

**ANNAMALAI**



**UNIVERSITY**

**FACULTY OF SCIENCE**

**DIVISION OF COMPUTER AND INFORMATION SCIENCE**

**&**

**DIRECTORATE OF DISTANCE EDUCATION**

**MASTER OF COMPUTER APPLICATIONS**

**(2-Year)**

**Programme Code: SCIS23**

**Handbook**

**2020-2021**

**ANNAMALAI UNIVERSITY**  
**FACULTY OF SCIENCE**  
**DIVISION OF COMPUTER & INFORMATION SCIENCE**  
**REGULATIONS FOR THE TWO-YEAR POST GRADUATE PROGRAMMES UNDER**  
**CHOICE BASED CREDIT SYSTEM (CBCS) (2020-2021)**

These Regulations are common to all the students admitted to the Two-Year Master's Programmes in the Faculties of Arts, Science, Indian Languages, Education, Marine Sciences, and Fine Arts from the academic year 2020-2021 onwards.

## **1. Definitions and Nomenclature**

**University** refers to Annamalai University.

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

**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.

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

**Syllabus** is an academic document that contains the 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.

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

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

**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.

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

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

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

**Credit** refers to the quantum of course work in terms of 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.

**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.

**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.

**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.

**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.

**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.

**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

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

**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, RA, and W.

## 2. Programme Offered and Eligibility Criteria

The Department of Computer and Information Science offers a **Two Year Master of Computer Applications Programme**. The eligibility criteria and admission procedure are followed as per the guidelines of Tamil Nadu Common Entrance Test (TANCET).

Reservation of seats for candidates belonging to ST/SCA/SC/MBC/DNC/BC/BC (Muslim) communities and Differently-abled will be made as per the rules and regulations of the Government of Tamil Nadu. In the case of SC/ST and Differently - abled candidates, a pass is the minimum qualification for all the above Programmes.

## 3. Programme Duration

The Two Year Master's Programmes consist of two academic years (Four Semesters). Each academic year is divided into two semesters, the first being from July to November and the second from December to April. Each semester will have 90 working days (18 weeks).

#### **4. Programme Structure**

The Two Year Master's Programme consists of Core Courses, Elective Courses (Departmental & Interdepartmental), and Project.

##### **Core courses**

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

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

##### **Elective courses**

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

**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.

Students shall take a combination of both DEs and IDEs.

##### **Experiential Learning**

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

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

Experiential learning is categorized as Core.

##### **Project**

Each student shall undertake a Project in the final semester. The Head of the Department shall assign a Research Supervisor to the student.

The Research Supervisor shall assign a topic for research and monitor the progress of the student periodically.

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

##### **Value added Courses (VACs)**

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

These courses impart employable and life skills. VACs are listed in the University website and in the Handbook on Interdepartmental Electives and VACs.

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

Classes for a VAC are conducted beyond the regular class hours and preferably in the II and III Semesters.

### **Online Courses**

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.

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

### **Credit Distribution**

The credit distribution is organized as follows:

<b>Semester I to IV</b>	<b>Credits</b>
Core Courses	58
Department Elective Courses	06
Inter Departmental Elective Courses	06
Dissertation and Viva Voce/In plant training	22
<b>Total Credits Semester I to IV (Minimum requirement for the award of Degree)</b>	<b>92</b>

### **Credit Hours**

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.

## **5 Attendance**

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

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.

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

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.

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.

Each student shall have a minimum of 75% attendance in all 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.

Relaxation of attendance requirement up to 10% may be granted for valid reasons such as illness, representing the University in extracurricular activities and participation in NCC/NSS/YRC/RRC.

## **6 Mentor-Mentee System**

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 certain number of students to a member of the faculty who shall function as a Mentor throughout their period of study.

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

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.

## **7 Examinations**

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).

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

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.

## **Continuous Internal Assessment Tests**

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 to the course. This requires an element of openness.

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

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

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

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

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.

## **End Semester Examinations (ESE)**

The ESE for the first/third semester will be conducted in November and for the second/fourth semester in May.

A candidate who does not pass the examination in any course(s) of the first, second and third semesters will be permitted to reappear in such course(s) that will be held in April and November in the subsequent semester/year.

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

## **8 Evaluation**

### **Marks Distribution**

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.

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

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

### **Assessment of CIA Tests**

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

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

	Marks
Test-I & Test-II	15
Seminar	05
Assignment	05
Total	25

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

### **Assessment of End-Semester Examinations**

Evaluation for the ESE is done by both External and Internal examiners (Double Evaluation).

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

### **Assessment of Project/Dissertation**

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

The Project Work / Dissertation shall carry a maximum of 200 marks.

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

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

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

The marks shall be distributed as follows:

<b>Continuous Internal Assessment (50 Marks)</b>		<b>End Semester Examination (150 Marks)</b>	
Review-I 20	Review-II: 30	Project / Dissertation Evaluation	Viva-voce
		100	50



### **Assessment of Value-added Courses**

Assessment of VACs shall be internal. Two CIA Tests shall be conducted during the semester by the Department(s) offering VAC.

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

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

### **Passing Minimum**

A minimum of 50% marks in each course is prescribed for a pass.

While a minimum of 40% marks in each course is essential for the End Semester Examinations, there is no passing minimum for CIA Tests.

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

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

## **9. 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.

## **10 Marks and Grading**

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

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.

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 in any semester;

$G_i$  is the Grade Point obtained by the student for the

$n$  Course and is the number of Courses passed in that semester.

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

$$CGPA = \frac{\sum_{i=1}^m \sum_{j=1}^n c_j G_{ij}}{\sum_{i=1}^m \sum_{j=1}^n c_j}$$

where,  $c_i$  is the Credit earned for the Course in any semester;  
 $G_i$  is the Grade Point obtained by the student for the  
 $n$  Course and is the number of Courses passed in that  
semester.  
 $m$  is the number of semesters

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

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

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*).

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

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

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

## **Course-Wise Letter Grades**

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

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

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

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 candidate has appeared for clearance of the arrears.

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.

### **11. Provision for Withdrawal from the End Semester Examination**

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

A candidate is permitted to withdraw from appearing for the ESE for valid reasons. However, such permission is granted only once during the entire duration of the programme.

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. Withdrawal is not granted for arrear examinations of courses in previous semesters and for the final semester examinations.

Candidates who have been granted permission to withdraw from the examination shall reappear for the courses in the subsequent semester/year.

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

### **12 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 library or computer resources, stealing other students' notes/assignments, and 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 sensitized on issues of academic integrity and ethics.

### **13. 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.

- 14.** *Notwithstanding anything contained in the above pages as Rules and Regulations governing the Two Year 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**  
**DIRECTORATE OF DISTANCE EDUCATION**  
**M.C.A. (Master of Computer Applications)**  
**(Two Years - 4 Semesters)**

**REGULATIONS**  
**(2020-2021)**

**1. Eligibility for admission to the Programme**

- i. Candidates seeking admission to the first year of the two year Master of Computer Applications (MCA) Programme should have a three-year Bachelor's Degree after completion of +2 or three year Bachelor's Degree after completion of three year Diploma from any recognized University.
- ii. Candidates seeking admission to first year of MCA Programme and who have not studied Mathematics at +2 or at Diploma level should undergo a bridge programme for a week.

**Lateral Entry to Second year**

The Candidates seeking admission to II year of the MCA programme have to satisfy any one of the following conditions.

- i. The Candidates who have successfully completed first year of MCA in any recognized University (75% of the Syllabus equivalent to this University).
- ii. The Candidates who have successfully completed M.Sc (IT) / M.Sc (CS) / M.Sc (Software Engineering) from any recognized University.
- iii. The candidates who have successfully completed MBA (Systems /E-Commerce/E-Business) with under graduation in BCA/ B.Sc (Computer Science / Information Technology / Visual Communication / Computer Technology)
- iv. The candidate who have successfully completed B.E. or B.Tech in CSE/IT from any recognized University.

**2. DURATION OF THE PROGRAMME**

The minimum duration of the Programme for the degree of MASTER OF COMPUTER APPLICATIONS is 2 years (4 semesters).

**3. ELIGIBILITY FOR THE AWARD OF DEGREE**

No candidate shall be eligible for the award of the Degree of MASTER OF COMPUTER APPLICATIONS unless he/she has undergone the Programme of study prescribed by University and has passed the prescribed examination for the Degree.

#### 4. MEDIUM OF STUDY

The medium of instruction and examination for the above Programme will be English only.

#### 5. PERSONAL CONTACT PROGRAMME

Personal Contact Programme will be held each semester in the Annamalai University Computer Training Centres (AUCTC) for students enrolling for this Programme. The candidate will be permitted to appear for the examination only if he/ she has attended 90% of the theory and practical classes in that Semester.

#### 6. PASSING RULES AND CLASSIFICATION OF SUCCESSFUL CANDIDATES

A candidate must secure not less than 50% marks in each Course for a pass and will be classified as follows, based on the aggregate of all the semesters of study.

AGGREGATE		CLASSIFICATION
a)	75% and above	First class with Distinction
b)	60% and above but below 75%	First class
c)	50% and above but below 60%	Second class

A candidate will be declared to have passed the examination in First class with distinction if he/she has passed all the papers in the first appearance and he/she has an aggregate of not less than 75% of marks.

The students have to do any computer oriented project work under a qualified guide in any computer related industry. The approval of the Director, DDE for the project work and project guide has to be obtained before starting the project. The project report should be submitted on or before the last date prescribed by the Director, DDE. The project work viva-voce will be conducted after submission of project work.

#### 7. FAILED CANDIDATES

A candidate, who failed in any paper, in the first Semester, will be permitted to proceed to the next Semester



**ANNAMALAI UNIVERSITY**

**Faculty of Science**

**Division of Computer and Information Science**

**Master of Computer Applications Programme**

**Programme Code: SCIS23**

**Programme Structure**

**(For Students Admitted from the Academic year 2020 – 2021)**

Course Code	Course Title	Hours per week		C	MARKS		
		L	P		CIA	ESE	TOTAL
<b>FIRST SEMESTER</b>							
20MCAC101	Core 1: Object-Oriented Programming using C++	4	-	4	25	75	100
20MCAC102	Core 2: Advanced Data Structures and algorithms	4	-	4	25	75	100
20MCAC103	Core 3: Relational Database Management System	4	-	4	25	75	100
20MCAC104	Core 4: Operating Systems	4	-	4	25	75	100
19AENGX01	Interdepartmental Elective-I Soft Skills	3	-	3	25	75	100
20MCAP105	Core 5: Programming Lab - I (Object-Oriented Programming)	-	4	2	40	60	100
20MCAP106	Core 6: Programming Lab-II (RDBMS)	-	4	2	40	60	100
	<b>Total Credits</b>			<b>23</b>			
<b>SECOND SEMESTER</b>							
20MCAC201	Core 7: JAVA Programming	4	-	4	25	75	100
20MCAC202	Core 8: Computer Networks	4	-	4	25	75	100
20MCAC203	Core 9: Digital Image Processing	4	-	4	25	75	100
20MCAE204	Department Elective-I	3	-	3	25	75	100
19SMATX04	Interdepartmental Elective-II Resource Management Techniques	3	-	3	25	75	100
20MCAP205	Core 10: Programming Lab- III (Java Programming)	-	4	2	40	60	100

20MCAP206	Core 11: Programming Lab- IV (Image Processing Lab)	-	4	2	40	60	100
	<b>Total Credits</b>			<b>22</b>			
<b>THIRD SEMESTER</b>							
20MCAC301	Core 12: Web Technology	4	-	4	25	75	100
20MCAC302	Core 13: Mobile Computing	4	-	4	25	75	100
20MCAC303	Core 14: Big Data Analytics	5	-	5	25	75	100
20MCAC304	Core 15: Python and R Programming	5	-	5	25	75	100
20MCAE305	Department Elective – II	3	-	3	25	75	100
20MCAP306	Core 16: Programming Lab – V ( Mobile Application Development)	-	4	2	40	60	100
20MCAP307	Core 17: Programming Lab–VI (Data Analytics: Python and R)	-	4	2	40	60	100
	<b>Total Credits</b>			<b>25</b>			
<b>FOURTH SEMESTER</b>							
20MCAD401	Dissertation and Viva Voce / In plant training	-	*	<b>22</b>	50	150	200
	<b>Semester 1- 4 Total Credits</b>			<b>92</b>			
	<b>Value Added Courses</b>						

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

\* Student is required to undergo 44 hours per week of practical work in software development at any Software Industry/Research Establishment of his/her choice.

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.



## ELECTIVE COURSES

### Department Electives

S.No	Course Code	Course Title	Hours/Week		C	Marks		
			L	P		CIA	ESE	Total
1.	20MCAE204.1	Compiler Design	3	0	3	25	75	100
2.	20MCAE204.2	Data Mining Techniques	3	0	3	25	75	100
3.	20MCAE204.3	Artificial Intelligence	3	0	3	25	75	100
4.	20MCAE204.4	E-Commerce	3	0	3	25	75	100
5.	20MCAE305.1	Network Security	3	0	3	25	75	100
6.	20MCAE305.2	Internet of Things	3	0	3	25	75	100
7.	20MCAE305.3	Machine Learning	3	0	3	25	75	100
8.	20MCAE305.4	Open Source Technologies	3	0	3	25	75	100

**Inter- Departmental Elective Course (IDE) (Offered by other departments)**

S.No	Course Code	Course Title	Department	L	P	Credits	Marks		
				Hrs				CIA	ESE
1.	19AENGX01	Soft Skills	English	3	0	3	25	75	100
2.	19SMATX01	Discrete Mathematics	Mathematics	3	0	3	25	75	100
3.	19SMATX02	Numerical Methods		3	0	3	25	75	100
4.	19SMATX03	Statistical Computing		3	0	3	25	75	100
5.	19SMATX04	Resource Management Techniques		3	0	3	25	75	100
6.	19SMATX05	Differential Equations		3	0	3	25	75	100
7.	19SSTAX01	Statistical Methods		Statistics	3	0	3	25	75
8.	19SSTAX02	Mathematical Statistics	3		0	3	25	75	100
9.	19SSTAX03	Bio-Statistics	3		0	3	25	75	100
10.	19SPHYX01	Classical Mechanics and Special Theory of Relativity	Physics	3	0	3	25	75	100
11.	19SPHYX02	Physics of the Earth		3	0	3	25	75	100
12.	19SPHYX03	Bio-Medical Instrumentation		3	0	3	25	75	100
13.	19SCHEX01	Applied Chemistry	Chemistry	3	0	3	25	75	100
14.	19SCHEX02	Basic Chemistry		3	0	3	25	75	100
15.	19SCHEX03	Instrumental Methods of Chemical Analysis		3	0	3	25	75	100
16.	19SBOTX01	Plant Tissue Culture	Botany	3	0	3	25	75	100
17.	19SBOTX02	Plant Science – I		3	0	3	25	75	100
18.	19SBOTX03	Gardening and Horticulture		3	0	3	25	75	100
19.	19SBOTX04	Plant Science – II		3	0	3	25	75	100
20.	19SZOOX01	Animal Culture Techniques	Zoology	3	0	3	25	75	100
21.	19SZOOX02	Environmental Science		3	0	3	25	75	100
22.	19SGEOX01	Environmental Geosciences	Earth Science	3	0	3	25	75	100
23.	19SGEOX02	Applied Geophysics		3	0	3	25	75	100
24.	19SBIOX01	Basic Biochemistry	Biochemistry & Biotechnology	3	0	3	25	75	100
25.	19SBIOX02	Basic Biotechnology		3	0	3	25	75	100

26.	19SBIOX03	Biochemical Techniques		3	0	3	25	75	100
27.	19SBIOX04	Immunology		3	0	3	25	75	100
28.	19SMIBX01	Microbiology	<b>Microbiology</b>	3	0	3	25	75	100
29.	19SMSSX01	Fundamentals of Sports Sciences	<b>Sports Sciences</b>	3	0	3	25	75	100

**Inter- Departmental Elective Course (IDE) (Offered to other departments in Third Semester)**

S. No.	Course Code	Course Title	Hours/week		C	Marks		
			L	P		CIA	ESE	Total
1.	19SCISX01	R Programming	3	0	3	25	75	100

**VALUE ADDED COURSES**

COURSE CODE	COURSE TITLE	L	P	C	Marks		
		Hours/Week			CIA	ESE	Total
SCISVAC01	Web Development	3		0	25	75	100
SCISVAC02	Fundamentals of Computing	3		0	25	75	100
SCISVAC03	Advanced Web Development	3		0	25	75	100
SCISVAC04	Internet and its Applications	3		0	25	75	100

L- Lecture; P-Practical; C- Credit

## PROGRAMME OUTCOMES (PO)

<b>SI.No</b>	<b>PO</b>
PO1	An ability to apply knowledge of mathematics, computer science and management in practice.
PO2	An ability to identify, critically analyze, formulate and develop computer applications.
PO3	An ability to select modern computing tools and techniques and use them with dexterity.
PO4	An ability to design a computing system to meet desired needs within realistic constraints such as safety, security and applicability.
PO5	An ability to devise and conduct experiments, interpret data and provide well informed conclusions.
PO6	An ability to understand the impact of system solutions in a contemporary, global, economical, environmental, and societal context for sustainable development
PO7	An ability to function professionally with ethical responsibility as an individual as well as in multidisciplinary teams with positive attitude
PO8	An ability to effectiveness in communicating with a wide range of audiences

## PROGRAMME SPECIFIC OUTCOMES (PSO)

<b>SI.No</b>	<b>PSO</b>
<b>PSO1</b>	To prepare graduates who will productive careers in software industry, corporate sector, Govt. organizations and academia by providing skill based environment for teaching and research in the core and emerging areas of the discipline.
<b>PSO2</b>	To prepare graduates who will contribute to society as broadly educated, expressive, ethical and responsible citizens with proven expertise.
<b>PSO3</b>	To prepare graduates who will achieve peer-recognition; as an individual or in a team; through demonstration of good analytical, design and implementation skills.
<b>PSO4</b>	Develop and deploy software systems with assured quality and efficiency.
<b>PSO5</b>	To prepare graduates who will thrive to pursue life-long learning to fulfill their goals.

## **20MCAC101: OBJECT-ORIENTED PROGRAMMING USING C++**

### **Learning Objectives:**

- To explain the advantages of object oriented programming over procedure oriented programming.
- Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism.
- To learn how to implement constructors, function, pointers and class member functions.
- Explain array handling, function overloading, operator overloading and virtual functions.
- Helps in implementing some important features of C++ including templates, utilizing the I/O classes in C++ and exception handling.

### **UNIT-I**

Introduction to OOP: Overview of C++ - classes - structures - union - friend function- friend class - inline function - constructors - static members - scope resolution operator - passing objects to functions - function returning objects.

### **UNIT-II**

Arrays - pointers - this pointer - references - dynamic memory allocation - functions overloading - default arguments - overloading constructors - pointers to functions

### **UNIT-III**

Operator overloading - member operator function - friend operator function - type conversion - inheritance - types of inheritance - virtual base class - polymorphism - virtual function.

### **UNIT-IV**

Class templates and generic classes - function templates and generic functions - overloading function templates - power of templates - exception handling - derived class exception - exception handling functions

### **UNIT-V**

Streams - formatted I/O with its class functions and manipulators - creating own manipulators - file I/O - conversion functions - standard template library.

### **Text Book:**

1. Balagurusamy E, "Object Oriented Programming with C++", 3/E, TMG, 2006.

### **References:**

1. Balagurusamy E, "Object Oriented Programming with C++", 7/E, TMG, 2017
2. Kavita Pabreja, Neetu Narwal, Object Oriented Programming in C++. Dream tech Press, 2019.

3. Hubbard, "Programming with C++", 2/e, Schaum Outline Series, TMH, 2006.
4. Bjarne Stroustrup, "The C++ Programming Language", Addison Wesley Publications, Second Edition, 1991.
5. Sarang Proonachandra, "Object Oriented Programming with C++", HI, 2006.
6. Jagadev A K, Rath A M, and Dehuri S, "Object Oriented Programming Using C++", PHI, 2007.

**Course Outcomes:**

- 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.
- CO5: Develop good quality software using object-oriented techniques.

**Outcome Mapping**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3		3		3				3			
CO2	3		3		3				3	3	3	2	2
CO3	3						2	2		3			1
CO4	3	3			3				3	2	2	1	
CO5				2		2	1		3		2		

**20MCAC102: ADVANCED DATA STRUCTURES AND ALGORITHMS**

**Learning Objectives:**

- To teach efficient storage mechanisms of data for an easy access.
- To design and implementation of various basic and advanced data structures.
- To introduce various techniques for representation of the data in the real world.
- To develop application using data structures.
- To teach the concept of protection and management of data.

## **Unit-I**

**The Role of algorithm in computing** - Insertion sort - Analyzing algorithm - Designing algorithm - Divide and Conquer - The maximum-sub array problem - Strassen's algorithm for matrix multiplication - The substitution method for solving recurrences - The recursion tree method for solving recurrences - Proof of the master theorem.

## **Unit-II**

**Sorting and order statistics** - Heap sort - Maintaining the heap priority - Building a heap - The 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 - Counting sort - Radix sort - Bucket sort - Medians and order statistics - Minimum and Maximum - Selection in expected linear time - Selection in worst case linear time.

## **Unit-III**

**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-IV**

**Advanced Design and Analysis Techniques** - Dynamic Programming - Rod cutting - Matrix chain multiplication - Elements of dynamic programming - Longest common subsequence - Optimal binary search trees - Greedy algorithms - An activity-selection algorithm - Elements of greedy strategy - Huffman codes - Matroids and Greedy method - A task scheduling problem as matroid.

## **Unit-V**

**Advanced Data Structures** - B- trees - Definition - Basic Operations on B-trees - Deleting a key from B-tree - Fibonacci heaps - Structure - Mergeable heap operations - Decreasing a key and deleting a node - Bounding the maximum degree - Van Emde Boas Trees - Preliminaries - Recursive structures - Data structure for disjoint sets - Disjoint set operations - Linked list representation of disjoint sets.

## **Text Book:**

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, Introduction to Algorithms, Third Edition, The MIT press, 2009.

## References:

1. Anany Levitin "Introduction to the Design and Analysis of Algorithms" Pearson Education, 2015
2. Brian W. Kernighan, Dennis Ritchie, "The C Programming Language", Second Edition, Pearson Education, 2015.
3. Timothy Budd, An Introduction to Object Oriented Programming, Pearson Education, Second Edition, 1996.
4. Jean Paul Tremblay and Paul G. Sorenson, An Introduction to Data Structures with Applications, Tata McGraw Hill, Second Edition, 2010.
5. Sahini, Data Structures, Algorithms and Applications in C++, Tata McGrawHill, 1998.

## Course Outcomes:

CO1: Student will be able to choose appropriate data structure as applied to specified problem definition.

CO2: Student will be able to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.

CO3: Students will be able to apply concepts learned in various domains like DBMS, compiler construction etc.

CO4: Students will be able to use linear data structures.

CO5: Students will be able to use non-linear data structures.

## Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3		3		3			3		3		3
CO2			3		3			2		3	3		2
CO3	3			3			2						1
CO4	3	3			3			2	2	2	2	1	
CO5		3	3			2	2				2	1	

## 20MCAC103: RELATIONAL DATABASE MANAGEMENT SYSTEM

### Learning Objectives:

- To understand the different issues involved in the design and implementation of a database system.
- To study the physical and logical database designs, database modeling, relational, hierarchical, and network models



- To understand and use data manipulation language to query, update, and manage a database.
- To develop an understanding of essential DBMS concepts such as: database security, integrity, and concurrency.
- To design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

### **Unit-I**

**Introduction** - Database System Applications – Purpose of Database Systems – View of Data – Database Languages – Relational Databases – Database design – Data storage and Querying – Transaction Management – Database Architecture – Data Mining and Information Retrieval – Database Users and Administrators – History of Database Systems.

### **Unit-II**

**Relational Databases** - Structure of the relational databases - Database schema - Keys - Schema diagrams - Relational query languages - Relational operations -Overview of SQL query language - SQL data definition - Basic structure of SQL queries - Additional basic operations - Set operations - Null values - Aggregate functions - Nested sub queries - Modification of the database.

### **Unit-III**

**Relational Database design** - Features of Good Relational Designs - Atomic Domains and First Normal Form - Decomposition Using Functional Dependencies - Functional-Dependency Theory - Algorithms for Decomposition - Decomposition Using Multivalued Dependencies - More Normal Forms - Database-Design Process.

### **Unit-IV**

**Indexing and Hashing** - Basic Concepts - Ordered Indices - B+-Tree Index Files - B+-Tree Extensions - Multiple-Key Access - Static Hashing - Dynamic Hashing - Comparison of Ordered Indexing and Hashing - Bitmap Indices - Index Definition in SQL- Measures of Query Cost - Selection Operation - Sorting - Join Operation - Other Operations - Evaluation of Expressions.

### **Unit-V**

**Distributed Databases** - Introduction - Homogeneous and Heterogeneous Databases - Distributed Data Storage - Distributed Transactions - Commit Protocols - Concurrency Control in Distributed Databases - Availability - Distributed Query Processing - Heterogeneous Distributed Databases - Cloud-Based Databases - Directory Systems.

**Text Book:**

1. Abraham Silberschatz, Henry F. Korth and S. Sudharshan, Database System Concepts, Sixth Edition, Tata McGraw Hill, 2002.

**References:**

1. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Seventh Edition, Pearson Education, 2017.
2. R. Elmasri, S.B. Navathe, "Fundamentals of Database Systems", Seventh Edition, Pearson Education/Addison Wesley, 2017.
3. Raghu Ramakrishnan, —Database Management SystemsII, Fourth Edition, McGrawHill College Publications, 2015.
4. Bipin C. Desai, An Introduction to Database Systems, Galgotia Publications, 2002.
5. Raghu Ramakrishnan and Johannes Gehrke, Database Management Systems, Third Edition, Tata McGraw Hill Higher Education, 2003.
6. Elmasri and Navathe, Fundamentals of Database Systems, Sixth Edition, Pearson Education Asia, 2010.

**Course Outcomes:**

CO1: Define program-data independence, data models for database systems, database schema and database instances.

CO2: Recall Relational Algebra concepts, and use it to translate queries to Relational statements and vice versa.

CO3: Identify Structure Query Language statements used in creation and manipulation of Database Identify the methodology of conceptual modeling through Entity Relationship model.

CO4: Develop an understanding of the differences between OODBMS, ORDBMS and RDBMS and the practical implications of each approach.

CO5: Analyze and design a real database application.

**Outcome Mapping**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3			3		3		3		3		3	
CO2		3	3		3		2		3		1	2	2
CO3	3			3			2			3			1
CO4	2		2		2				3	3	3	1	
CO5		3	3			2		1		2	3		2

## 20MCAC104: Operating Systems

### Learning objectives:

- To learn the fundamentals of Operating Systems.
- To learn the mechanisms of OS to handle processes and threads and their communication.
- To learn the mechanisms involved in the memory management.
- To gain knowledge on Distributed OS concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols.
- To know the components and Management aspects of concurrency management.

### Unit-I

Introduction – Operating System Structure - Operating System Operations – Protection and Security – Kernel Data Structures - Computing Environments - Open Source Operating Systems - Operating System Services – User operating system Interface – System calls - Types of system calls – System programs – Operating System design and Implementation – Operating System: debugging - Operating System: Generation – System Boot.

### Unit-II

Process Management – Process Concepts – Process Scheduling – Operation on Processes – Interprocess Communication – Threads – Multicore Programming - Multithreading Models – Thread Libraries - Implicit Threading - Threading Issues – Process Synchronization – The Critical Section Problem – Peterson’s Solution – CPU Scheduling – Scheduling Criteria – Scheduling Algorithms - Deadlocks – System Model – Deadlock Characterization – Methods for handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock.

### Unit-III

Memory Management – Background – Swapping – Contiguous Memory Allocation – Paging – Structure of the Page Table – Virtual Memory Background - Demand Paging – Copy-on-Write – Page Replacement – Allocation of Frames – Thrashing – Memory- Mapped Files – Allocating Kernel Memory – Other Considerations – Operating System Examples.

### Unit-IV

Storage Management – Overview of Mass Storage Structure – Disk Structure – Disk Attachment – Disk Scheduling – Disk Management – Swap Space Management- RAID Structure – Stable Storage Implementation – Tertiary Storage Structure – I/O Hardware – Application of I/O Interface – Kernel I/O Subsystem - File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection – File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free Space Management – Efficiency and Performance.

## Unit-V

Case study: Windows 7 - History - Design Principles - System Components - Terminal Services and Fast User Switching - File System - Networking - Programmer Interface. Android - Overview of Android Operating System - The Android ecosystem – Android Architecture - Android Versioning.

### Text Book:

1. Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, Operating Systems Concepts, John Wiley & Sons, Inc., Ninth Edition, 2004.

### References:

1. Abraham Silberschatz, Peter Galvin and Gagne, "Operating System Concepts", 10th Edition, Addison Wesley, 2018.
2. Andrew S. Tanenbaum, Herbert Boston, "Modern Operating Systems".4th edition, Pearson, 2015.
3. Ann McHoes, Ida M. Flynn, "Understanding Operating Systems", 7th Edition, Cengage Learning, 2013.
4. Andrew S. Tanenbaum, Modern Operating Systems, Prentice Hall of India, Third Edition, 2007.

Deitel ,H. M., Operating Systems, Pearson Education, Third Edition, 2004.

### Course outcomes:

- CO1: Analyze the structure of OS and basic architectural components involved in 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 time sharing and distributed systems.
- CO4: Understand the mutual exclusion, deadlock detection and agreement protocols of Distributed OS.
- CO5: Interpret the mechanisms adopted for file sharing in distributed applications.

### Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3			3		3			3			2	
CO2		3	3		3					3	3	2	2
CO3		3					1	1		3			2
CO4	3			2	2				3	3	3	2	
CO5	3	3	2		2			1	3		3		

## 20MCAP105 - PROGRAMMING LAB - I (Object-Oriented Programming using C++)

### Learning Objectives:

- At the end of the course students should be familiar with the main features of the C++ language.
- Be able to write a C++ program to solve a well specified problem.
- Understand a C++ program written by someone else.
- Be able to debug and test C++ programs;
- Understand how to read C++ doc library documentation and reuse library code.

### Lab Exercises

1. Programs on concept of classes and objects.
2. Programs using inheritance.
3. Programs using static polymorphism.
4. Programs on dynamic polymorphism.
5. Programs on operator overloading.
6. Programs on dynamic memory management using new, delete operators.
7. Programs on copy constructor and usage of assignment operator.
8. Programs on exception handling.
9. Programs on generic programming using template function & template class.
10. Programs on file handling.

### Course outcomes:

CO1: Students will be able to apply the computer programming techniques to solve practical problems.

CO2: Students will be able to understand the concepts and implementation of constructors and destructors.

CO3: Students will be able to develop software applications using object oriented programming language in C++

CO4: Student can be able to understand and use the basic programming constructs of C++

CO5: Students are able to learn C++ data types, memory allocation/de-allocations, functions and pointers.

### Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3		3		3		3	3	3			
CO2	3		3		3			3		3	3	2	2
CO3	3	3					3		3	3			2
CO4	2			2	2			1				1	1
CO5	2				2	2				3	3		

## 20MCAP106- Programming Lab - II (RDBMS)

### Learning Objectives:

- Keep abreast of current developments to continue their own professional development.
- To engage themselves in lifelong learning of Database management systems theories and technologies this enables them to pursue higher studies.
- To interact professionally with colleagues or clients located abroad and the ability to overcome challenges that arises from geographic distance, cultural differences, and multiple languages in the context of computing.
- Develop team spirit, effective work habits, and professional attitude in written and oral forms, towards the development of database applications.

### List of Exercises

#### Cycle – I (Simple SQL)

1. Employee Management System Using SQL Commands.
2. Students Management System Using SQL Commands.
3. Bank Management System Using SQL Commands.
4. Index Creation.
5. Implementation of SQL queries for route database.
6. Implementation of SQL queries for route database - part I.
7. Implementation of SQL queries for route database - Part II.
8. Creating view using SQL commands.
9. Creation of Table Partition.
10. Default trigger procedure and drop command
11. Report creation.

#### Cycle – II (PL/SQL)

12. Factorial of number
13. Checking whether a number is prime or not
14. Fibonacci series
15. Reversing the string
16. Swapping of two numbers
17. Odd or even number
18. Duplication of records

### Course Outcomes

CO1: In drawing the ER, EER, and UML Diagrams.

CO2: In analyzing the business requirements and producing a viable model for the implementation of the database.

CO3: In converting the entity-relationship diagrams into relational tables.

CO4: To develop appropriate Databases to a given problem that integrates ethical, social, legal, and economic concerns.

## Outcome Mapping

	PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5
<b>CO1</b>	3	3		3		3		3		3		3	
<b>CO2</b>	3		3		3				3			2	2
<b>CO3</b>			3				2			2			1
<b>CO4</b>	3	2			2			2			3	1	

## SECOND SEMSTER

### 20MCAC201: JAVA PROGRAMMING

#### Learning Objectives:

- To understand fundamentals of concepts of java programming.
- To understand the Applet, string handling and AWT concepts.
- Gain knowledge about Swing and JDBC.
- Be familiar with understand Java bean and EJB.
- To gain the Knowledge of Servlet and JSP.

#### Unit-I

**CoreJava:** Introduction – Operators – Data types – Variables – Arrays - Control Statements - Methods & Classes- Inheritance-package and interface- Exception handling-Multithread programming

#### Unit-II

I/O-Java Applet-String handling-Networking- Event Handling- Introduction to AWT- AWT controls- Layout managers-Menus-Images-Graphics.

#### Unit-III

**Java swing:** Creating a swing Applet and Application-Programming using Panes- Pluggable Look and feel-Labels- Text fields-Buttons- Toggle Buttons- Checkboxes- Radio Buttons-View Ports-Scroll Panes-Scroll Bars-List-Combo Box-Progress bars- Menus and Toolbars-Layered Panes-Tabbed Panes- Split Panes-Layouts-Windows- Dialog Boxes- Inner frame.

**JDBC:** The connectivity Model-JDBC/ODBC Bridge-Java.sql package-connectivity to remote database – navigating through multiple rows retrieved from a database.

#### Unit-IV

**JavaBeans:** Application Builder tools-The bean developer kit (BDK)-JAR files- Introduction-Developing a simple bean-using bound properties-The java Beans API- Session Beans-Entity Beans-Introduction to Enterprise Java Beans(EJB)-Introduction to RMI(Remote Method Invocation):A simple client-server application using RMI.

## Unit-V

**Java Servlets:** Servlet basic-Servlet API basic-Lifecycle of a Servlet-Running Servlet- DebuggingServlet-Thread-safeServlet-HTTPRedirects-Cookies-Introduction to Java server pages (JSP).

### Text Books:

1. Herbert Schidt, “The Complete Reference JAVA2”, TataMc- Graw Hill 5<sup>th</sup> Edition 2002.

### References:

1. BalagurusamyE.,“ProgrammingwithAPerimer3eJava”, TataMc-Graw Hill,2007.
2. DustinR.Callway,“InsideServlets”,AddisonWesley, 1999.
3. MarkWatka“UsingJava2EnterpriseEdition”,Que,1<sup>st</sup>edition, 2001.
4. SetvenHolzner,“Java2 BlackBook”, CoriolisGroupBooks, 2001.
5. NPTEL: [https://onlinecourses.nptel.ac.in/noc19\\_cs07/course](https://onlinecourses.nptel.ac.in/noc19_cs07/course)

### Course Outcomes:

CO1: To learn the structure and model of the Java programming language.

CO2: To gain the knowledge of java programming statement.

CO3: Develop software in the Java programming language.

CO4: To gain the knowledge of Java servlets.

CO5: Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements.

### Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3			3		3		3		3		3	
CO2			3		3		3		3				3
CO3	3	3			3		3	3		3			2
CO4	3	2			2		1		2			2	
CO5		2	2			2		1		2	2		1



## 20MCAC202: COMPUTER NETWORKS

### Learning Objectives:

- Study the basic taxonomy and terminology of the computer networking and enumerate the layers of OSI model and TCP/IP model.
- Acquire knowledge of Application layer and Presentation layer paradigms and protocols.
- Study Session layer design issues, Transport layer services, and protocols.
- Gain core knowledge of Network layer routing protocols and IP addressing. 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:

1. James F. Kurose, Keith W. Ross, “Computer Networking: A Top-Down Approach”, Seventh Edition, Pearson Education, 2017.
2. Nader F. Mir, Computer and Communication Networks, Second Edition, Prentice Hall, 2014.
3. William Stallings,” Data and computercommunications”,PHI-2001.
4. DouglasE. comer,”Internet working with TCP/IP-Volume-I”,PHI,1997.

5. Larry L. Peterson and Bruce S. Davie, "Computer Networks: A Systems Approach", Fifth Edition, Morgan Kaufmann Publishers, 2012.
6. William Stallings, "Data and Computer Communications", Tenth Edition, Pearson, 2013.
7. James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach", Fifth Edition, Pearson Education, 2012

**Course Outcomes:**

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.

CO5: To be familiar with network tools and network programming.

**Outcome Mapping**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3			3		3		3		3		3	
<b>CO2</b>	3		3	3	3				3		2	2	2
<b>CO3</b>		3				3	2			3	3		1
<b>CO4</b>	3		2		2				2			1	
<b>CO5</b>		3				3		2			2		1

**20MCAC203: Digital Image Processing**

**Learning objectives:**

- To understand the fundamental concepts related to image processing, feature extraction, pattern analysis etc.
- To understand image processing, analysis and understanding.
- To understand low-level, middle-level and high-level operations.
- To apply the concepts to solve computer vision problems of different fields.
- To study the image compression procedures.

## Unit-I

**Digital Image Processing Systems:** Introduction-Structure of human eye-Image formation in the human eye-Brightness adaptation and discrimination-Image sensing and acquisition-Storage-Processing-Communication-Display. Image sampling and quantization- Basic relationships between pixels

## Unit-II

**Image Enhancement in the Spatial Domain:** Gray level transformations-Histogram processing-Arithmetic and logic operations-Spatial filtering: Introduction - Smoothing and sharpening filters

**Image Enhancement in the Frequency Domain:** Frequency domain filters: Smoothing and Sharpening filters-Homomorphic filtering

## Unit-III

**Wavelets and Multi resolution Processing:** Image pyramids-Sub and coding-Haar transform-Series expansion-Scaling functions- Wavelet functions-Discrete wavelet transforms in one dimensions- Fast wavelet transform-Wavelet transforms in two dimensions

## Unit-IV

**Image Data Compression:** Fundamentals- Redundancies: Coding- Inter pixel-Psycho-visual-Fidelity criteria-Image compression models-Error free compression-Lossy compression-Image compression standards: Binary image and Continuous tone still image compression standards-Video compression standards.

## Unit-V

**Morphological Image Processing:** Introduction-Dilation- Erosion- Opening-Closing-Hit-or-Miss transformation-Morphological algorithm operations on binary images-Morphological algorithm operations on gray-scale images.

**Image Segmentation:** Detection of discontinuities - Edge linking and Boundary detection -Thresholding - Region based segmentation

**Image Representation and Description:** Representation schemes- Boundary descriptors- Regional descriptors

## Text Books:

1. Gonzalez R.C and R.E.Woods, "Digital Image Processing", Second Edition, Pearson Education 2002
2. Anil K. Jain, "Fundamentals of Image Processing", PHI New Delhi 2001.

## References:

1. Rafael Gonzalez, Richard E. Woods, "Digital Image Processing", Fourth Edition, Pearson Education, 2018.
2. S. Sridhar, "Digital Image Processing", Second Edition, Oxford University Press, 2016.
3. Milan Sonka, Vaclav Hlavac, Roger Boyle, "Image Processing Analysis and Machine Vision", Fourth Edition, Cengage India, 2017
4. William Pratt, "Digital Image Processing", John Wiley & Sons, Third edition, 2001.
5. Hany Farid, "Fundamentals of Image Processing", Dartmouth College, 2010.
6. Stefan G. Stanciu, "Digital Image Processing", In Tech, 2012.
7. Dwayne Philipps, "Image processing in C: Analysis and Enhancing Digital Images", R & D Books, 1997.

**Course outcomes:**

CO1: Review the fundamental concepts of a digital image processing system.

CO2: Analyze images in the frequency domain using various transforms.

CO3: Evaluate the techniques for image enhancement and image restoration.

CO4: Categorize various compression techniques.

CO5: Interpret image segmentation and representation techniques.

**Outcome Mapping**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	3		3		3			3			3	
<b>CO2</b>	3		3		3			3			3		2
<b>CO3</b>				3			3		2	3			1
<b>CO4</b>	3	2			3		2					1	
<b>CO5</b>		3	2			3		2		2	2		

**20MCAP206- Programming Lab – III (Java Programming)****Learning objectives:**

- To understand how to design, implement, test, debug, and document programs that use basic data types and computation, simple I/O, conditional and control structures, string handling and functions.
- To understand the importance of Classes & objects along with constructors, Arrays and Vectors.
- Discuss the principles of inheritance, interface and packages and demonstrate through problem analysis assignments how they relate to the design of methods, abstract classes and interfaces and packages.
- To understand importance of Multi-threading & different exception handling mechanisms.
- To learn experience of designing, implementing, testing, and debugging graphical user interfaces in Java using applet and AWT that respond to different user events.

**Lab Exercises**

1. Write a JAVA program to implement class and object
2. Write a JAVA program to implement command line argument.
3. Write a JAVA program to implement the bitwise operators.
4. Write a JAVA program to implement method overloading.
5. Write a JAVA program to implement packages.

6. Write a JAVA program to implement interface.
7. Write a JAVA program to implement inheritance mechanism.
8. Write a JAVA program to implement exception handling.
9. Write a JAVA program to implement user-defined exception handling.
10. Write a JAVA program to implement multithreaded programming concept.
11. Write a JAVA program to implement abstract class concept.
12. Write a JAVA program to implement RMI concept.
13. Applet using Labels, Text Fields and Buttons.
14. Library Management using JDBC concept
15. Programs using Swings Concepts

**Course outcomes:**

CO1: Implement Object Oriented programming concept using basic syntaxes of control Structures, strings and function for developing skills of logic building activity.

CO2: Identify classes, objects, members of a class and the relationships among them needed for a finding the solution to specific problem

CO3: Demonstrates how to achieve reusability using inheritance, interfaces and packages and describes faster application development can be achieved.

CO4: Demonstrate understanding and use of different exception handling mechanisms and concept of multithreading for robust faster and efficient application development.

CO5: Identify and describe common abstract.

**Outcome Mapping**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	3		3		3		3		3			3
<b>CO2</b>	3		3		3		3		3		3	2	
<b>CO3</b>			3		2		2			2			2
<b>CO4</b>	3				2				2			1	
<b>CO5</b>		3	3			2		1		3	2		1

## 20MCAP207- Programming Lab – IV (Image Processing Lab)

### Learning Objectives (LO):

- To impart skills on the processing the digital images.
- To learn the transform of the image from spatial domain to frequency domain.
- To perform edge deduction techniques.
- To gain knowledge on compressing the images using suitable techniques.
- 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 gradient 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	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	3		3		3		3		3			3
<b>CO2</b>	3		3		3		2		3		2	3	
<b>CO3</b>			3		2		3			2			2
<b>CO4</b>	3				2				2			1	

## THIRD SEMSTER

### 20MCAC301: WEB TECHNOLOGY

#### Learning Objectives

- To learn about Java, HTML, DHTML concepts.
- Deploy Java Applets and Servlets.
- To know about appropriate client-side or Server-side applications.
- To gain the Knowledge of XML and its applications.
- To know about PHP scripts and create adaptive web pages.

#### 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 Queriesin 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.
3. Deitel & Deitel, Goldberg, Internet and World Wide Web – How to Program, Third Edition, Pearson Education Asia, 2005.
4. 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.

## Reference

1. Laura Lemay, Rafe Colburn and Jennifer Kymin, "Mastering HTML, CSS & Javascript Web Publishing ",BPB Publications, July 2016.
2. Rajkamal, "Web Technology", First Edition, Tata McGraw-Hill, 2001.
3. Tim Converse, Joyce Park and Clark Morgan "PHP5 and MySQL Bible", Wiley Publishing, Inc,2004.

## Course Outcomes

CO1: Develop a dynamic webpage by the use of java script and DHTML.

CO2: Write a well formed / valid XML document.

CO3: Connect a java program to a DBMS and perform insert, update and delete operations on DBMS table.

CO4: Write a server side java application called Servlet to catch form data sent from client, process it and store it on database.

CO5: Write a server side java application called JSP to catch form data sent from client and store it on database.

## Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3		3		3		3		3			3
CO2	3		3		2		3		3		3	2	
CO3			3		2		2			2			3
CO4	3				3				2			1	
CO5		3	3			2		1		3	2		1

## 20MCAC302: MOBILE COMPUTING

### Learning Objectives:

- To learn about the concepts and principles of Mobile computing.
- To explore theoretical issues of Mobile computing.
- To develop skills of finding solutions and building software for Mobile computing applications.
- To study the specifications and functionalities of various protocols/standards of mobile networks.
- To learn Android and IOS platform and its architecture.

### UNIT-I

**Introduction:** Aspects of Mobility – Mobile Device Profiles – Device Portability – Mobile Applications – Characteristics and Benefits – Application Model –



Infrastructure and Managing Resources – Frameworks and Tools – Generic UI Development – Visual UI – Text to Speech Techniques – Multimodal and Multichannel UI .

#### **UNIT-II**

**Tools:** Google Android Platform – Eclipse Simulator – Android Application Architecture – Event based programming – Apple iPhone Platform – UI and Toolkit Interfaces – Event handling – Graphical Services – Animation Techniques.

#### **UNIT-III**

**Application Design:** Memory Management – Design Patterns for Limited Memory - Work Flow for Application development – Techniques for Composing Applications - Dynamic Linking - Plug ins and rule of thumb for using DLLs - Concurrency and Resource Management - Look and Feel

#### **UNIT-IV**

**Application Development:** Intents and Services – Storing and Retrieving data – Communication via the Web – Notification and Alarms – Graphics and Multimedia – Telephony – Location based Services – Packaging and Deployment – Security and Hacking

#### **UNIT-V**

**Cellular Networks And Wireless LANs:** Cellular Network Structure and Operation - Principles - Tessellation, Frequency Reuse, Hand off - GSM - System Architecture, Elements, Interfaces, Frame Structure, Protocol Stack, Types of Handover - IEEE 802.11 WLAN - Architecture, Reference Model - Physical layer - MAC Layer - CSMA/CA- Interference Spacing – Security – WEP, 802.1x Authentication.

#### **Text Books:**

1. Reza B'Far, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", Cambridge Press University, 2009.
2. Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal, "Mobile Computing Technology, Applications and Service Creation", 2nd ed, Tata McGraw Hill, 2010.

#### **References:**

1. Reto Meier, "Professional Android 4 Application Development", Wrox Wiley, 2012.
2. Neil Smyth, "iPhone iOS 4 Development Essentials – Xcode", 4 Edition, Payload media, 2011.
3. Neil Smyth, "iPhone iOS 4 Development Essentials – Xcode", 4 Edition, Payload media, 2011.
4. Reto Meier, "Professional Android 2 Application Development", Wrox Wiley, 2010.
5. Ben Shneiderman and Catherine Plaisant, "Designing the User Interface: strategies for Effective Human Computer Interaction", Addison– Wesley, 5th Edition, 2009.

6. Zigurd Mednieks, Laird Dornin, G, Blake Meike and Masumi Nakamura, "Programming Android", O'Reilly, 2011.
7. Reto Meier, Wrox Wiley, "Professional Android 2 Application Development", 2010.
8. Alasdair Allan, "iPhone Programming", O'Reilly, 2010.
9. Wei-Meng Lee, "Beginning iPhone SDK Programming with Objective-C", Wrox Wiley, 2010.
10. Stefan Poslad, "Ubiquitous Computing: Smart Devices, Environments and interactions", Wiley, 2009.

**Course Outcomes:**

- CO1: Grasp the concepts and features of mobile computing technologies and applications.
- CO2: Have a good understanding of how the underlying wireless and mobile communication networks work, their technical features, and what kinds of applications they can support.
- CO3: Identify the important issues of developing mobile computing systems and applications.
- CO4: Develop mobile computing applications by analyzing their characteristics and requirements, selecting the appropriate computing models and software architectures, and applying standard programming languages and tools.
- CO5: Describe Android platform, Architecture and features and design User Interface and develop Android App.

**Outcome Mapping**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	3		3		3		3		3	3		3
<b>CO2</b>	3		3		2		3			3		3	2
<b>CO3</b>			3				2		2	2			1
<b>CO4</b>	3		2		3			2			2	2	
<b>CO5</b>	3			3		3		2		1	1	1	

## 20MCAC303: BIG DATA ANALYTICS

### Learning Objectives:

- To understand the concepts of Big Data Analytics and gain ability to design high scalable systems.
- To understand various statistical models.
- To understand the frequent item set and clustering concept.
- To understand big data and use cases from selected business domains.
- To learn, Install, configure, and run Hadoop and HDFS.

### Unit-I

**Introduction to Big Data:** Introduction to Big Data Platform – Traits of Big data - Challenges of Conventional Systems - Web Data – Evolution Of Analytic Scalability - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

### Unit-II

**Data Analysis:** Regression Modeling - Multivariate Analysis - Bayesian Modeling - Inference and Bayesian Networks - Support Vector and Kernel Methods - Analysis of Time Series: Linear Systems Analysis - Nonlinear Dynamics - Rule Induction - Neural Networks: Learning And Generalization - Competitive Learning - Principal Component Analysis and Neural Networks - Fuzzy Logic: Extracting Fuzzy Models from Data - Fuzzy Decision Trees - Stochastic Search Methods.

### Unit-III

**Mining Data Streams:** Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

### Unit-IV

**Frequent Item sets and Clustering:** Mining Frequent Item sets - Market Based Model – Apriori Algorithm – Handling Large Data Sets in Main Memory – Limited Pass Algorithm – Counting Frequent Item sets in a Stream – Clustering Techniques – Hierarchical – K-Means – Clustering High Dimensional Data – CLIQUE And PROCLUS – Frequent Pattern based Clustering Methods – Clustering in Non-Euclidean Space – Clustering for Streams and Parallelism.

### Unit-V

**Hadoop and R for Visualization:** Background and fundamentals-moving data in and out of Hadoop-data serialization-applying Map Reduce patterns to big data-streaming big data-integrating R and Hadoop for statistics and more-predictive analytics with Mahout- Hacking with Hive-Programming pipelines with pig – HBase-MySQL-NoSQL- RHadoop

**Text Books:**

1. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
2. Anand Rajaraman and Jeffrey David Ullman, "Mining of Massive Datasets", Cambridge University Press, 2012.

**References:**

1. Raj Kamal, Preeti Saxena , "Big Data Analytics", McGraw Hill, First Edition, February 2018.
2. Maheshwari , "Data Analytics", McGraw Hill, First Edition, 2017.
3. Bill Franks, "Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics", John Wiley & sons, 2012.
4. Glenn J. Myatt, "Making Sense of Data", John Wiley & Sons, 2007.
5. Pete Warden, "Big Data Glossary", O'Reilly, 2011.
6. Jiawei Han, Micheline Kamber, "Data Mining Concepts and Techniques", Second Edition, Elsevier, second edition, 2006.
7. Alex Holmes, "Hadoop in Practice", 2012 by Manning Publications, 2012.
8. Ohri A, "R for Business Analytics", Springer, 2012.
9. Prabhanjan Narayanachar Tattar, "R Statistical Application Development by Example Beginner's Guide" , packt publishing, 2013.

**Course Outcomes:**

CO1: Explain the concepts of big data analysis.

CO2: Identify the various Big data management, processing techniques

CO3: Explain NoSQL big data management.

CO4: Analyze performance of big data analysis in Hadoop environment.

CO5: Use Hadoop related tools such as HBase, Cassandra, Pig, and Hive for big data analytics.

**Outcome Mapping**

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO1	PSO2	PSO 3	PSO4	PSO5
<b>CO1</b>	3	3		3		3		3		3		3	
<b>CO2</b>	3		3		3		3		3		3	2	2
<b>CO3</b>				3			2			3			1
<b>CO4</b>		3			3		2		2		2	2	
<b>CO5</b>	3	2	2			2		1		1		1	

## 20MCAC304: PYTHON AND R PROGRAMMING

### Learning Objectives:

- To acquire knowledge in Python programming.
- To acquire knowledge in R programming.
- To develop Python programs with conditionals and loops and data structures.
- To learn how to design and program Python applications.
- To learn how to build and package Python modules for reusability.

### UNIT-I

**Introduction to Python Programming:** Python interpreter and interactive mode; values and types variables, expressions, statements, tuple assignment, Order of operations, comments, debugging; modules and functions: function Calls, adding new functions, Definitions and Uses, flow of execution, parameters and arguments, Fruitful functions. Conditionals: Boolean values and operators, conditional (if), alternative (if- else), chained conditional (if-elif-else); Iteration: state, while, for, range, break, continue, pass; recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays.

### UNIT-II

**Lists, Tuples, Dictionaries:** Lists: Traversing a List, list operations, list slices, list methods, Map, Filter and Reduce, list loop, mutability, aliasing, cloning lists, list parameters; Dictionaries: operations and methods; advanced list processing - list comprehension; Tuples: tuple assignment, tuple as return value.

### UNIT-III

**Files, Modules, Packages:** Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages: PANDAS, NUMPY, SCIKIT-LEARN;

### UNIT-IV

**Introduction to R Programming:** Introduction and Preliminaries, numbers and vectors, Objects, their modes and attributes, Ordered and unordered factors, Arrays and matrices, Lists and data frames, Grouping, loops and conditional execution, functions.

### UNIT-V

**Statistical Models, Graphical Procedures, Packages:** Statistical models : Defining statistical models; formulae, Linear models, Generic functions for extracting model information, Analysis of variance and model comparison, Updating fitted models, Generalized linear models, Nonlinear least squares and maximum likelihood models; Graphical procedures: High-level and low-level plotting commands, graphics parameters and list, Dynamic graphics. Packages: Standard packages, Contributed packages and CRAN, Namespaces.

### Text Books:

1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist``, 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016.
2. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

3. William N. Venables, David M. Smith, An Introduction to R: A Programming Environment for Data Analysis and Graphics, 2nd edition, Network Theory Ltd, 2009.
4. John V Guttag, —Introduction to Computation and Programming Using Python“, Revised and expanded Edition, MIT Press , 2013.
5. Robert Sedgewick, Kevin Wayne, Robert Dondero, —Introduction to Programming in Python: An Inter-disciplinary Approach, Pearson India Education Services Pvt. Ltd., 2016.

### Reference

1. Dr.M.Suresh Anand, Dr.R.Jothikumar, Dr.N.Vadivelan ,“Python Programming” First Edition Notion press,2020
2. Sandip Rakshit, “R PROGRAMMING FOR BEGINNERS”, McGraw Hill, First Edition, 2017

### Course outcomes:

CO1: Problem solving and programming capability.

CO2: Construct and execute basic programs in Python.

CO3: Use external libraries and packages with Python.

CO4: Construct and execute basic programs in R using elementary programming techniques.

CO5: Use external R-packages in statistics and graphics.

### Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	3		3		3		3		3	3	3	
<b>CO2</b>			3		3				3			2	2
<b>CO3</b>		3		2			3			2	2		1
<b>CO4</b>	3				3		2		2			1	
<b>CO5</b>		3	2	3		3		2		2	1		

## 20MCAP306 - Programming Lab V (Mobile Application Development)

### Learning Objectives:

- To introduce Android platform and its architecture.
- To learn activity creation and Android UI designing.
- To be familiarized with Intent, Broadcast receivers and Internet services.
- To work with SQLite Database and content providers.
- To integrate multimedia, camera and Location based services in Android Application.

### List of Exercises

1. Develop an application that uses GUI components, Font and Colors.
2. Implement an android application that demonstrates the use of Button, Text view & Edit text.
3. Implement an android application that demonstrates the use of Radio button, Radio group and Checkbox.
4. Develop a native calculator application.
5. Implement an android application that demonstrates the use of Intents.
6. Develop an application that uses Layout Managers and Event Listeners.
7. Develop a native application that uses GPS location information.
8. Develop an application that makes use of database.
9. Implement an application that writes data to the SD card.
10. Implement an application that creates an alert upon receiving a message.

### Course Outcomes:

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.

CO5: Use multimedia, and Location based services in Android App.

### Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	3		3		3		3		3	3	3	
<b>CO2</b>			3		3				2			2	2
<b>CO3</b>		3		2			2			2	2		1
<b>CO4</b>	3				3		3		3			1	
<b>CO5</b>		3	3	2		3		2		2	1		

## 20MCAP307 - PROGRAMMING LAB-VI (Data Analytics: Python and R)

### Learning objectives:

- To understand and be able to use the basic programming principles such as data types, variable, conditionals, loops, array, recursion and function calls.
- To learn how to use basic mathematical problems are evaluated and be able to manipulate text files and file operations.
- 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. Python Program to check if a Number is Positive, Negative or Zero.
2. Python program to check prime numbers.
3. Python Program to check Armstrong Number.
4. Python Program to Find Hash of File.
5. Python Program to Root search.
6. R Program to Check if a Number is Odd or Even.
7. R Program to Find the Factors of a Number.
8. R Program to Convert Decimal into Binary using Recursion.
9. R Program to find Fibonacci Sequence Using Recursion.
10. R program to find the Factorial of a Number Using Recursion.

### Course Outcomes:

CO1: Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python.

CO2: Express different Decision Making statements and Functions in R and Python.

CO3: Interpret Object oriented programming in Python.

CO4: Understand and summarize different File handling operations in R.

CO5: Design and develop Client Server network applications using Python and R.

### Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	3		3		3		3		3	3		
<b>CO2</b>			3	3	3				3			3	2
<b>CO3</b>	3	2					3				2		1
<b>CO4</b>	3				3		2		2	2		2	
<b>CO5</b>			3			3		2	2		1		1



## 20MCAE204.1: COMPILER DESIGN

### Learning Objectives:

- To introduce the major concept areas of language translation and compiler design.
- To enrich the knowledge in various phases of compiler and its use, code optimization techniques, machine code generation, and use of symbol table.
- To extend the knowledge of error recovery, code generation, and code optimization.
- To extend the knowledge of parser by parsing LL parser and LR parser.
- To provide practical programming skills necessary for constructing a compiler.

### Unit-I

**Introduction To Compilers:** Translators-Compilation and Interpretation- The phases of Compiler-Errors encountered in different phases-The grouping of phases-Compiler construction tools-A simple one-pass compiler – Language design-Programming language grammars-Derivation-Reduction and Ambiguity.

### Unit-II

**Lexical Analysis:** Need and role of lexical analyzer-Input Buffering-Lexical errors-Expressing tokens by Regular Expression –Finite Automata-Converting regular expression to NFA-Converting NFA to DFA-Minimization of DFA-Language for specifying lexical analyzers-LEX-Design of lexical analyzer for a sample language.

### Unit-III

**Syntax Analysis:** Need and role of the parser-Context Free Grammars-Top Down parsing-Recursive Parsing-Problems- Recursive Descent parser- Predictive Parser – LL(1)Parser-Bottom up parsers-shift reduce parser-operator precedence parsers-LR parser–LR(0)item–Construction of SLR Parsing table–CLR parser–LALR Parser. Error handling and recovery in syntax analyzer-YACC-Design of a syntax analyzer for a sample language.

### Unit-IV

**Syntax Directed Translation:** Syntax-directed definitions-Construction of syntax trees-Bottom-up evaluation, L-attributed definitions-Top down translation, Recursive Evaluator Method, Comparison of Translation Methods. Syntax directed translation for declaration statements, assignment statements, Boolean expression, control flow statements, procedure calls.

### Unit-V

**Run-Time Environment:** Source language issues-Storage organization-Storage allocation-access to non local names-parameter passing-Symbol tables.

**Code Optimization and Code Generation:** Principal sources of Optimization-Optimization of basic blocks-Global Optimization-Global dataflow analysis-Efficient data flow algorithms-Issues in design of a code generator-A simple code generator algorithm.

**Text Book:**

1. AlfredVAho, RaviSethiand JeffreyD Ullman, "Compilers– Principles, Techniques andTools", PearsonEducation, NewDelhi, 2004.

**References:**

1. Peter Linz, "An Introduction to formal languages and automata", Fifth Edition, 2012.
2. Keith Cooper and Linda Torczon, " Engineering a Compiler ", Second Edition, Morgan Kauffmann, 2011.
3. Sudha Sadasivam G, "Compiler Design", Scitech Publications (India) Private Limited, Chennai, 2008.
4. Dick Grone, Henri EBal, CerialJH Jacobs and Koen G Langendoen, " Modern Compiler Design", John Wiley & Sons, USA, 2000.
5. Dhamdhare DM, " Compiler Construction Principles & Practice", Macmillan India Limited, NewDelhi, SecondEdition, 1997.
6. Jean Paul Tremblay and Paul G Serenson, "The Theory & Practice of Compiler Writing", McGrawHillPublishingCompany, NewDelhi, 1985.

**Course Outcomes:**

CO1: To apply the knowledge of lex tool & YACC tool to develop a scanner & parser.

CO2: To design & conduct experiments for Intermediate Code Generation in compiler.

CO3: To design & implement a software system for backend of the compiler.

CO4: To learn the new code optimization techniques to improve the performance of a program in terms of speed & space.

CO5: To acquire the knowledge of modern compiler & its features.

**Outcome Mapping**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3	3		3		3		3			3	3	
CO2	3		3		3			2	3		2	2	2
CO3				3			2			3			1
CO4	3		3		2				3			2	
CO5			3			3		2		2		1	

**20MCAE204.2- DATA MINING TECHNIQUES****Learning Objectives:**

- To introduce concepts of data mining techniques.
- To understand its applications in knowledge extraction from databases.
- To develop skills of using recent data mining software for solving practical problems.
- To understand preprocessing operations on data.
- To understand data interpretation, transformation and reduction techniques.

### **Unit-I**

Data mining – Motivation – Importance - DM Vs KDD - DM Architecture - Data Types – DM Tasks –DM System Classification - Primitives of DM - Data Mining Query Language - DM Metrics - DM Applications - DM Issues – Social Implications of DM.

### **Unit-II**

Data Preprocessing: Summarization - Data cleaning - Data Integration and Transformation - Data Reduction - Discretization and Concept Hierarchy Generation.

### **Unit-III**

Mining Frequent Patterns – Frequent Item set Mining Methods. Classification: Classification by Decision Tree Induction – Bayesian Classification – Rule based Classification - Prediction– Accuracy and Error Measures.

### **Unit-IV**

Cluster Analysis – Types of Data in Cluster Analysis – Categorization of clustering Methods – Partition Methods - Outlier Analysis – Mining Data Streams – Social Network Analysis – Mining the World Wide Web.

### **Unit-V**

Data Warehousing: OLTP Vs OLAP - Multidimensional Data Model -DW Architecture Efficient Processing of OLAP queries - Metadata repository – DWH Implementation – OLAM.

### **Text book:**

1. JiaweiHan, Micheline amber, "Data Mining: Concepts and Techniques", 3<sup>rd</sup> Edition, Elsevier India Private Limited, 2012

### **References:**

1. Pang Ning Tan and Vipin Kumar and Michael Steinbach, Pearson "Introduction To Data Mining" 1st Edition ,Pearson ,October 2016
2. Margaret H. Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education, 2012.
3. K.P.Soman, ShyamDiwakar, V.Ajay, "Insight into Data Mining Theory & Practice, Prentice Hall India, 2012
4. G.H.Gupta, "Introduction to Data Mining with Case Studies", 2nd Edition, PHI.
5. Ralph Kimball, Margy Ross "The Data Warehouse Toolkit: The Complete Guide to Dimensional Modeling", 3rd Edition ,wiley , Jul 2013

### **Course Outcomes:**

- CO1: Explain the concepts in data mining and KDD, recognizing issues in Data Mining.
- CO2: Practice the preprocessing operations of Data.
- CO3: Define the methodologies in Data interpretation, transformation and reduction.
- CO4: Perform Association Rule Mining, Classify and Cluster the data sets into groups.
- CO5: Implement star schema through ETL tools.

## Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	3		3				3	3			3	
<b>CO2</b>			3		3		3			2			3
<b>CO3</b>				3		3			2		3		2
<b>CO4</b>	3	2			3		2			3	2	2	
<b>CO5</b>		3	2			3		1					1

### 20MCAE204.3: ARTIFICIAL INTELLIGENCE

#### Learning objectives:

- To obtain a thorough knowledge of various knowledge representation schemes.
- To have an overview of various AI applications.
- To study about various heuristic and game search algorithms.
- To know about various Expert System tools and applications.
- An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.

#### Unit-I

#### Unit-I

**Introduction:** Introduction-AI Problems and techniques- Problem spaces and searches -Search algorithms: Blind search-heuristic search-algorithmic search – State space representation of problems-Game playing: Two player games.

#### Unit-II

**Knowledge Representation Issues:** Procedural Knowledge- Declarative Knowledge - Logic: Using FOL - Unification- Resolution- Semantic nets-Frames - Inheritance-Scripts –Representing knowledge using rules- Rule based deduction systems.

#### Unit-III

**Reasoning Uncertainty:** Introduction to uncertain knowledge – review of probability theory–Bayes’s Theorem- Non monotonic reasoning. Planning and Learning: Planning-Introduction-Partial order planning algorithm- Learning from examples-Discovery as learning–Learning by analogy–Explanation based learning.

#### Unit-IV

**Fuzzy Sets:** Definitions-Basic set – theoretic operations for fuzzy sets. Fuzzy measures and measures of fuzziness – fuzzy relations on sets and fuzzy sets – fuzzy functions on fuzzy sets-Fuzzy logic.

#### Unit-V

**Applications:** Principles of Natural Language Processing- Expert systems- Knowledge acquisition concepts- Introduction to Agents.

#### Text Books:

1. Elain Richard Kevin Knight, "Artificial Intelligence", Tata Mc Graw– HillPublishingCompanyLimited,NewDelhi,1995.
2. Stuart Russel and Peter Norvig, "Artificial Intelligence–A Modern Approach", Prentice Hall,1995.
3. Patrick Henry Winston, "Artificial Intelligence", Addison Wesley, Third edition,2000.
4. Zimmerman H.J,"Fuzzy Set Theory and its Applications", Allied Publishers Ltd., Second Edition.

#### Reference:

1. NilsJ.Nilsson,"PrinciplesofArtificialIntelligence",NarosaPublishing House, 2000.

#### Course outcomes:

CO1: Know how to build simple knowledge-based systems.

CO2: Apply knowledge representation and machine learning techniques to solve real- world problems.

CO3: Apply Artificial Intelligence techniques to solve real-world problems.

CO4: Ability to carry out independent (or in a small group) research and communicate it effectively in a seminar setting.

CO5: Demonstrate working knowledge of reasoning in the presence of incomplete and/or uncertain information.

#### Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3			3		3		3		3		3	
CO2	3				3	3			3		3		3
CO3		2	3	2			3			2			2
CO4	3		2		3		2		2			1	
CO5		3	2			3		2		1	1		

## 20MCAE204.4: E-COMMERCE

### Learning Objectives:

- This objective of this study is to use of e-commerce domain companies and consumers.
- This study is conducted to evaluate the perception and attentive and secure recommending payment method based on analysis and study.
- The results are expected to contribute significantly towards the current thinking, security regarding e-commerce online transactions.
- The main objectives are involved an attempt to determine the current awareness and alert in the particular area in ecommerce like security issues, Screening, Recommended payment method, Internal order cancellations.
- This study provides best solution to e-commerce domain companies/industries and alert and awareness to common man. For safe and secure transaction consumers and e-commerce domain companies should follow some basic rules and regulations with latest technologies.

### Unit-I

Introduction to E-Commerce: Benefits-Impacts-Classification and Application of E-Commerce-Business Model-Architectural Frame Work

### Unit-II

Network Infrastructure: Local Area Network-Ethernet-Wide Area Network-Internet-TCP/IP Reference Model-Domain Name System-Internet Industry structure- Information Distribution and Messaging: FTP Application-Electronic Mail-World Wide Web Server - HTTP -Web Server Implementations

### Unit-III

Information Publishing Technology: Information Publishing-Web Browsers-HTMLCGI-Multimedia Content-Other Multimedia Objects-VRML-Securing the Business on Internet-Why Information on Internet is Vulnerable?-Security Policy-Procedures and Practices-Site Security-Protecting the Network-Firewalls- Securing the Web Service

### Unit-IV

Securing Network Transaction-Electronic Payment Systems: Introduction -Online Payment Systems-Pre-paid Electronic Payment System-Post-paid Electronic Payment System- Requirement Metrics of a Payment System

### Unit-V

Search Engines and Directory Services: Information Directories -Search Engines- Internet Adverting-Agents in Electronic Commerce: Needs and Types of Agents- Agent Technologies -Agents Standards and Protocols-Agents Applications-Case Study.

### Text Book:

1. Bharat Bhasker, 'Electronic Commerce Framework Technologies and Applications', TataMcGrawHillPublication, 2003.

### References:

1. Ravi Kalakota and Andrew B. Whinston, Eleventh Impression, 2011,, Frontiers of Electronic Commerce, Pearson Education Inc., Delhi.
2. Joseph A. Brady, Ellen F. Monk, Bret J. Wangner, "Concepts in Enterprise Resource Planning" , Thomson Learning, 2001.

3. Ravi Kalakota and Andrew B Whinston, "Frontiers of Electronic Commerce", Pearson Education Asia, 1999
4. Marilyn Greenstein and Todd M Feinman, "Electronic commerce: Security, Risk Management and Control", TataMcGraw-Hill, 2000.

**Course outcomes:**

- CO1: Recognize the impact of Information and Communication technologies, especially of the Internet in business operations.
- CO2: Recognize the fundamental principles of e-Business and e-Commerce.
- CO3: Distinguish the role of Management in the context of e-Business and e-Commerce.
- CO4: Explain the added value, risks and barriers in the adoption of e- Business and e-Commerce.
- CO5: Examine applications of e- Commerce in relation to the applied.

**Outcome Mapping**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	3		3				3		3	3		
<b>CO2</b>			3		3		3					2	3
<b>CO3</b>		3		3		2		2			1		1
<b>CO4</b>	3	2			3	2			3			1	
<b>CO5</b>		3	2				3		3	2			

**20MCAE305.1: NETWORKSECURITY**

**Learning objectives:**

- To understand the fundamentals of Cryptography.
- To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.
- To understand the various key distribution and management schemes.
- To understand how to deploy encryption techniques to secure data in transit across data Networks.
- To design security applications in the field of Information technology.

**Unit-I**

**Symmetric Ciphers:** Classical Encryption Techniques – Block Ciphers and the Data Encryption Standard – Finite Field – Advanced Encryption Standard– Symmetric Ciphers–Confidentiality using Symmetric Encryption.

## Unit-II

**Public Key Encryption and Hash Functions:** Introduction to Number Theory– Public Key Cryptography and RSA – Key Management – other Public Key Cryptosystem– Message Authentication and Hash Functions – Hash and MAC Algorithms–Digital Signatures and Authentication Protocols.

## Unit-III

**Program Security:** Secure Programs – Non Malicious Program Errors – Viruses and Others Malicious Code–Targeted Malicious Code–Control Against Threats.

## Unit-IV

**Database Security:** Introduction to Database – Security Requirement – Reliability and Integrity – Sensitive Data–Inference–Multilevel Databases- Multilevel Security

## Unit-V

**Network Security:** Networks concepts – Threats in Networks – Network Security Controls – Firewalls –Electronic Mail Security– IP Security – Web Security.

### Text Books:

1. Charles B. Pfleeger -Shari Lawrence Pfleeger ,“Security in Computing“, Third Edition, PearsonEducation,2003.
2. William Stallings, “Cryptography and Network Security – Principles and Practices“, Pearson Education, Fourth Edition, 2003.

### References:

1. Behrouz A. Forouzan, Debdeep Mukhopadhyay -Cryptography and Network Security -Tata McGraw-Hill Education Pvt. Ltd., 2ndEdition, 2011.
2. Manuel Mogollon,"Cryptography Security Services Mechanisms Applications", CyberTech Publishing, 2008.

### Course outcomes:

CO1: Analyze the vulnerabilities in any computing system.

CO2: Able to design a security solution.

CO3: Identify the security issues in the network and resolve it.

CO4: Evaluate security mechanisms using rigorous approaches, including theoretical.

CO5: Compare and Contrast different IEEE standards and electronic mail security.

### Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	3			3		3	3	3			3		3
CO2	3		3		3				3		2		2
CO3	3		2		3		2			2			1
CO4		3		3	2				2			2	
CO5	3	2	3			2		1		3		1	



## 20MCAE305.2: INTERNET OF THINGS

### Learning objectives:

- To understand the fundamentals of Internet of Things
- To learn about the basics of IOT protocols
- To build a small low cost embedded system using Raspberry Pi.
- To apply the concept of Internet of Things in the real world scenario.
- To classify Real World IoT Design Constraints, Industrial Automation in IoT.

### Unit I

**Introduction to IoT:** Introduction - Definition & Characteristics of IoT - Physical Design of IoT - Things in IoT - IoT Protocols - Logical Design of IoT - IoT Functional blocks - IoT Communication Models - IoT Communication APIs - IoT Enabling Technologies - Wireless Sensor Networks - Cloud Computing - Big Data Analysis - Communication protocols - Embedded Systems - IoT Levels & Deployment Templates. IoT and M2M: Introduction - M2M - Difference between IoT and M2M-SDN and NFV for IoT. Ubiquitous IoT Applications: A Panoramic View of IoT Applications-Important Vertical IoT.

### Unit II

**Four pillars of IoT:** The Horizontal, Verticals, and Four Pillars, M2M, RFID, WSN, SCADA. The DNA of IoT - Device, Connect and Manage - Device: Things That Talk - Connect: Via Pervasive Networks - Manage: To Create New Business Value.

### Unit III

**Middleware and IoT:** An Overview of Middleware - Communication Middleware for IoT. Protocol standardization of IoT : Web of Things versus Internet of Things - IoT Protocol Standardization Efforts- Unified Data Standards: A Challenging Task.

### Unit 1V

**Architecture Standardization for WoT:** Platform Middleware for WoT - Unified Multitier WoT Architecture - WoT Portals and Business Intelligence - Challenges of IoT Information Security. The Cloud of Things : Cloud Middleware - NIST's SPI Architecture and Cloud Standards - Cloud Providers and System. The Cloud of Things:The Internet of Things and Cloud Computing, Mobile Cloud Computing. MAI versus XaaS: The Long Tail and the Big Switch - The Cloud of Things Architecture.

### Unit V

**Thinking about Prototyping:** Prototypes and Production - Open Source versus Closed Source. Prototyping Embedded devices : Electronics - Embedded Computing Basics - Arduino, Raspberry pi - Beagle Bone Black - Electric Imp - Other Notable Platforms.

### Text Books:

1. Arshdeep Bahga, Vijay Madiseti, —Internet of Things: A Hands of Approachll , Arshdeep Bagha & Vijay Madiseti, First Edition, 2014.
2. Honba Zhou, —The Internet of things in the Cloud: A Middleware Perspectivell, CRC Press, First Edition, 2012.
3. Adrian McEwen, Hakim Cassimally, — Designing The Internet thingsll, John Wiley and Sons, First Edition, 2014.

**References:**

1. Marco Schwartz,"Esp8266 Internet of Things Cookbook",Packt Publications,2017.
2. Marco Schwartz,"Internet of Things with ESP8266",Packt Publications,2016.

**Course outcomes:**

CO1: Interpret the vision of IoT from a global context.

CO2: Determine the Market perspective of IoT.

CO3: Compare and Contrast the use of Devices, Gateways and Data Management in IoT.

CO4: Implement state of the art architecture in IoT.

CO5: Illustrate the application of IoT in Industrial Automation and identify Real World Design Constraints.

**Outcome Mapping**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3			3		3		3		3		3	
<b>CO2</b>		3	2		2				3		3		3
<b>CO3</b>	3			2			3			3			
<b>CO4</b>	3				3			2	2	2	2		
<b>CO5</b>			3			2	2					1	1

**20MCAE305.3 : MACHINE LEARNING****Learning Objectives (LO):**

- To Learn about Machine Intelligence and Machine Learning applications.
- To implement and apply machine learning algorithms to real-world applications.
- To identify and apply the appropriate machine learning technique to classification, pattern recognition, optimization and decision problems.
- 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.

### **References**

1. Ian Good fellow, Yoshua Bengio, Aaron Courville, Francis Bach "Deep Learning",2017.
2. Bishop Christopher M,"Pattern Recognition and Machine Learning",2010.
3. EthemAlpaydin, —Introduction to Machine Learning (Adaptive Computation and Machine Learning), The MIT Press 2004.
4. Stephen Marsland, —Machine Learning: An Algorithmic Perspective, CRC Press, 2009.
5. Michael Affenzeller, Stephan Winkler, Stefan Wagner, Andreas Beham, “Genetic Algorithms and Genetic Programming”, CRC Press Taylor and Francis Group.

### **Course Outcomes**

On successful completion of the course, the students will be able 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	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	3		3				3		3	3		
<b>CO2</b>			3		3		3					3	2
<b>CO3</b>		3		3		3		2			2		1
<b>CO4</b>	3	2			3	2			3			1	

### 20MCAE305.4: OPEN SOURCE TECHNOLOGIES

#### Learning objectives:

- To learn the concepts of dynamic web content.
- To learn implementation of web development server.
- To understand the basics of syntax, arrays, functions and objects in PHP programming language.
- To know the structure of MySQL database and access using PHP.
- Testing and debug a PHP applications.

#### UNIT-I

Introduction to Dynamic Web Content: HTTP and HTML: Berners-Lee's Basics - The Request/Response Procedure - The Benefits of PHP, MySQL, JavaScript, CSS, and HTML5 - Using PHP - Using MySQL - Using JavaScript - Using CSS - And Then There's HTML5 - The Apache Web Server - About Open Source. Setting Up a Development Server: WAMP, MAMP, or LAMP - Installing XAMPP on Windows - Testing the Installation - Installing XAMPP on Mac OS X - Accessing the Document Root - Installing a - LAMP on Linux - Working Remotely - Logging In - Using FTP - Using a Program Editor - Using an IDE.

#### UNIT-II

Introduction to PHP: - Incorporating PHP Within HTML - The Structure of PHP - Using Comments -Basic Syntax - Variables – Operators - Variable Assignment - Multiple-Line Commands -Variable Typing - Constants - Predefined Constants – The Difference Between the echo and print Commands - Functions - Variable Scope. Expressions and Control Flow in PHP: Expressions - Operators – Conditionals – Looping - Implicit and Explicit Casting - PHP Dynamic Linking - Dynamic Linking in Action

#### UNIT-III

PHP Functions and Objects: PHP Functions - Including and Requiring Files - PHP Version Compatibility - PHP Objects. PHP Arrays: Basic Access – The foreach...as Loop - Multidimensional Arrays - Using Array Functions.

**UNIT-IV**

Practical PHP: Using printf - Date and Time Functions - File Handling - System Calls  
 - XHTML - HTML5 Introduction to MySQL: MySQL Basics - Summary of Database Terms -  
 Accessing MySQL via the Command Line – Indexes - MySQL Functions - Accessing  
 MySQL via phpMyAdmin.

**UNIT-V**

Accessing MySQL Using PHP: Querying a MySQL Database with PHP – Example -  
 Practical MySQL - Preventing Hacking Attempts - Using mysqli procedurally Form  
 Handling: Building Forms - Retrieving Submitted Data. Cookies, Sessions, and  
 Authentication: Cookies in PHP - HTTP Authentication - Sessions.

**Text book**

1. Robin Nixon, “Learning PHP, MySQL & JavaScript With jQuery, CSS & HTML5”,  
 Forth edition, Published by O’Reilly Media, December 2014.

**References:**

1. Laura Thomson and Luke Welling, "PHP and MySQL Web Development", 5th  
 Edition, 2016.
2. Joel Murach and Ray Harris, "PHP and MySQL", 2nd Edition, 2014.
3. Elizabeth Naramore, Jason Gerner, Yann Le Scouarnec, Jeremy Stolz, Michael K.
4. Glass, “Beginning PHP5, Apache, and MySQL Web Development”, Published by  
 Wiley Publishing, Inc., 2005.
5. Tim Converse and Joyce Park with Clark Morgan, “PHP5 and MySQL Bible”,  
 Published by Wiley Publishing, Inc., 2004.

**Course outcomes:**

- CO1: Apply dynamic web content concept into real time web applications.  
 CO2: Develop web server side programming.  
 CO3: Design database for real time applications.  
 CO4: How to receive and process form submission data.  
 CO5: Using PHP built-in functions and creating custom functions

**Outcome Mapping**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	3		3				3		3	3		
<b>CO2</b>			3		3		3					2	2
<b>CO3</b>		3		3		3		2			3		1
<b>CO4</b>	3	2			2	3			2		1	1	
<b>CO5</b>		3	2				2		3	3			

## **INTER DEPARTMENT ELECTIVES COURSE OFFERED BY OTHER DEPARTMENTS**

### **19AENGX01: SOFT SKILLS DEVELOPMENT**

#### **Learning objectives:**

- To develop the soft skill among the students.
- To impart the student knowledge in developing the positive attitude and art of speaking and writing.
- To indulge the students to improve the body language group discussion and time management.

#### **Unit-I**

##### **Soft skills and developing positive Attitude**

Soft skills: introduction – what are soft skills? - selling your soft skills - attribute regarded as soft skills – soft skills – social- soft skills- thinking – soft skills –Negotiating –exhibiting your soft skills- indentifying your soft skills- improving your soft skills - soft skills training –train yourself-top 60 soft skills.

Developing positive attitude: introduction – meaning - features of attitudes- attitude and behavior formation of attitudes– change of attitudes – what can you do to change attitude?- ways of changing attitude in a person – attitude in a workplace – the power of positive attitude-developing positive attitude-example of positive attitude- example of negative attitude-over coming negative attitude- negative attitude and its result.

#### **Unit-II**

##### **Art of speaking and writing**

Art of speaking: Introduction-what make communication important? - Defining communication-special features of communication –communication process- channel of communication-importance of communication - tips for effective communication - tips for powerful presentation-art of public speaking - importance of public speaking.

Art of writing: Introduction – importance of writing –creative writing - writing tips- drawbacks of writing communication.

#### **Unit-III**

##### **Body language**

Introduction – body talk – voluntary and involuntary body language-forms of body language-parts of body language - origin of body language - uses of body language - body language in building interpersonal relations – body language in building industrial relations-reason to study body language-improving your body language – types of body language-Gender differences-female interest and body language - shaking hands with women - interpreting body language-developing confidence with correct body language.

#### **Unit-IV**

##### **Group discussion**

Introduction – meaning of GD – why group discussion? - characters tested in a GD – tips on GD – types of GD - skills required in a GD - consequences of GD - behavior of a GD - essential elements of GD - different characters in GD - traits tested in a GD - GD etiquette -

areas to be concentrated while preparing for a GD - imitating a GD - techniques to initiate a GD - Non-verbal communication in GD – movement and gestures to be avoided in a GD- topics for GD.

### **Interview skills**

Introduction – why an interview?.- types of interview - interview panel-types of questions asked-reason for selecting a candidate –reason for rejecting a candidate – on the day of interview– on the interview table – attending job fair-common mistakes that you would't want to do-questions the candidate should not ask during the interview –post- interview etiquette-how does one follow up?- telephonic interview –dress code at interview – typical questions asked – interview mistakes –quick tips- how to present well in interview –tips to make a good impression in an interview – job interview-basic tips-how to search for job effectively – interview quotations.

### **Unit-V**

#### **Time management**

Introduction- the 80:20 rule- take a good look at the CO1ple around you- examine your work-sense of time management – time is money – features of time- three secretes of time management - time management matrix- analysis of time matrix-effective scheduling – grouping of activities – five steps to successful time management –difficulties in time management- evils of not planning - time management is a myth – overcoming procrastination – ways of find free time- time management tips for students – interesting facts about time- ideal way of spending a day- time wasters – time savers – realizing the value of time-time circle planner.

#### **Text Book:**

1. Alex K., “Soft Skills: Know yourself and know the world” S.Chand & company Pvt Lts, Third revised Edition, 2014.

#### **References:**

1. Gopaldaswamy Ramesh, and Mahadevan Ramesh, “ The ACE of Soft Skills, Attitude, Communication and Etiquette for Success”, Pearson; First edition, 2013.
2. Barun K. Mitra, “Personality Development and Soft Skills”, Oxford university press, New Delhi, 2011.
3. Rao M.S, “Soft Skills - Enhancing Employability: Connecting Campus with Corporate”, I K International Publishing House Pvt. Ltd, 2011
4. Sanjay Kumar and Pushp Lata, “Communication Skills”, Oxford university press, New Delhi, 2011.

#### **Course Outcomes:**

- CO1: The students' community enrich the knowledge in the field of soft skills.
- CO2: They can able to cope up with recent development in business world.
- CO3: The students will have the powerful knowledge in attitude and personality.

## Outcome Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✓	✓		✓		✓		✓		✓			
CO2	✓		✓		✓			✓		✓	✓	✓	✓
CO3	✓						✓		✓	✓			✓

### 19SMATX04: RESOURCE MANAGEMENT TECHNIQUES

#### Learning Objectives:

- Resource management techniques find 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)LP formulation and graphical solution –the simplex method-revised simplex method.

#### Unit-II

Duality and networks-definition of the dual problem-primal-Dual relationships-Dual simplex method -transportation and assignment models - transshipment models – network minimization-shortest route problems.

#### Unit-III

Integer programming - cutting plane algorithms, Branch and bound Algorithm - Multistage(dynamic) programming solution of LP by dynamic programming.

#### Unit-IV

Classical optimization theory: unconstrained problem – Jacobian method-Lagrangian method-khuntucker conditions- simple problems.

#### Unit-V

Project scheduling- network diagram representation –critical path Computation-time charts and resources levelling– PERT Networks

#### Text Book:

1. TahaA.H., operations research an introduction, macmillan publishing company, Newyork,1997.



**References:**

1. Billey E. Gillet, "Introduction To Operations Research A Computer Oriented Algorithmic Approach", TataMcGrawHill, NewDelhi,1979.
2. Hamdy A. Taha, A.M. Natarajan, P.Balasubramnie and A.Tamilarasi, "Operations Research-An Introduction", 2009.
3. Kandi swarup, P.K Gupta and Manmohan, "Operations Research", 18the edition, 2015.
4. Ravidran, Phillips and Solterg, "Operations Research: Principles & Practice", 2<sup>nd</sup> EDC(WSE series),2007.

**Course outcomes:**

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	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	✓	✓		✓		✓		✓		✓			✓
CO2	✓		✓		✓		✓		✓	✓		✓	
CO3			✓			✓	✓			✓	✓		✓
CO4	✓				✓				✓				
CO5		✓	✓			✓		✓				✓	✓

**INTER DEPARTMENT ELECTIVE COURSE OFFERED TO OTHER DEPARTMENTS IN  
THIRD SEMESTER**

**19SCISX01 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 operator.

**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	PSO1	PSO2	PSO3	PSO4	PSO5
<b>CO1</b>	3	3		3		3		3		3	3		
<b>CO2</b>			3		3		3					2	2
<b>CO3</b>				3				2			3		1
<b>CO4</b>	3	2			3				2		1	1	

## VALUE ADDED COURSES OFFERED BY OUR DEPARTMENT

### SCISVAC01: 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-1

**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-2

**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-3

**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-4

**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-5

**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.

## **SCISVAC02: Fundamentals of Computing**

### **Learning Objectives**

- LO1. To impart basic knowledge on Microsoft office
- LO2. To provide the basic knowledge about Graphs and Charts.

### **Unit-1: Document Creation in MS-WORD**

Creating new Documents – Document template – Typing Text – Editing Text – Insert Text – Go to, Find, and Replace text or word- Formatting of Text – Format painter – Cut and Paste utility.

### **Unit-2: Table Creation in Ms-Word**

Creating tables – Working with table – Merging cells – Splitting a cell – Splitting a table - using auto correct.

### **Unit-3: Ms-PowerPoint**

Create Slide Presentation – Design Theme – Add Text – Editing Techniques – Slide Master – Format Slide.-Transition and Animation.

#### **Unit-4: Ms-Excel**

The typical worksheet or spread sheet – cell and their properties – formatting cell – text, numbers, currency, accounting, date, time, percentage, scientific – formats.

Formula: using arithmetic and relational operators in a worksheet -Advanced Formulas: sum, count, Average, Max, Min, Product.

#### **Unit-5: Graphs and Charts**

Bar diagrams, pie charts, Area, - Building Line Diagrams, Histograms, Scatter plots - Frequency Graphs.Introduction to Flash.

#### **Text Book:**

1. Torben Lage Frandsen ,'Microsoft Office Word 2007', Bookboon, India.

#### **Reference Book:**

1. Stephen Moffat ,'Microsoft Word 2010', Bookboon, India.

#### **Course Outcomes**

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

- CO1. Develop simple Mail Merge.
- CO2. Design presentation.
- CO3. Spreadsheet Data Collection.
- CO4. Convert data into charts or graphs

### **SCISVAC03: 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-1**

**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-2**

**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 – AutoPostBack 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–3**

**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–4**

**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–5**

**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 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.

### **SCISVAC04: Internet and its applications**

#### **Learning Objectives**

LO1. To impart ideas of online communication

LO2. To provide the basic knowledge about Social Medias

#### **Unit I : Internet concepts**

Introduction – Internet Connection Concepts – Connecting to Dial-up Internet Accounts – High Speed Connections : ISDN, ADSL, and Cable Modes – Intranets : Connecting LAN to the Internet.

#### **Unit II: E-mail concept**

E-mail Concepts – E-mail Addressing – E-mail Basic Commands – Sending and Receiving Files by e-mail – Controlling e-mail Volume – Sending and Receiving secure e-mail.

#### **Unit III: Internet services**

Conferencing Concepts – E-mail Mailing Lists – Usenet Newsgroup Concepts – Reading Usenet Newsgroups – Video Conferencing.

#### **Unit IV : Web concepts and Browsers**

World-Wide-Web Concepts – Elements of Web – Clients and Servers – URL and –Web Browsers – Netscape Navigator and Communicator-Microsoft Internet Explorer.

#### **Unit V: Social Media**

Online Chatting – Whatsapp –Telegram- Instagram – Facebook – Twitter.

#### **Text Book:**

1. Alexis Leon and Mathews Leon- 2012Internet for everyone, Leon Techworld, 2000 Chennai, India.

#### **Reference Book:**

1. Kamlesh N. Agarwal & PrateekA.Agarwal –An introduction to Wireless application protocol, McMillan India Ltd

#### **Course Outcomes**

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

CO1. Overall view of mailing concepts.

CO2. Communicate via social media.