactions, security issues – the common attacks – security attacks facilitated within web services quality of services – Architecting of systems to meet users requirement with respect to latency, performance, reliability, QOS metrics, Mobile and wireless services – energy consumption, network bandwidth utilization, portals and services management.

UNIT – IV

Building real world enterprise applications using web services – sample source codes to develop web services – steps necessary to build and deploy web services and client applications to meet customer s requirement – Easier development,

customization, maintenance, transactional requirements, seamless porting to multiple devices and platforms.

UNIT - V

Deployment of Web services and applications onto Tomcat application server and axis SOAP server (both are free wares) – Web services platform as a set of enabling technologies for XML based distributed computing.

TEXTBOOKS:

1. Sandeep Chatterjee, James Webber, "Developing Enterprise Web Services : An Architects Guide , Prentice Hall, Nov 2003.
2. Heather Williamson, "XML: The Complete Reference ",Tata McGraw-Hill Education India.

REFERENCE BOOK:

1. Martin Kalin, "Java Web Services: Up and Running", O'Reilly Publishers.

COURSE OUTCOMES

CO1. Understand the design principles and application of SOAP and REST based web services.
CO2. Design collaborating web services according to a specification.
CO3. Implement an application that uses multiple web services in a realistic business scenario.
CO4. Use industry standard open source tools such as Apache Axis2, Tomcat, Derby and Eclipse to build, test, deploy and execute web services and web applications that consume them.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔	✔	✔		✔	✔				✔		✔			✔			
CO2	✔	✔		✔	✔	✔		✔		✔	✔	✔	✔	✔	✔	✔	✔	✔
CO3	✔			✔		✔		✔			✔	✔	✔	✔			✔	✔
CO4	✔		✔		✔			✔		✔		✔		✔	✔			✔

19ISEE97.1 WEB DATABASE AND INFORMATION SYSTEM

LEARNING OBJECTIVES

LO1. Understand how n-tiered architectures can be used to implement secure, scalable systems

LO2. Design and develop database-driven websites and applications

LO3. Understanding XML as a messaging and data exchange mechanism

LO4. Understand Web "semantic systems," such as auctions, recommendation systems, and search ranking.

LO5. Understand critical components of the modern Web infrastructure: DNS, Content Delivery Networks, etc.

UNIT I

Introduction: Web Overview, Introduction to Apache, MySQL, Networking : TCP/IP, HTTP, Introduction to PHP, Dynamic Page Generation, Sessions and Personalization.

UNIT II

Web Analytics: Basics – Traditional Ways – Expectations – Data Collection – Clickstream Data – Weblogs – Beacons – JavaScript Tags – Packet Sniffing – Outcomes data – Competitive data – Search Engine Data.

UNIT III

Qualitative Analysis: Customer Centricity – Site Visits – Surveys – Questionnaires – Website Surveys – Post visits – Creating and Running- Benefits of surveys – Critical components of successful strategy.

UNIT IV

Web Analytic concepts: URLS – Cookies – Time on site – Page views – Understand standard reports – Website content quality – Navigation reports (top pages, top destinations, site overlay). – Search Analytics – Internal search, SEO and PPC – Measuring Email and Multichannel Marketing - Competitive intelligence and Web 2.0 Analytics – Segmentation – Connectable reports.

UNIT V

Goals and Funnels: Filters - Ecommerce Tracking - Real Time Reports - Customer Data Alert - Adwords Linking - Adsense Linking -Attribution Modeling - Segmentation - Campaign Tracking - Multi-Channel Attribution.

TEXTBOOK

1. Avinash Kaushik, "Web Analytics 2.0: The Art of Online Accountability and Science Of Customer Centricity ", 1st edition, Sybex, 2009.

REFERENCE BOOKS

1. Michael Beasley, "Practical Web Analytics for User Experience: How Analytics can help you Understand your Users", Morgan Kaufmann, 2013.

2. Magy Seif El-Nasr, Anders Drachen, Alessandro Canossa, eds., "Game Analytics: Maximizing the Value of Player Data", Springer, 2013.

3. Bing Liu, "Web Data Mining: Exploring Hyperlinks, Content, and Usage Data", 2nd Edition, Springer, 2011.

4. Justin Cutroni, "Google Analytics", O'Reilly, 2010.

Eric Fettman, Shiraz Asif, Feras Alhlou , "Google Analytics Breakthrough", John Wiley & sons, 2016.

COUSE OUTCOMES:

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

CO1. Know the concepts and terminologies related to web analytics.

CO2. Explore various parameters used for web analytics and their impact.

CO3. Explore the use of tools and techniques of web analytics.

CO4. Get experience on websites, web data insights and conversions.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓	✓	✓			
CO2	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓
CO3	✓			✓		✓	✓	✓			✓	✓	✓	✓	✓		✓	✓
CO4	✓	✓	✓		✓		✓			✓	✓	✓		✓	✓			✓

19ISEE97.2 – BUSINESS INTELLIGENCE

LEARNING OBJECTIVES

The student should be made to:

LO1. Be exposed with the basic rudiments of business intelligence system

LO2. understand the modelling aspects behind Business Intelligence

LO3. understand of the business intelligence life cycle and the techniques used in it

LO4. Be exposed with different data analysis tools and techniques

UNIT I

Business Intelligence: Effective and timely decisions – Data, information and knowledge – Role of mathematical models – Business intelligence architectures: Cycle of a business intelligence analysis – Enabling factors in business intelligence projects – Development of a business intelligence system – Ethics and business intelligence.

UNIT - II

Knowledge Delivery: The business intelligence user types, Standard reports, Interactive Analysis and Adhoc Querying, Parameterized Reports and Self-Service Reporting, dimensional analysis, Alerts/Notifications, Visualization: Charts, Graphs, Widgets, Scorecards and Dashboards, Geographic Visualization, Integrated Analytics, Considerations: Optimizing the Presentation for the Right Message.

UNIT - III

Efficiency: Efficiency measures – The CCR model: Definition of target objectives- Peer groups – Identification of good operating practices; cross efficiency analysis – virtual inputs and outputs – Other models. Pattern matching – cluster analysis, outlier analysis

UNIT - IV

Business Intelligence Applications: Marketing models – Logistic and Production models – Case studies.

UNIT - V

Future of Business Intelligence: Future of business intelligence – Emerging Technologies, Machine Learning, Predicting the Future, BI Search & Text Analytics – Advanced Visualization – Rich Report, Future beyond Technology.

TEXT BOOK:

1. Efraim Turban, Ramesh Sharda, Dursun Delen, "Decision Support and Business Intelligence Systems", 9th Edition, Pearson 2013.

REFERENCE BOOKS:

1. Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", Addison Wesley, 2003.

2. Carlo Vercellis, "Business Intelligence: Data Mining and Optimization for Decision Making", Wiley Publications, 2009.

3. David Loshin Morgan, Kaufman, "Business Intelligence: The Savvy Manager"s Guide", Second Edition, 2012.

4. Cindi Howson, "Successful Business Intelligence: Secrets to Making BI a Killer App", McGraw-Hill, 2007.

5. Ralph Kimball , Margy Ross , Warren Thornthwaite, Joy Mundy, Bob Becker, "The Data Warehouse Lifecycle Toolkit", Wiley Publication Inc.,2007.

COURSE OUTCOMES

CO1. Explain the fundamentals of business intelligence.

CO2. Link data mining with business intelligence.

CO3. Apply various modelling techniques.

CO4. Explain the data analysis and knowledge delivery stages.

CO5. Apply business intelligence methods to various situations.

CO6. Decide on appropriate technique.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔
CO2	✔	✔	✔	✔			✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔
CO3	✔		✔		✔			✔		✔	✔	✔		✔	✔	✔	✔	✔
CO4		✔			✔			✔		✔	✔			✔	✔		✔	✔
CO5	✔				✔			✔		✔	✔			✔	✔	✔	✔	✔
CO6		✔			✔		✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔

19ISEE97.3. ADVANCED COMPUTER NETWORKS

LEARNING OBJECTIVES

LO1. To study communication network protocols, different communication layer structure

LO2. To learn security mechanism for data communication

UNIT I - Introduction – Network Hardware – Software – Reference Models – OSI and TCP/IP models – Example networks: Internet, 3G Mobile phone networks, Wireless LANs –RFID and sensor networks - Physical layer – Theoretical basis for data communication - guided transmission media

UNIT-II -Wireless transmission - Communication Satellites – Digital modulation and multiplexing - Telephones network structure – local loop, trunks and multiplexing, switching. Data link layer: Design issues – error detection and correction.

UNIT-III-Elementary data link protocols - sliding window protocols – Example Data Link protocols – Packet over SONET, ADSL - Medium Access Layer – Channel Allocation Problem – Multiple Access Protocols.

UNIT-IV-Network layer - design issues - Routing algorithms - Congestion control algorithms – Quality of Service – Network layer of Internet- IP protocol – IP Address – Internet Control Protocol.

UNIT-V-Transport layer – transport service- Elements of transport protocol - Addressing, Establishing & Releasing a connection – Error control, flow control, multiplexing and crash recovery - Internet Transport Protocol – TCP - Network Security: Cryptography.

TEXT BOOK

1) A. S. Tanenbaum, 2011, Computer Networks, Fifth Edition, Pearson Education, Inc.

REFERENCE BOOKS

1) B. Forouzan, 1998, Introduction to Data Communications in Networking, Tata McGraw Hill, New Delhi.

2) F. Halsall, 1995, Data Communications, Computer Networks and Open Systems, Addison Wessley.

3) D. Bertsekas and R. Gallagher, 1992, Data Networks, Prentice hall of India, New Delhi.

4) Lamarca, 2002, Communication Networks, Tata McGraw Hill, New Delhi.

5) Teresa C.Piliouras, "Network Design Management and Technical Perspectives, Second Edition", Auerbach Publishers, 2015.

WEBSITE:

1) http://peasonhighered.com/tanenbaum

COURSE OUTCOMES

After the completion of this course students will be able to

CO1. To master the terminology and concepts of the OSI reference model and the TCP-IP reference model.

CO2. To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and wide area networks.

CO3. To be familiar with wireless networking concepts, and be familiar with contemporary issues in networking technologies.

CO4. To be familiar with network tools and network programming

CO5. OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1			✔		✔	✔			✔	✔		✔	✔		✔	✔	✔	✔
CO2				✔	✔	✔		✔		✔		✔	✔	✔	✔	✔	✔	
CO3	✔			✔		✔		✔		✔		✔	✔	✔		✔	✔	✔
CO4	✔		✔	✔	✔	✔		✔		✔	✔	✔	✔	✔		✔	✔	

INTER DEPARTMENT ELECTIVE COURSES OFFERED TO OTHER DEPARTMENTS

19CSE215.1 R PROGRAMMING

LEARNING OBJECTIVES

LO1. To provide an overview of a new language R used for data science and to introduce students to the R programming environment and related eco-system and thus provide them with an in demand skill-set, in both the research and business environments.

LO2. To demonstrate usage of as standard Programming Language.

LO3. To familiarize students with how various statistics like mean median etc. can be collected for data exploration in R and enable students to use R

UNIT-I:
Overview and Preliminaries
Basic Features of R - Design of R System-Limitations of R – Installation – R studio - Getting started with R interface - Entering Input - R Objects –   Attributes - Creating Vectors - Mixing Objects – Matrices – Lists – Factors - Data Frames.

UNIT-II:
Input, Output, Reading and Subsetting
Reading Data Files - Reading in Larger Datasets - Calculating Memory Requirements - File Connections - Reading Lines of a Text File - Reading From a URL Connection - Subsetting a Vector - Subsetting a Matrix - Subsetting Lists - Subsetting Nested Elements of a List - Extracting Multiple Elements of a List - Partial Matching. Date, Time and Managing Data Frames Operations on Dates and Times - Data Frames - dplyr Package - Installing the dplyr package – select – filter – arrange – rename – mutate - group_by - pipeline operater.

UNIT-III:
Control Structures and Loop Functions
if-else - for Loops - Nested for loops - while Loops - repeat Loops - next, break - Looping on the Command Line - lapply() - sapply() - split() - Splitting a Data Frame – tapply - apply() - Col/Row Sums and Means - mapply() - Vectorizing a Function.

UNIT-IV:
Statistics functions - Debugging, Profiling
Mean - Median - variance of the population - Estimated standard deviation - Standard scores – Sort – Rank – summary function - Debugging Tools in R - traceback() - debug() - recover() - Using system.time() - Timing Longer Expressions - The R Profiler - Using summaryRprof().

UNIT-V:
Simulation and Graphs
Generating Random Numbers - Setting random number seed - Simulating Linear Model - Loading and Processing Raw Data – Creating a Graph - density plots - dot plots, bar charts - line charts - pie charts - box plots - Scatter plots.

TEXT BOOK
1. Roger D. Peng, "R Programming for Data Science", Lean Publishing, (2015), ISBN: 9781365056826, 1365056821.

REFERENCE BOOKS
1. Winston Chang, "R Graphics Cookbook", O'Reilly Media, Inc., (2012), ISBN: 9781449363086.
2. Using R for Introductory Statistics by John Verzani, CRC Press, 2004.

COURSE OUTCOMES

CO1. Install and use R for simple programming tasks.
CO2. Extend the functionality of R by using add-on packages and extract data from files and other sources and perform various data manipulation tasks on them.
CO3. Code statistical functions in R and use R Graphics and Tables to visualize results of various statistical operations on data.
CO4. Apply the knowledge of R gained to data Analytics for real life applications. to conduct analytics on large real life datasets.

OUTCOME MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	✔	✔	✔	✔		✔	✔			✔		✔		✔			✔	✔
CO2			✔	✔						✔	✔	✔	✔	✔			✔	✔
CO3			✔	✔	✔	✔	✔			✔	✔	✔	✔	✔	✔	✔	✔	✔
CO4	✔	✔	✔	✔			✔	✔	✔	✔				✔			✔	✔

VALUE ADDED COURSES OFFERED BY OUR DEPARTMENT

CISA215 WEB DEVELOPMENT

LEARNING OBJECTIVES

LO1. To impart basic knowledge on web development

LO2. To impart basic scripting ideas and importance in client server architecture

LO3. To provide the basic knowledge about ASP, XML, CSS, PHP and MySql.

UNIT-I

HTML: History of the Internet and World Wide Web – HTTP, SMTP, POP3, MIME, Understanding roles of Web Browsers and Web Servers. Structure of HTML, Text formatting, Text styles, hyper link, image, and tables.

UNIT-II

Frames, Forms and CSS: Frames, Forms and controls, Embedding audio, video and animated files in HTML, CSS –Understanding CSS, Internal CSS, External CSS, Font Properties, Text Properties, Color and Background properties, Table properties, Numbering and List Properties.

UNIT-III

JavaScript: Data types and literals, operators, conditional statements, loop constructs, reserved words; core Objects: Array Object, Date Object; Functions: passing value to JavaScript functions, user defined functions, Handling old browsers , java script events, formatting cookie, retrieving cookie value from the cookie file, removing a cookie , animations using events.

UNIT-IV

ASP & XML: ASP – Working of ASP – Request and Response Objects – File System Objects – Session tracking and cookies – ADO – Access a Database from ASP – XML – Structure in Data – Name spaces – DTD – Vocabularies – Accessing Web servers – IIS – Apache web server.

UNIT-V

PHP & MySQL: Why PHP and MySQL - Server-Side Web Scripting - Getting Started with PHP - Adding PHP to HTML -Syntax and Variables - Control and Functions - Passing Information between Pages – Strings – Arrays and Array Functions – Numbers - MySQL Database Administration - PHP/MySQL Functions -Displaying Queries in Tables - Building Forms from Queries.

TEXT BOOKS

1. Kris Jamsa, konrad King and Andy Anderson, "HTML & Web Design Tips and Techniques", Tata McGraw-Hill, First Edition, 2002.

2. Powell T.A, HTML: Complete Reference, Tata McGraw-Hill, Fifth Edition, 2010.

REFERENCE BOOKS

1. Deitel & Deitel, Goldberg, Internet and World Wide Web – How to Program, Third Edition, Pearson Education Asia, 2005.

2. Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, and Michael K. Glass, "Beginning PHP5, Apache, and MySQL Web Development", First Edition, Wrox publications, 2005.

3. Rajkamal, "Web Technology", First Edition, Tata McGraw-Hill, 2001. Tim Converse, Joyce Park and Clark Morgan "PHP5 and MySQL Bible", Wiley Publishing, Inc. 2004.

COURSE OUTCOMES

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

CO1. Develop simple components in web pages.

CO2. Write code using scripting languages.

CO3. Can connect databases via web applications.

CO4. Design a web page.

CISA415 ADVANCED WEB DEVELOPMENT

LEARNING OBJECTIVES

LO1. To impart advanced ideas of web development

LO2. To impart scripting ideas and importance in web development.

LO3. To provide the basic knowledge about ASP.NET, ADO.NET and web services.

UNIT-I

OVERVIEW OF ASP.NET - The .NET framework – Learning the .NET languages : Data types – Declaring variables- Scope and Accessibility- Variable operations- Object Based manipulation- Conditional Structures- Loop Structures- Functions and Subroutines. Types, Objects and Namespaces : The Basics about Classes-Value types and Reference types- Advanced class programming- Understanding name spaces and assemblies. Setting Up ASP.NET and IIS .

UNIT–II

Developing ASP.NET Applications - ASP.NET Applications: ASP.NET applications–Code behind- The Global.asax application file- Understanding ASP.NET Classes-ASP.NET Configuration. Web Form fundamentals: A simple page applet- Improving the currency converter- HTML control classes- The page class- Accessing HTML server controls. Web controls: Web Control Classes – Auto PostBack and Web Control events- Accessing web controls. Using Visual Studio.NET: Starting a Visual Studio.NET Project- Web form Designer- Writing code- Visual studio.NET debugging. Validation and Rich Controls: Validation- A simple Validation example-

Understanding regular expressions- A validated customer form. State management - Tracing, Logging, and Error Handling.

UNIT–III

Working with Data **-** Overview of ADO.NET - ADO.NET and data management- Characteristics of ADO.NET-ADO.NET object model. ADO.NET data access : SQL basics– Select , Update, Insert, Delete statements- Accessing data- Creating a connection- Using a command with a DataReader - Accessing Disconnected data - Selecting multiple tables – Updating Disconnected data. Data binding: Single value Data Binding- Repeated value data binding- Data binding with data bases. Data list – Data grid – Repeater – Files, Streams and Email – Using XML

UNIT–IV

Web Services - Web services Architecture : Internet programming then and now- WSDL–SOAP- Communicating with a web service-Web service discovery and UDDI. Creating Web services : Web service basics- The StockQuote web service – Documenting the web service- Testing the web service- Web service Data types- ASP.NET intrinsic objects. Using web services: Consuming a web service- Using the proxy class- An example with TerraService.

UNIT–V

Advanced ASP.NET - Component Based Programming: Creating a simple component – Properties and state- Database components- Using COM components. Custom controls: User Controls- Deriving Custom controls.   Caching and Performance Tuning: Designing and scalability– Profiling- Catching- Output catching- Data catching. Implementing security: Determining security requirements- The ASP.NET security model- Forms authentication- Windows authentication.

TEXT BOOK

 Mathew Mac Donald, "ASP.NET Complete Reference", TMH 2005.

REFERENCE BOOKS

1. Crouch Matt J, "ASP.NET and VB.NET Web Programming",Addison Wesley 2002.

2. J.Liberty, D.Hurwitz, "Programming ASP.NET", Third Edition, O'REILLY, 2006.

COURSE OUTCOMES

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

  CO1. Overall view to develop web pages.

  CO2. Write advanced codes in scripting languages.

  CO3. Connect the different databases via web applications.

  CO4. Able to use components, remote calls and web services in distributed web applications.

❑