ALAGAPPA UNIVERSITY

(A State University Established in 1985)

Karaikudi - 630003. Tamil Nadu, India

2017 Accredited with A+ Grade by NAAC (CGPA : 3.64)

2018 MHRD Govt. of India UGC Graded as Category - I Deemed to be University

2018 MHRD Swachh Campus Rank : 4

2021 nirf National Institutional Ranking Framework Rank : 33

2021 QS University Rankings Asia Rank : 199

FACULTY OF EDUCATION

ALAGAPPA INSTITUTE OF SKILL DEVELOPMENT

M.Voc., SOFTWARE DEVELOPMENT

REGULATIONS AND SYLLABUS

(For the candidates admitted from the Academic Year 2022 - 2023)

ALAGAPPA INSTITUTE OF SKILL DEVELOPMENT
M.Voc., (Software Development)

REGULATIONS AND SYLLABUS
[For the candidates admitted from the Academic Year 2022 – 2023 onwards]

ALAGAPPA UNIVERSITY

(A State University Accredited with "A+" grade by NAAC (CGPA: 3.64) in the Third Cycle andGraded as Category-I University by MHRD-UGC)
Karaikudi -630003, Tamil Nadu.

THE PANEL OF MEMBERS-BROAD BASED BOARD OF STUDIES

Chairperson: Dr. C. Vethirajan,Director i/c Alagappa Institute of Skill Development, Alagappa University,Teaching Experience: 27 Years, Research Experience: 20 Years, Area of Research: Corporate Finance, Corporate Taxation, Investors‟ Protection – SEBI, Customer Relationship Management, Women Entrepreneurs – HRM Competencies, Corporate Social Responsibility Corporate Financial Reporting, Environmental Protection,Corporate Stakeholders Interest.	
Foreign Expert: Dr. Seshadri Ramkumar,Professor Department of Environmental Toxicology, Texas Tech University,Teaching Experience: 40 Years Research Experience: 39 Years, Area of Research: Advanced Materials	
Indian Expert: Dr. J. Hayavadana,Professor & Head Department of Textile Technology, Osmania University,Teaching Experience: 35 Years Research Experience: 34 Years, Area of Research: Fabrication and Techno Economics of Textile production and intra discipline Projects Linking Industry with Institute & Lean & Six sigma	
Indian Expert: Dr. S. Nickolas, Professor in Computer ApplicationNational Institute of Technology, Teaching Experience: 30 Years, Research Experience: 15 Years, Area of Research: Data Mining, Big Data Analytics, Cloud Computing and High Performance Computing.	
Industry Expert: Ms.Neethu Deepak ,General Manager Opuu Fashion private Limited, Chennai,Experience:20 Years, Area: Design and Product Development	
Industry Expert: Mr. A. Arockia Arulnathan, Senior Automation Developer K7 Computing Pvt.Ltd, Chennai,Experience:07 Years, Area: Automation	

Special Invitee Dr. B.Senthil Kumar, Assistant Professor in Textile Engineering Department of Rural Industries and Management,Gandhigram Rural Institute – Deemed University,Teaching Experience:16 Years, ResearchExperience: 12 Years, Area of Research: Clothing Technology, Antimicrobial Textiles, Medical textile structures & natural dyes, Advance Textile Reinforced Composite Structures, TQM / LEAN applications in Textile & Clothing industries.	
Special Invitee Mr. Dinesh Paranthagan,Founder & CEO Hackup TechnologyEthical Hacker | Pen Tester,Experience:07 Years, Area: Hacking	
Special Invitee Dr.M.Sutha , Associate Professor Department of Tamil, Alagappa University,Teaching Experience:16 Years, Research Experience: 18 Years, Area of Research: Sangam literature to Modern literature specialization: Kappiyangal, Comparative literature.	
Special Invitee Dr.S.Valliammai , Assistant Professor Department of English and Foreign Languages, Alagappa University,Teaching Experience:14 Years, Research Experience:10 Years, Area of Research: English Language Teaching	
Alumnus/Alumna: Ms.B.Suganthi,CAD Operator,Industry, SRV Knit Garments, Perumanallur, Tirupur, Tamil Nadu, India	

ALAGAPPA UNIVERSITY
ALAGAPPA INSTITUTE OF SKILL DEVELOPMENT
Karaikudi -630003, Tamil Nadu.

REGULATIONS AND SYLLABUS-(CBCS-University Department)
[For the candidates admitted from the Academic Year 2022 – 2023 onwards]

Name of the Department : Alagappa Institute of Skill Development

Name of the Programme : M.Voc., Software Development

Duration of the Programme : Full Time (Two Years)

Choice-Based Credit System
A choice-Based Credit System is a flexible system of learning. This system allows students to gain knowledge at their own tempo. Students shall decide on electives from a wide range of elective courses offered by the University Departments in consultation with the Department committee. Students undergo additional courses and acquire more than the required numberof credits. They can also adopt an inter-disciplinary and intra-disciplinary approach to learning, and make the best use of the expertise of available faculty.

Programme
"Programme" means a course of study leading to the award of a degree in a discipline.

Courses
"Course" is a component (a paper) of a programme. Each course offered by the Department isidentified by a unique course code. A course contains lectures/ tutorials/laboratory work/seminar/project work / practical training/report writing /Viva-voce, etc or a combination of these, to meet effectively the teaching and learning needs.

Credits
The Term "Credit" refers to the weightage given to a course, usually in relation to the instructional hours assigned to it. Normally in each of the courses credits will be assigned on the basis of the number of lectures/tutorials/laboratory and other forms of learning required tocomplete the course contents in a 15-week schedule. One credit is equal to one hour oflecture per week. For laboratory/field work one credit is equal to two hours.

Semesters
An Academic year is divided into two **Semesters.** In each semester, courses are offered in 15 teaching weeks and the remaining 5 weeks are to be utilized for conduct of examination and evaluation purposes. Each week has 30 working hours spread over 5 days a week.

Medium of instruction
English

Departmental committee

The Departmental Committee consists of the faculty of the Department. The Departmental Committee shall be responsible for admission to all the programmes offered by the Department including the conduct of entrance tests, verification of records, admission, and evaluation. The Departmental Committee determine the deliberation of courses and specifies the allocation of credits semester-wise and course-wise. For each course, it will also identify the number of credits for lectures, tutorials, practicals, seminars etc. The courses (Core/Discipline Specific Elective/Non-Major Elective) are designed by teachers and approved by the Departmental Committees. Courses approved by the Departmental Committees shall be approved by the Board of Studies. A teacher offering a course will also be responsible for maintaining attendance and performance sheets (CIA -I, CIA-II, assignments and seminar) of all the students registered for the course. The Non-major elective programme and MOOCs coordinator are responsible for submitting the performance sheet to the Head of the department. The Head of the Department consolidates all such performance sheets of courses pertaining to the programmes offered by the department. Then forward the same to be Controller of Examinations.

Programme Educational Objectives- (PEO)

PEO-1	Professional Competence: Graduates of the M.Voc Software Development programme will be equipped with the necessary technical knowledge and skills to design, develop, and maintain software applications effectively.
PEO-2	Problem-Solving and Innovation: Graduates will possess strong problem-solving abilities, enabling them to analyze complex software-related issues and devise innovative solutions. They will demonstrate creativity in software design and development
PEO-3	Communication and Collaboration: The programme will enhance graduates' communication skills, enabling them to effectively interact with stakeholders, understand client requirements, and collaborate with interdisciplinary teams to deliver successful software projects.
PEO-4	Ethical and Professional Behavior: Graduates will uphold high ethical standards and professional conduct in their software development practice.
PEO-5	Adaptability and Lifelong Learning: The programme will instill in graduates a commitment to lifelong learning and a readiness to adapt to evolving technologies and industry trends
PEO-6	Entrepreneurship and Leadership: Graduates will have the knowledge and entrepreneurial mindset to identify opportunities and develop software-based solutions to meet market demands.
PEO-7	Social and Environmental Responsibility: The programme will emphasize the importance of considering the societal and environmental impact of software development. Graduates will develop an awareness of sustainability practices and contribute to solutions that align with social and environmental needs.
PEO-8	Provide flexibility to students by means of pre-defined entry and multiple exit points.
PEO-9	Industry Readiness: Graduates will be well-prepared to enter the software development industry with a strong foundation of technical and soft skills.

PEO-10	They will be able to adapt to the dynamic work environment and make valuable contributions to the organizations they join.

Programme Specific Objective-(PSO)

PSO-1	Software Development Skills: Graduates will possess advanced software development skills and be proficient in programming languages, database management, web development, mobile application development, and software testing.
PSO-2	Project Management Abilities: Graduates will demonstrate proficiency in project management methodologies, including agile and waterfall approaches. They will be capable of effectively planning, executing, and delivering software projects within specified timelines and resource constraints.
PSO-3	User-Centric Design: Graduates will have a deep understanding of user experience (UX) design principles. They will be capable of creating intuitive and user-friendly interfaces that enhance the usability and accessibility of software applications.
PSO-4	Emerging Technologies: Graduates will be familiar with emerging technologies in software development, such as artificial intelligence, machine learning, cloud computing, and Internet of Things (IoT). They will be able to explore and implement innovative solutions using these technologies.
PSO-5	Collaboration and Teamwork: Graduates will demonstrate the ability to work effectively in cross-functional teams and collaborate with diverse stakeholders. They will contribute actively to team projects, demonstrating professionalism and effective communication skills.

Programme Outcome-(PO)

PO1	Recognize the organizational need and to engage themselves in continuing professional development
PO2	Get ability to analyze the problem statements and to solve the specific field of Computer Science
PO3	Apply computer science theory and software development concepts to construct computing-based solutions
PO4	Be able to apply and evaluate the role of Computer Science in solving real time problems in society.
PO5	Use appropriate techniques, skills, and tools necessary for computing practice.
PO6	Communicate scientific information in a clear and concise manner
PO7	To develop creative solutions, and better understand the effects of future developments of computer systems and technology on people and society.
PO8	Build up programming, analytical and logical thinking abilities with ethics
PO9	Get some development experience within a specific field of domain, through project work with industry need.

PO10	Know the recent developments IT, future possibilities and limitations, and Understand the value of lifelong learning.

Programme Specific Outcomes (PSOs)

PSO1	Enrich the knowledge in the areas like, Web Services, Cloud Computing, Paradigm of Programming language, Design and Analysis of Algorithms, Database Technologies Advanced Operating System, Mobile Technologies, Software Project Management and core computing subjects
PSO2	Students understand all dimensions of the concepts of software application and domain.
PSO3	Students understand the computer subjects with demonstration of all programming and theoretical concepts with the use of ICT
PSO4	Interact with IT experts & knowledge by industry visits
PSO5	To make them employable according to current demand of IT Industry and responsible citizen

Eligibility for admission

For Admission

A candidate who is a graduate of this University or any recognized University in the main subject / subjects as given below against each or who has passed an examination accepted by the Syndicate, as equivalent thereto.

M.Voc., Software Development	B.Voc., degree in Software Development / B.Sc., degree in Computer Science/ Information Technology /Electronics / B.C.A. / B.Com. (Computer Applications) / any UG degree with core / allied papers related to Software Development / Computer Science / Information Technology / Computer Applications or any qualification equivalent thereto in 10+2+3 pattern with 55% marks in Part III (for SC/ST candidates 50%)

For the Degree

The candidates shall have subsequently undergone the prescribed programme of study in Alagappa Institute of Skill Development, Alagappa University for not less than two academic years comprising 4 semester, passed the examinations prescribed and fulfill such conditions as have been prescribed therefore.

Minimum Duration of programme

The programme is for a period of two years. Each year shall consist of two semesters viz. Odd and Even semesters. Odd semesters shall be from June / July to October / November and evensemesters shall be from November / December to April / May. Each semester there shall be 90 working days consisting of 6 teaching hours per working day (5 days/week).

Components

A PG programme consists of a number of courses. The term "course" is applied to indicate a logicalpart of the subject matter of the programme and is invariably equivalent to the subject matter of a "paper" in the conventional sense. The following are the various categories of the courses suggested for the PG programmes:

A. Core courses (CC)- "Core Papers" means "the core courses" related to the programme concerned including practicals and project work offered under the programme and shall cover Core competency, critical thinking, analytical reasoning, and research skill.

B. Discipline-specific electives (DSE) means the courses offered under the programme related to the major but are to be selected by the students, and shall cover additional academic knowledge, critical thinking, and analytical reasoning.

C. Non-Major Electives (NME)- Exposure beyond the discipline

- Students have to undergo a total of Non-Major Elective courses with 2 credits offered by other departments (one in II Semester and another in III Semester)
- A uniform time frame of 3 hours on a common day (Tuesday) shall be allocated for the Non-Major Electives
- Non-Major Elective courses offered by the departments pertaining to a semester should be announced before the end of the previous semester.
- Registration process: Students have to register for the Non-Major Elective course within 15 days from the commencement of the semester either in the department or NME portal (University website).

D. Self-Learning Courses from MOOCs platforms.

- MOOCs shall be voluntary for the students.
- Students have to undergo a total of 2 Self Learning Courses (MOOCs) one inII semester and another in III semesters.
- The actual credits earned through MOOCs shall be transferred to the credit plan of programmes as extra credits. Otherwise 2 credits/course be given if the self-Learning Course (MOOCs) is without credit.
- While selecting the MOOCs, preference shall be given to the course related to employability skills.

E. Projects / Dissertation /Internships (Maximum Marks: 200**)**

The student shall undertake the Project/Dissertation/internship during the fourthsemester.

- **Plan of work**

Project/ Dissertation

The candidate shall undergo Project/Dissertation Work during the final semester. The candidate should prepare a scheme of work for the dissertation/project and should get approval from the guide. The candidate, after completing the dissertation /project work, shall be allowed to submit it to the university departments at the end of the final semester. If the candidate is desirous of availing the facility from other

departments/universities/laboratories/organizations they will be permitted only after getting approval from the guide and HOD. In such a case, the candidate shall acknowledge the same in their dissertation/project work.

- **Format to be followed for dissertation/project report**

  The format /certificate for thesis to be followed by the student are given below

  - Title page
  - Certificate
  - Acknowledgment
  - Content as follows:

Chapter No	Title	Page number
1	Introduction	
2	Aim and objectives	
3	Review of literature	
4	Materials and methods	
5	Result	
6	Discussion	
7	Summary	
8	References	

- **Format of the title page**

Title of Dissertation/Project work

Dissertation submitted in partial fulfilment of the requirement for the degree of Master of Science in _____to the Alagappa University, Karaikudi - 630003.

By

(Student Name)

(Register Number)

University Logo

Department of ----------

Alagappa University

(A State University Accredited with –A+‖ grade by NAAC (CGPA: 3.64) in the Third Cycle and Graded as Category-I University by MHRD-UGC, 2019: QS ASIA Rank- 216, QS BRICS Rank-104, QS India Rank-20)

Karaikudi – 630003

(Year)

- **Format of certificates-**

Certificate –Guide

This is to certify that the thesis entitled "----------" Submitted to Alagappa University, Karaikudi-630 003 in partial fulfilment for the degree of Master of Science in ---------- by Mr/Miss ----------(Reg No----------) under my Supervision. This is based on the results of studies carried out by him/her in the Department of----------, Alagappa University, Karaikudi-630 003. This dissertation/Project or any part of this work has not been submitted elsewhere for any other degree, diploma, fellowship, or any other similar titles or record of any University or Institution.

Place: Karaikudi
Date:

Research Supervisor

Certificate - (HOD)

This is to certify that the thesis entitled **"----------"** submitted by Mr/**Miss ----------(Reg No: ----------)** to the Alagappa University, in partial fulfilment for the award of the degree of **Master of** --------in ---------- is a bonafide record of research work done under the supervision of **Dr----------,** Assistant Professor, Department of----------, Alagappa University. This is to further certify that the thesis or any part thereof has not formed the basis of the award to the student of any degree, diploma, fellowship, or any other similar title of any University or Institution.

Place: Karaikudi
Date:

Head of the Department

Declaration (student)

I hereby declare that the dissertation entitled **"----------"** submitted to Alagappa University for the award of the degree of Master of -------- in ---------- has been carried out by me under the guidance of **Dr----------**, Assistant Professor, Department of----------, Alagappa University, Karaikudi – 630 003. This is my original and independent work and has not previously formed the basis of the award of any degree, diploma, associateship, fellowship, or any other similar title of any University or Institution.

Place: Karaikudi
Date:

(----------)

Internship

The students shall undergo Internship / industrial training in the reputed organizations for minimum of two weeks to acquire industrial knowledge during the summer vacation of second semester. The students have to find industry related to their discipline (Public limited/Private Limited/owner/NGOs etc.,) in consultation with the faculty in charge/Mentor and get approval from the Head of the Department and Departmental Committee before going for an internship / industrial training.

Format to be followed for Internship report

The format for internship report to be followed by the student are given below

- **Format of the title page**

Title of internship report

Internship report submitted in partial fulfillment of the requirement for the Master of Science in Fisheries Science to the Alagappa University, Karaikudi -630003.

By

(Student Name)

(Register Number)

University Logo

Department of _____

Alagappa University

(A State University Accredited with "A+" grade by NAAC (CGPA: 3.64) in the Third Cycle and Graded as Category-I University by MHRD-UGC, 2019: QS ASIA Rank- 216, QS BRICS Rank-104, QS India Rank-20)

Karaikudi – 630003

(Year)

- **Format of certificate**

(Faculty in-charge)

This is to certify that the internship report entitled "----------
------" submitted to Alagappa University, Karaikudi-630 003 in partial fulfilment for the Master of vocational in_____by Mr/Miss ---------- (Reg. No.:---
---------) under my supervision. This is based on the work carried out by him/her in the organization M/S---------- --. This Internship report or any part of this work has not been submitted elsewhere for any other degree, diploma, fellowship, or any other similar record of any University or Institution.

Place: Research Supervisor

Date:_____

(HOD)

This is to certify that the Internship report entitled "---------- " submitted by Mr./Miss.---------- (Reg No:----------) to the Alagappa University, in partial fulfilment for the award of the Master of vocational in _____is a bonafide record of Internship report done under the supervision of ----------, Assistant Professor, Department of ----------, Alagappa University and the work carried out by him/her in the organization M/S ----------. This is to further certify that the thesis or any part thereof has not formed the basis of the award to the student of any degree, diploma, fellowship, or any other similar title of anyUniversity or Institution.

Place: Karaikudi Head of the Department
Date:_____

(Company supervisor or Head of the Organization)

This is to certify that the Internship report entitled "----------
-----" submitted to Alagappa University, Karaikudi-630 003 in partial fulfilment for the Master of vocational in_____by Mr./Miss ---------- (Reg No:----------
-) under my supervision. This is based on the work carried out by him/her in our organization M/S ---------- for the period of ------. This Internship report or any part of this work has not been submitted elsewhere for any other degree, diploma, fellowship, or any other similar record of any University or Institution.

Place: Supervisor or In charge
Date:_____

Declaration (student)

I hereby declare that the Internship Report entitled " ---------- " submitted to the Alagappa University for the award of the Master of vocational in _____has been carried out by me under the supervision of----------, Assistant Professor, Department of----------, Alagappa University, Karaikudi – 630 003. This is my original and independent work carried out by me in the organization M/S --------
---------- for the period of and has not previously formed the basis of the award of any degree, diploma, associateship, fellowship, or any other similar title of any University or Institution.

Place: Karaikudi (----------)
Date:_____

- Acknowledgment
- Content as follows:

Chapter No.	Title	Page No.
1	Introduction	
2	Aim and objectives	
3	Organisation profile / details	
4	Methods / Work	
5	Observation and knowledge gained	
6	Summary and outcome of the Internship study	
7	References	

No. of copies of the dissertation/internship report

The candidate should prepare three copies of the dissertation report and submit the same for the evaluation of examiners. After evaluation, one copy will be retained in the department library, one copy will be retained by the guide and the student shall hold one copy. The candidate should prepare one copy of the field visit/internship report and submit the same for the evaluation of examiners

Teaching methods

The teacher delivers the lecture and provides some time after the lecture for discussionamong the students and teacher in the classroom. The student‟s views, comments experiences, problems, difficulties in understanding any point or portion of the lecture come to teacher‟s knowledge and teacher replies, and clarifies the doubts. It is an important strategy in stimulating the student‟s interests and assesses their understanding of the concept. In the laboratory the instruction was given associated with their course, the students are allowed to attend the demonstration and allow them to do the experiment individually. Skill oriented workshop and demo classes are arranged with industrial experts. Periodic tests would be conducted and for the students of slow learners would be given special attention.

Attendance

Students must have earned 75% of attendance in each course for appearing for the examination. Students who have earned 74% to 70% of attendance need to apply forcondonation in the prescribed form with the prescribed fee. Students who have earned 69% to 60% of attendance need to apply for condonation in the prescribed form with the prescribed fee along with the Medical Certificate. Students who have below 60% of attendance are not eligible to appear for the End Semester Examination (ESE). They shall re-do the semester(s) after completion of the programme

Examination

The examinations shall be conducted separately for theory and practical‟s to assess (remembering, understanding, applying, analysing, evaluating, and creating) the knowledge required during the study. There shall be two systems of examinations viz., internal and external examinations. The internal examinations shall be conducted as Continuous Internal Assessment tests I and II (CIA Test I & II).

Internal Assessment

The internal assessment shall comprise a maximum of 25 marks for each subject. The following procedure shall be followed for awarding internal marks.

Theory -25 marks

Sr.No	Content	Marks
1	Average marks of two CIA test	15
2	Seminar/group discussion/quiz	5
3	Assignment/field trip report/case study report	5
	Total	**25**

Practical -25 Marks

1	Average marks of two CIA test	15 marks
2	Attendance	2 marks
3	Observation note book	8 marks
	Total	25 Marks

Internship- 25 Marks (assess by Guide/incharge/HOD/Supervisor)

1	Presentations	15 Marks
2	Progress report	10 Marks
	Total	25 Marks

Project/Dissertation -50 Marks (assess by Guide /incharge /HOD/ Supervisor)

1	Two presentations (mid-term)	30 Marks
2	Progress report	20 Marks
	Total	50 Marks

External Examination

- There shall be examinations at the end of each semester, for odd semesters in the month of October / November; for even semesters in April / May.
- A candidate who does not pass the examination in any course(s) may be permitted to appear in such failed course(s) in the subsequent examinations to be held in October / November or April / May. However, candidates who have arrears in Practical shall be permitted to take their arrear Practical examination only along with Regular Practical examination in the respective semester.
- A candidate should get registered for the first-semester examination. If registration is not possible owing to a shortage of attendance beyond condonation limit/regulation prescribed OR belated joining OR on medical grounds, the candidates are permitted to move to the next semester. Such candidates shall re-do the missed semester after completion of the programme.
- For the Project Report/ Dissertation Work the maximum marks will be 100 marks for project

report evaluation and for the Viva-Voce it is 50 marks

- For the Internship the maximum marks will be 50 marks for project report evaluation and for the Viva –Voce it is 25 marks.
- Viva-Voce: Each candidate shall be required to appear for the Viva-Voce Examination (in defense of the Dissertation Work / Internship).

Scheme of External Examination (Question Paper Pattern)

Theory - Maximum 75 Marks

Section A	10 questions. All questions carry equal marks. (Objective-type questions)	10 x 1 = 10 Marks	10 questions – 2 each from every unit
Section B	5 questions Either / or type like 1.a (or) b. All questions carry equal marks	5 x 5 = 25	5 questions – 1 each from every unit
Section C	5 questions Either / or type like 1.a (or) b. All questions carry equal marks	5 x8 = 40	5 questions – 1 each from every unit

Practical –Maximum 75 Marks

Section A	Major experiment	15 Marks
Section B	Minor experiment	10 Marks
Section C	Experimental setup	5 Marks
Section D	Spotters (5 spotters x5 marks)	25 Marks
Section E	Record note	10 Marks
Section F	Vivo voce	10 Marks

Dissertation /Project report Maximum 150 Marks

Dissertation /Project report	100 Marks
Vivo voce	50 Marks

Internship report Maximum 75 Marks

Internship report	50 Marks
Vivo voce	25 Marks

Results

The results of all the examinations will be published through the Department where thestudent underwent the course as well as through University Website

Passing minimum

- A candidate shall be declared to have passed in each course if he/she secures not less than 40% marks in the End Semester Examinations and 40% marks in the Internal Assessment and not less than 50% in the aggregate, taking Continuous assessmentand End Semester Examinations

marks together.

- The candidates not obtained 50% in the Internal Assessment are permitted to improve their Internal Assessment marks in the subsequent semesters (2 chances will be given)by writing the CIA tests and by submitting assignments.
- Candidates, who have secured the pass marks in the End-Semester Examination and in the CIA but failed to secure the aggregate minimum pass mark (E.S.E + C I.A), are permitted to improve their Internal Assessment mark in the following semester and/or in University examinations.
- A candidate shall be declared to have passed in the Project / Dissertation / Internshipif he /she gets not less than 40% in each of the Project / Dissertation / Internship and Viva-Voce and not less than 50% in the aggregate of both the marks for Project / Dissertation / Internship Report and Viva-Voce.
- A candidate who gets less than 50% in the Project Report must resubmit the Project Report. Such candidates need to take again the Viva-Voce on the resubmitted Project.

Grading of the Courses

The following table gives the marks, Grade points, Letter Grades and classificationsmeant to indicate the overall academic performance of the candidate.

Conversion of Marks to Grade Points and Letter Grade (Performance in Paper / Course)

RANGE OF MARKS	GRADE POINTS	LETTER GRADE	DESCRIPTION
90 - 100	**9.0 – 10.0**	**O**	**Outstanding**
80 - 89	**8.0 – 8.9**	**D+**	**Excellent**
75 - 79	**7.5 – 7.9**	**D**	**Distinction**
70 - 74	**7.0 – 7.4**	**A+**	**Very Good**
60 - 69	**6.0 – 6.9**	**A**	**Good**
50 - 59	**5.0 – 5.9**	**B**	**Average**
00 - 49	**0.0**	**U**	**Re-appear**
ABSENT	**0.0**	**AAA**	**ABSENT**

a) Successful candidates passing the examinations and earning GPA between 9.0 and 10.0and marks from 90 – 100 shall be declared to have Outstanding (O).
b) Successful candidates passing the examinations and earning GPA between 8.0 and 8.9and marks from 80 - 89 shall be declared to have Excellent (D+).
c) Successful candidates passing the examinations and earning GPA between 7.5 – 7.9and marks from 75 - 79 shall be declared to have Distinction (D).
d) Successful candidates passing the examinations and earning GPA between 7.0 – 7.4and marks from 70 - 74 shall be declared to have Very Good (A+).
e) Successful candidates passing the examinations and earning GPA between 6.0 – 6.9and marks from 60 - 69 shall be declared to have Good (A).
f) Successful candidates passing the examinations and earning GPA between 5.0 – 5.9and marks from 50 - 59 shall be declared to have Average (B).
g) Candidates earning GPA between 0.0 and marks from 00 - 49 shall be declared to haveRe-appear (U).
h) Absence from an examination shall not be taken as an attempt.

From the second semester onwards the total performance within a semester and continuous performance starting from the first semester are indicated respectively **by Grade PointAverage (GPA) and Cumulative Grade Point Average (CGPA).** These two are calculatedby the following formulate

GRADE POINT AVERAGE (GPA) = $\sum_i C_i G_i / \sum_i C_i$

GPA = Sum of the multiplication of Grade Points by the credits of the courses / Sum of the credits of the courses in a Semester

Classification of the final result

CGPA	Grade	Classification of Final Result
9.5 – 10.0 9.0 and above but below 9.5	**O+** **O**	First Class – Exemplary*
8.5 and above but below 9.0 8.0 and above but below 8.5 7.5 and above but below 8.0	**D++** **D+ D**	First Class with Distinction*
7.0 and above but below 7.5 6.5 and above but below 7.0 6.0 and above but below 6.5	**A++A+** **A**	First Class
5.5 and above but below 6.0 5.0 and above but below 5.5	**B+** **B**	Second Class
0.0 and above but below 5.0	**U**	Re-appear

The final result of the candidate shall be based only on the CGPA earned by the candidate.

a) Successful candidates passing the examinations and earning CGPA between 9.5 and 10.0 shall be given Letter Grade (O+), those who earned CGPA between 9.0 and 9.4 shall be given Letter Grade (O) and declared to have First Class –Exemplary*.
b) Successful candidates passing the examinations and earning CGPA between 7.5 and 7.9shall be given Letter

Grade (D), those who earned CGPA between 8.0 and 8.4 shall be given Letter Grade (D+), those who earned CGPA between 8.5 and 8.9 shall be given Letter Grade (D++) and declared to have First Class with Distinction*.

c) Successful candidates passing the examinations and earning CGPA between 6.0 and 6.4 shall be given Letter Grade (A), those who earned CGPA between 6.5 and 6.9 shall be given Letter Grade (A+), and those who earned CGPA between 7.0 and 7.4 shall be given Letter Grade (A++) and declared to have First Class

d) Successful candidates passing the examinations and earning CGPA between 5.0 and 5.4 shall be given Letter Grade (B), those who earned CGPA between 5.5 and 5.9 shall be given Letter Grade (B+) and declared to have passed in Second Class.

i) Candidates those who earned CGPA between 0.0 and 4.9 shall be given Letter Grade (U) and declared to have Re-appear.

e) Absence from an examination shall not be taken as an attempt.

CUMULATIVE GRADE POINT AVERAGE (CGPA) = $\sum_n \sum_i C_{ni} G_{ni} / \sum_n \sum_i C_{ni}$

CGPA = Sum of the multiplication of Grade Points by the credits of the entire Programme Sum of the credits of the courses for the entire Programme

Where „**Ci**" is the Credit earned for Course i in any semester; „**Gi**" is the Grade Point obtained by the student for Course i and „n" refers to the semester in which such courses were credited.

CGPA (Cumulative Grade Point Average) = Average Grade Point of all the Courses passed starting from the first semester to the current semester.

Note: * The candidates who have passed in the first appearance and within the prescribed Semesters of the PG Programme are alone eligible for this classification.

Maximum duration of the completion of the programme

The maximum period for completion of **M.Voc** in software development shall not exceed eight semesters continuing from the first semester.

Conferment of the Master's Degree

A candidate shall be eligible for the conferment of the Degree only after he/ she has earned the minimum required credits for the Programme prescribed therefor (i.e. 90 credits). Programme).

Village Extension Programme

The Sivaganga and Ramnad districts are very backward districts where a majority of people Lives in poverty. The rural mass is economically and educationally backward. Thus the aim of the introduction of this Village Extension Programme is to extend out to reach environmental awareness, social activities, hygiene, and health to the rural people of this region. The students in their third semester have to visit any one of the adopted villages within the jurisdiction of Alagappa University and can arrange various programs to educate the rural mass in the following areas for three day based on the theme.1. Environmental awareness 2. Hygiene and Health. A minimum of two faculty members can accompany the students and guide them.

M.Voc., SOFTWARE DEVELOPMENT

Degree	Sem	Subject code	Courses	Course Name	Credits Skills(S)/ General (G)		Theory/ Practical	Hrs./Week	Marks		Total
					S	G			Int.	Ext	
Post-Graduate Diploma in Software Development	I	2MS1C1	**Core – I**	Programming with Java	5	--	T	5	25	75	100
		2MS1C2	**Core – II**	Software Engineering	4	--	T	4	25	75	100
		2MS1P1	**Core-III**	Programming with Java - Lab	5	--	P	5	25	75	100
		2MS1P2	**Core-IV**	Web Designing Technologies - Lab	4	--	P	4	25	75	100
		2MS1G1	**General**	Digital Electronics & Computer System Architecture	--	4	T	4	25	75	100
		2MS1G2	**General**	Mathematical logics for Software Development	--	4	T	4	25	75	100
			DSE-I	**Elective – I-Lab**	--	4	P	4	25	75	100
			Sub-Total		**18**	**12**					
			Total for Semester - I		**30**			**30**	**--**	**--**	**700**
	II	2MS2C1	**Core – V**	Principles of Computer Networks & Cyber Security	4	--	T	4	25	75	100
		2MS2C2	**Core – VI**	Fundamental of Operating System	4	--	T	4	25	75	100
		2MS2P1	**Core-VII**	UI and UX Design Lab	4	--	P	4	25	75	100
		2MS2P2	**Core –VIII**	Python - Lab	3	--	P	3	25	75	100
		2MS2MP	**Core – IX**	**Mini-Project**	3	--		3	100	--	100
			NME	**Non-major Elective Course – I**	--	2	-	2	25	75	100
			DSE-II	**Elective – II – Lab**	--	5	P	5	25	75	100
			DSE-III	**Elective – III @**	--	5	P	5	25	75	100
			SLC	**Self-Learning Course (MOOCs) – I %**	--	(E)	-	--	--	--	--
			Sub-Total		**18**	**12**					
			Total for Semester – II		**30**			**30**	**--**	**--**	**800**
M.Voc. Degree in Software Development	III	2MS3C1	**Core- X-**	Principles of IOT	4	--	T	4	25	75	100
		2MS3C2	**Core- XI-**	Fundamentals of Data Science	4	--	T	4	25	75	100
		2MS3C3	**Core – XII**	Fundamentals of AI & ML	4	--	T	4	25	75	100
		2MS3P1	**Core –XIII**	Mobile Application Development-Lab	4	--	P	4	25	75	100
		2MS3C4	**Core – XIV**	Finishing Skills for Software Development #	2	--	P	2	100	--	100
			NME	**Non-major Elective Course – II**	--	2	-	2	25	75	100
			DSE-IV	**Elective – IV**	--	5	T	5	25	75	100
			DSE-V	**Elective – V – Lab**	--	5	P	5	25	75	100
			SLC	**Self-Learning Course (MOOCs) – II%**	--	(E)	-	--	--	--	--
				Sub-Total	**18**	**12**					
				Total for Semester – III	**30**			**30**	**--**	**--**	**800**
	IV	2MS4G1	**General**	Principles of Digital Marketing	-	6	T	6	25	75	100
		2MS4G2	**General**	Fundamentals of Industry 4.0& 3D Printing	-	6	T	6	25	75	100
		2MS4MR	**Core – XV**	Industrial Internship with Project Work	18	-		18	150	50	200
			Total for Semester – IV		**18**	**12**		**30**	**-**	**--**	**400**
			Grand total		**120**			**120**	**-**	**--**	**2700**

Elective – I

1. C Programming Lab – 2MS1E1
2. Data Structures and Analysis of Algorithms Lab – 2MS1E2
3. Object-Oriented Programming with C++ Lab – 2MS1E3

Elective – II – Lab

1. RDBMS - Lab – 2MS2E1
2. Web Graphics – Lab – 2MS2E2
3. Distributed programming with .Net/ J2EE- Lab – 2MS2E3

Elective – III

1. Corporate Etiquette Skills – 2MV2E4
2. Competitive Examination Skills – 2MV2E5
3. Soft Skills and Entrepreneurial Skills – 2MV2E6

Elective – IV

1. Principles of Bioinformatics – 2MS3E1
2. Principles of Compiler Design – 2MS3E2
3. Cloud Computing – 2MS3E3

Elective – V – Lab

1. Ethical Hacking Essentials Laboratory – 2MS3E4
2. Data Analytics using python - Lab – 2MS3E5
3. IoT - Lab – 2MS3E6

Industrial Internship with Project Work

Project Evaluation (Internal) – 150 Marks
Viva – voce (External) – 50 Marks

Fully-internal Course – Examination will be conducted internally
@ External Examination will be conducted as Viva-voce Examination
% Self-Learning Course – MOOCs – Extra Credits (E) – Extra credits earned through MOOCs

Non-Major Elective Courses (PG):

Sem.	Course Code	Non-major Elective Course Name	Credits	Hrs. /	Marks		Total
					Int.	Ext.	
II		Non-major Elective – I : Web Designing	2	3	25	75	100
III		Non-major Elective – II : Principles of Digital Marketing	2	3	25	75	100

Semester - I					
				C	H/W
Core	**Course code 2MS1C1**	**Programming with Java**	**Theory**	**5**	**5**

Unit - I		
Objective 1	**To understand and familiar with Object-Oriented concepts and the power of Java language in Internet programming**	
An Overview of Java - Features of Java - Object oriented concepts - Lexical Issues - DataTypes - Variables - Type Conversions and Casting - Arrays - Operators - Control Statements.		
Outcome 1	**Understand the knowledge of programming skills in java**	**K1, K2**

Unit-II		
Objective 2	**To understand the clear structure of Java programs and makes the code easier to maintain, modify and debug**	
Object Orientation in Java: Classes – Methods – Inheritance – Packages – Interfaces –programming examples. Exception Handling: Fundamentals – Exception types – Try catch block – throw, throw clause – finally clause – User defined Exceptions.		
Outcome 2	**Comprehend and construct applications using java language**	**K2**

Unit III		
Objective 3	**To Apply the thread model in the features like Swing, JavaBeans, Sockets**	
Threads: Thread model – Life Cycle of a Thread- Thread priorities – Runnable interface –creating a thread, Multiple threads – Synchronization – Inter-thread communication – Suspending, Resuming and stopping threads.		
Outcome 3	**Complicated tasks performed by the applying method of threads**	**K3**

Unit IV		
Objective 4	**To analyze facilities of Java language such as, Applets, Exception handling and I/O streams.**	
Input/Output: String handling – Exploring java IO Package. Applets: Applet basics – Applet Program- Introducing the AWT: Working with Windows, Graphics and Text- AWT Classes Working with Frames-Working with Graphics-Working with Color Working with Fonts-Using AWT Controls, Layout Managers and Menus.		
Outcome 4	**Student Analyze the process the input and produce the output of Java**	**K4**

Unit V		
Objective 5	**To Educate about Network basics and enterprise architecture models.**	
Network basics –socket programming – proxy servers – TCP/IP– Net Address – URL – Datagrams - Java Utility Classes- Java Bean- Advantages of Java Beans- Introspection- Design Patterns for Properties- Design Patterns for Events- Methods and Design Patterns- Using the Bean info Interface- Bound and Constrained Properties- The JavaBeans API.		
Outcome 5	**Analyze various built in package and its applications and modules.**	**K4**

Suggested Readings:-

Herbert Schildt. (2019). *JAVA – The complete reference*. (11th ed.). New Delhi: Tata McGraw Hill.Cay S. Horstmann. (2012). *Core Java Volume I—Fundamentals*. (9th ed.). Prentice Hall.

Walter Savitch. (2014). *Java: An Introduction to Problem Solving and Programming*. (8th ed.)Chitra A. (2002). *Internet and Java Programming* ISTE.

Online Resources					
https://www.academia.edu/41982986/Java_The_Complete_Reference_11th_edition https://www2.nsru.ac.th/tung/java_doc/Core%20Java%20Volume%20I%20Fundamentals%209th%20Edition%20Horstmann,%20Cay%20S.%20&%20Cornell,%20Gary_2013.pdf					
K1- Remember	**K2-Understand**	**K3-Apply**	**K4-Analyze**	**K5-Evaluate**	**K6-Create**

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	M(2)	S (3)	S (3)	S (3)	L (1)	M (2)	M (2)	M (2)	L (1)
CO2	S (3)	S (3)	M(2)	S (3)	M(2)	M(2)	M(2)	M(2)	M(2)	M(2)
CO3	M(2)	M(2)	S (3)	M(2)	S (3)	L (1)	M(2)	M(2)	L (1)	M(2)
CO4	S (3)	S (3)	S (3)	M(2)	S (3)	M(2)	M(2)	M(2)	M(2)	M(2)
CO5	M(2)	M(2)	S (3)	S (3)	M(2)	L (1)	M(2)	S (3)	M(2)	M(2)
W.AV	**2.6**	**2.4**	**2.8**	**2.6**	**2.6**	**1.4**	**2**	**2.2**	**1.8**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	M(2)	M(2)	M(2)	L (1)
CO2	M(2)	S (3)	M(2)	S (3)	M(2)
CO3	M(2)	M(2)	M(2)	L (1)	M(2)
CO4	S (3)	M(2)	M(2)	M(2)	L (1)
CO5	M(2)	S (3)	M(2)	S (3)	M(2)
W.AV	**2.8**	**2.4**	**2**	**2.2**	**1.6**

S –Strong (3), M-Medium (2), L- Low (1)

Semester-I					
Core	**Course code: 2MS1C2**	**Software Engineering**	**Theory**	**C**	**H/W**
				4	**4**

Unit -I		
Objective 1	**To familiarize the basic information about software engineering and its process.**	
The Nature of Software- Software Engineering- Software Process Structure- Process Models-Agile Development - Human Aspects of Software Engineering.		
Outcome 1	**Learners understand the fundamental concepts of Software engineering**	**K1 & K2**

Unit II		
Objective 2	**To educate the modeling and its requirements of web and mobile applications**	
Principles that Guide Practice- understanding requirements- Requirements Modeling: Scenario Based Methods, Class Based Methods, Behavior, Patterns and Web/ Mobile Apps.		
Outcome 2	**Students identify the web based & mobile application technology**	**K3**

Unit III		
Objective 3	**To elaborate the design concepts of UI technologies**	
Design Concepts- User Interface Design- WebApp Design- Mobile App Design		
Outcome 3	**Students analyze the recent trends of User interface concepts**	**K4**

Unit IV		
Objective 4	**To equip students with a comprehensive understanding of software quality concepts, review techniques**	
Quality Concepts- Review Techniques- Software Quality Assurance- Software TestingStrategies- Testing Conventional Applications- Testing Web Applications.		
Outcome 4	**Learners acquire knowledge on software testing techniques**	**K2 & K4**

Unit V		
Objective 5	**To provide students with a comprehensive understanding of project management concepts, process and project metrics.**	
Project Management Concepts- Process and Project Metrics- Estimation for Software Projects- Project Scheduling- Risk Management.		
Outcome 5	**Demonstrate a solid understanding of project management principles, including project initiation, planning, execution, monitoring**	**K5**

Suggested Readings:-

Ian Sommerville**.** 2017. *Software Engineering*. Tenth Edition. By Pearson.

Rajib Mall.(2018). *Fundamentals of Software Engineering.* (5th ed.). New Delhi: PHIL earning, Private Limited.

Roger S. Pressman, 2014. *Software Engineering – A Practitioner's Approach.* 8 th Ed., McGrawHill International.

Online Resources::

https://www.javatpoint.com/software-engineering-tutorial
https://onlinecourses.swayam2.ac.in/cec20_cs07/preview
https://onlinecourses.nptel.ac.in/noc19_cs69/preview

K1-Remember	K2-Understand	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S (3)	S (3)	L (1)	M (2)	L (1)	S (3)	L (1)	M (2)	L (1)	L (1)
CO2	L (1)	M (2)	M (2)	L (1)	L (1)	S (3)	L (1)	M (2)	L (1)	L (1)
CO3	M (2)	M (2)	L (1)	L (1)	M (2)	S (3)	M (2)	M (2)	M (2)	L (1)
CO4	M (2)	M (2)	M (2)	L (1)	M (2)	S (3)	M (2)	M (2)	M (2)	M (2)
CO5	L (1)	L (1)	L(1)	L (1)	M (2)	S (3)	M (2)	M (2)	M (2)	L (1)
W.AV	**1.8**	**2**	**1.4**	**1.2**	**1.6**	**3**	**1.6**	2	1.6	**3**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	M (2)	L (1)	L (1)
CO2	M (2)	M (2)	M (2)	M (2)	M (2)
CO3	M (2)	M (2)	M (2)	L (1)	M (2)
CO4	M (2)	L (1)	M (2)	S (3)	M (2)
CO5	M (2)	L (1)	M (2)	S (3)	M (2)
W.AV	**2**	**1.8**	**2**	**2**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - I					
Core	**Course code: 2MS1P1**	**Programming with Java Lab**	**Practical**	**C**	**H/W**
				5	**5**

Unit - I		
Objective 1	**To impart the knowledge about Java programs to solve problems and able to debug and test Java programs**	
Demonstrate the String Operations Demonstrate Interfaces and Packages Demonstrate Inner Class Demonstrate Inheritance		
Outcome 1	**Understand the concept of Object Oriented Programming & Java Programming Constructs**	**K1, K2**
Unit-II		
Objective 2	**To understand Java libraries, Interfaces, Packages, Threads and I/O streams**	
Demonstrate 2D Shapes on Frames Demonstrate Text and Fonts (copy, display, counting characters, words and lines) Demonstrate Event handling for various types of Events		
Outcome 2	**Formulate a I/O streams and handling the events**	**K2,K6**
Unit III		
Objective 3	**To design programs using abstract classes**	
Multicasting Techniques Demonstrate the use of Dialog Box		
Outcome 3	**Students understand about abstract classes.**	**K2,K6**
Unit IV		
Objective 4	**To impart the students to hands on experience with java programming.**	
Create a Dialog Box and Menus. Create a Tool Bar, Menu & Popup Menu Implement File Handlings		
Outcome 4	**Design a Windows tool bar and handle a file structure in java Programming**	**K3,K6**
Unit V		
Objective 5	**To execute multithreaded programs**	
Demonstrate Applet Programming Demonstrate Multithreading Write an Application for Student Information System using JDBC and AWT		
Outcome 5	**Design the applications of Java & Java applet**	**K3,K6**

Suggested Readings:-

Database Programming With Jdbc & Java

David J. Eck Hobart and William Smith Colleges Introduction to Programming Using Java Version 5.0, December 2006 (Version 5.0.2, with minor corrections, November 2007)

Developing Java Servlets

Goodwill, James Techmedia 1

Reese, George 2nd ed Oreilly

Online Resources: https://www.atri.edu.in/images/pdf/departments/JAVA%20PROGRAMMING%20%20MANUAL.pdf https://introcs.cs.princeton.edu/					
K1-Remember	**K2-Understand**	**K3-Apply**	**K4-Analyze**	**K5-Evaluate**	**K6-Create**

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	M(2)	L(1)	M(2)	M(2)	M(2)	L(1)	M(2)	L(1)	S(3)
CO2	M(2)	M(2)	S(3)	S(3)	M(2)	L(1)	L(1)	S(3)	M(2)	L(1)
CO3	M(2)	M(2)	L(1)	S(3)	M(2)	L(1)	S(3)	M(2)	L(1)	S(3)
CO4	L(1)	M(2)	M(2)	M(2)	L(1)	M(2)	S(3)	M(2)	M(2)	S(3)
CO5	M(2)	L(1)	M(2)	S(3)	S(3)	M(2)	S(3)	M(2)	L(1)	M(2)
W.AV	**2**	**1.8**	**1.8**	**2.6**	**2**	**1.6**	**2.2**	**2.2**	**1.4**	**2.4**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	S(3)	S(3)	M(2)	M(2)
CO2	M(2)	M(2)	L(1)	M(2)	S(3)
CO3	S(3)	M(2)	S(3)	L(1)	M(2)
CO4	L(1)	S(3)	M(2)	S(3)	L(1)
CO5	M(2)	M(2)	L(1)	S(3)	S(3)
W.AV	**2.2**	**2.4**	**2**	**2.2**	**2.2**

S –Strong (3), M-Medium (2), L- Low (1)

Semester-I					
Core	**Course Code: 2MS1P2**	**Web Designing Technologies - Lab**	**Practical**	**C**	**H/W**
				4	**4**

Unit - I		
Objective 1	**Able to design a web page using HTML tags**	
1. Design and format the contents of a webpage using basic tags. 2. Design a HTML page describing your profile using list items. 3. Design three HTML pages to describe about courses offered in „Alagappa Institute of SkillDevelopment“ and navigate among them. 4. Design an application form for opening a SB account using 'form' tag. 5. Design a webpage using Frame tag.		
Outcome 1	**Understand & implement the basic HTML tags to create static web pages**	**K1 & K2**

Unit - II		
Objective 2	**Students will learn the basics of JavaScript syntax, data types, and control structures.**	
1. Find a maximum of three given numbers using JavaScript 2. Write a JavaScript to perform all arithmetic operations 3. Write a JavaScript to check whether the given number is prime or not 4. Write a JavaScript to illustrate built-in string functions. 5. Validate user name and password using JavaScript 6. Validate the details of SB Account form using JavaScript. 7. Create popup boxes using java script		
Outcome 2	**Develop a JavaScript program for various functions, statements and popup boxes**	**K3**

Unit - II		
Objective 3	**Students will learn how to design student ID cards, invitations, flexible banners, and web page layouts using Photoshop's powerful tools and features.**	
1. Design a Student ID card using Photoshop 2. Design an Invitation using Photoshop 3. Using Photoshop design Flexible Banners 4. Design a Web Page layout using slice tool using Photoshop		
Outcome 3	**Evaluate a web page layout with navigation, content sections, and images using Photoshop.**.	**K5**

Unit - III		
Objective 4	**Familiarize students with Flash's timeline-based animation and action scripting for creating engaging animations.**	
1. Develop an image with the help of basic shapes in Flash 2. Animate an image using motion, shape tweening, and actions using Flash 3. Design an animation to bounce a ball using Flash.		
Outcome 4	**Compare the animation sequence to simulate a ball bouncing using motion and shape tweening in Flash.**	**K5**

Unit - IV		
Objective 5	**To learn how to create class timetables, application forms, and personal web blogs using Dreamweaver's powerful visual design and coding capabilities.**	
1. Develop a web page class timetable using Dreamweaver. 2. Develop a College student application form using Dreamweaver. 3. Design a web blog of personal details using Dreamweaver		
Outcome 5	**Formulate and optimize the form for user inputs using Dreamweaver's form tools.**	**K6**
Suggested Readings:- Andrew, Rachel. The New CSS Layout , A Book Apart, 2017. Bartlett, Kynn. Sams Teach Yourself Cascading Style Sheets in 24 Hours, Second Edition, Sams, 2006 McFarland, David Sawyer. Dreamweaver CS5: The Missing Manual, O'Reilly Media, 2010. Smith, Dori. Dreamweaver CS6: Visual QuickStart, Peachpit Press, 2012.		
Online Resources: https://www.tutorialspoint.com/xml/index.htm https://www.tutorialspoint.com/internet_technologies/websites_development.htm https://www.youtube.com/watch?v=PlxWf493en4		

K1- Remember	K2-Understand	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	S(3)	M(2)	M(2)	L(1)	L(1)	M(2)	S(3)	L(1)	M(2)
CO2	S(3)	M(2)	S(3)	L(1)	L(1)	M(2)	S(3)	L(1)	L(1)	S(3)
CO3	M(2)	L(1)	L(1)	M(2)	S(3)	L(1)	L(1)	L(1)	M(2)	L(1)
CO4	S(3)	L(1)	L(1)	M(2)	S(3)	L(1)	M(2)	L(1)	L(1)	M(2)
CO5	M(2)	S(3)	L(1)	L(1)	L(1)	M(2)	L(1)	M(2)	S(3)	S(3)
W.AV	**2.6**	**2**	**1.6**	**1.6**	**1.8**	**1.4**	**1.8**	1.6	1.6	**2.2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	M(2)	M(2)	L(1)	L(1)
CO2	M(2)	S(3)	S(3)	L(1)	M(2)
CO3	S(3)	L(1)	M(2)	S(3)	L(1)
CO4	L(1)	S(3)	M(2)	S(3)	L(1)
CO5	S(3)	L(1)	L(1)	L(1)	M(2)
W.AV	**2.4**	**2**	**2**	**1.8**	**1.4**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - I					
General	**Course code: 2MS1G1**	**Digital Electronics & Computer System Architecture**	**Theory**	**C**	**H/W**
				4	**4**

Unit-I		
Objectives 1	**To Understand the fundamental principles of Digital electronics such as, Number Systems,Logic Circuits**	
Number Systems and Logic Circuits: Number systems - Decimal, Binary, Octal, Hexadecimal - conversion from one to another - Characters and codes - ASCII code, Excess- 3 code, gray code - binary arithmetic - unsigned binary numbers - signed magnitude numbers - complements in number systems - Truth tables, AND, OR, NOT, NOR & NAND gates, EX-OR gates - parity generators and checkers.		
Outcome 1	**Student educate the operation of electronic logic elements**	**K2**
Unit-II		
Objectives 2	**To Apply Boolean laws, algebra and Digital circuits**	
Boolean Algebra and Digital Circuits : Boolean laws and theorems - De Morgan‟s theorems - Duality theorem - simplification of sum of product and product of sum expressions - Karnaugh map and simplifications - Simple arithmetic circuits - Half and Full adders - Binary adder/subtracter - BCD adder - Data processing circuits – Multiplexers - Demultiplexers -Encoders and Decoders.		
Outcome 2	**Develop and solve the organization of a computer system Boolean Algebra and Digital Circuits.**	**K3**
Unit-III		
Objectives 3	**To Apply and illustrate the principles of CPU organization**	
Sequential Logic Design: Flip-flops - RS, JK, D & T Flip flops - Master/Slave Flip flop -Shift Registers - Counters - Asynchronous and Synchronous Counters.		
Outcome 3	**Modify different type of codes and number systems which are used in digitalcommunication and computer systems**	**K3**
Unit-IV		
Objectives 4	**Explain CPU organization and processor with controls**	
CPU organization: Processor Bus organization – ALU – Stack organization – instruction formats – Addressing modes – data transfer and manipulation – Program control.		
Outcome 4	**Assess the control unit for communication with Input and output devices**	**K5**
Unit -V		
Objectives 5	**To acquire the basic knowledge of digital logic levels**	
Register Transfer Language: Inter Register Transfer – Arithmetic – Logical shift micro operations – control functions – Basic computer organization – instruction codes – instructions – Timing control – Execution of instruction – Input/output interrupt		
Outcome 5	**Recall the domain of economy, performance and efficiency**	**K1**

Suggested Readings:-

Anil K. Maini. (2007). *Digital Electronics: Principles, Devices and Applications.* John Wiley & Sons, Ltd.

Donald P.Leach & Albert Paul Malvino. (2011). *Digital Principles and Application*. (7th ed.). New Delhi: TataMcGraw-Hill Publishing Company Ltd.

Morris Mano. (2001). *Computer System Architecture* (3rd ed.) Prentice Hall of India.

Virendra Kumar. (2015). *Digital Technology Principles and Practice.* (2nd ed.). New Delhi: New AgeInternational.

William Stallings. (2001). *Computer Organization and Architecture*. (5th ed.). Addison Wesley publications.

Online Resources:

https://www.shahucollegelatur.org.in/Department/Studymaterial/sci/it/BCA/FY/digielec.pdf

https://soaneemrana.org/onewebmedia/DIGITAL%20PRINCIPLES%20AND%20APPLICATION%20BY%20LEACH%20&%20MALVINO.pdf

K1-Remember	K2-Understand	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M(2)	S(3)	S(3)	M(2)	L(1)	L(1)	M(2)	S(3)	M(2)	M(2)
CO2	L(1)	M(2)	S(3)	M(2)	M(2)	L(1)	M(2)	S(3)	M(2)	L(1)
CO3	S(3)	L(1)	M(2)	S(3)	S(3)	M(2)	S(3)	L(1)	M(2)	M(2)
CO4	L(1)	L(1)	S(3)	M(2)	M(2)	M(2)	S(3)	M(2)	S(3)	L(1)
CO5	M(2)	M(2)	L(1)	L(1)	S(3)	M(2)	S(3)	M(2)	M(2)	S(3)
W.AV	**1.8**	**1.8**	**2.4**	**2**	**2.2**	**1.6**	**2.6**	**2.4**	**2.2**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	S(3)	M(2)	S(3)	L(1)
CO2	M(2)	M(2)	M(2)	L(1)	S(3)
CO3	L(1)	M(2)	M(2)	S(3)	L(1)
CO4	M(2)	S(3)	L(1)	S(3)	M(2)
CO5	M(2)	M(2)	L(1)	S(3)	M(2)
W.AV	**2**	**2.4**	**1.6**	**2.6**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

Semester-I					
General	**Course Code 2MS1G2**	**Mathematical logics for Software Development**	**Theory**	**C**	**H/W**
				4	**4**
Unit -I					
Objective 1	**To provide students with a foundational understanding of logic, including IF statements, connectives, atomic and compound statements, well-formed formulas (WFF) and truth tables.**				
Logic: IF Statements – Connectives – Atomic and Compound Statements – WFF – Truth Table of a Formula – Tautology – Tautological Implications and Equivalence of Formulae. Basic concepts of Set Theory: Inclusion and Equality of sets - Power set - Operations on Sets – Venn Diagrams - Cartesian Products.					
Outcome 1	**Describe and manipulate atomic and compound statements using logical connectives to form well-formed formulas (WFF) in various logical systems.**				**K1**
Unit II					
Objective 2	**To familiarize students with the concepts of spanning trees, rooted trees, and binary trees, and their applications in various real-world problems.**				
Graph Theory: Basic Concepts – Matrix representation of Graphs: Trees: Definition – Spanning Trees – Rooted Trees – Binary Trees					
Outcome 2	**Understand the basic concepts and terminology of graph theory, including vertices, edges, paths, cycles, and connected components**				**K2**
Unit III					
Objective 3	**To enable students to understand and apply the concepts of the transportation problem, including transportation tables, solution methods, optimality testing, and the assignment problem.**				
Transportation Problem – Transportation Table – Solution of Transportation Problem – Testing for Optimality – Assignment Problem – The Assignment Method – Special Cases in Assignment Problems					
Outcome 3	**Apply the assignment method to solve special cases in assignment problems, such as unbalanced assignment problems and travelling salesman problems.**				**K3**
Unit IV					
Objective 4	**To equip students with comprehensive understanding oftesting techniques based on normal population, including tests using chi-square test.**				
Testing of hypothesis: Tests based on normal population. Applications of chi -square, Student‟s-T, F- distributions - Chi-square Test - goodness of fit - Test based on mean, means, variance, correlation and regression coefficients.					
Outcome 4	**Analyze the strength and direction of relationships between variables using hypothesis testing for correlation and regression coefficients, and apply these tests in various data analysis scenarios.**				**K3 & K4**
Unit V					
Objective 5	**To equip students with the necessary knowledge and skills to analyze and solve probability problems in various real-world scenarios.**				
Probability: Sample space - Events - Probability - Probability axioms - addition andmultiplication law of probabilities - conditional probability – Independent events – Baye‟s theorem.					
Outcome 5	**Analyze and evaluate independent events and comprehend the implications of independence in probability calculations and statistical experiments.**				**K4 & K5**

Suggested Readings:-

Dr. M.K.Venkataraman, Dr N.Sridharan & N.Chandrasekaran. (2012). *Discrete Mathematics.* TheNational Publishing Company.**(Unit I, II)**

Hamdy A. Taha. (1987*).Operations Research-An Introduction*. (5th ed.). Macmillan Publishing Co.

J.P.Trembley, R.Manohar, *Discrete Mathematical Structures with Applications to Computer science*. Tata McGraw Hill.

Kantiswarap, P.K.Gupta & Man Mohan. (2005). *Operation Research.* Sultan Chand & Sons. **(Unit III,IV)**

S.C.Gupta & V.K.Kapoor. (2002). *Fundamentals of Mathematical Statistics*. (11th ed.). New Delhi: Sultan Chand & Sons, **(Unit V)**

Online Resources:

https://www.coursera.org/learn/what-is-a-proof
https://github.com/topics/mathematical-logic
https://www.geeksforgeeks.org/math-in-competitive-programming

K1- Remember	K2-Understand	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	M(2)	M(2)	L(1)	M(2)	S(3)	M(2)	L(1)	M(2)	L(1)
CO2	M(2)	M(2)	S(3)	L(1)	S(3)	M(2)	L(1)	M(2)	L(1)	M(2)
CO3	L(1)	M(2)	M(2)	S(3)	L(1)	M(2)	M(2)	S(3)	L(1)	M(2)
CO4	S(3)	L(1)	L(1)	M(2)	M(2)	S(3)	L(1)	M(2)	M(2)	S(3)
CO5	M(2)	S(3)	L(1)	M(2)	M(2)	S(3)	L(1)	M(2)	M(2)	S(3)
W.AV	**2.2**	**2**	**1.8**	**1.8**	**2**	**2.6**	**1.4**	2	1.6	**2.2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M(2)	S(3)	M(2)	L(1)	M(2)
CO2	S(3)	M(2)	S(3)	M(2)	L(1)
CO3	L(1)	M(2)	M(2)	S(3)	L(1)
CO4	M(2)	S(3)	L(1)	M(2)	M(2)
CO5	M(2)	S(3)	M(2)	M(2)	M(2)
W.AV	**2**	**2.6**	**2**	**2**	**1.6**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - I					
DSE I	**Course code: 2MS1E1**	**C Programming Lab**	**Practical**	**C**	**H/W**
				4	**4**

Unit-I		
Objectives 1	**To Remember the students to the basic knowledge of programming fundamentals of C language**	
check whether a given positive number is a multiple of 3 or a multiple of 7 check if two given non-negative integers have the same last digit		
Outcome 1	**Understand the logic for a given problem.**	**K1, K2**

Unit-II		
Objectives 2	**To Remember participants to write C programs to perform to apply basic arithmetic operations and conditional checks**	
Find whether a given year is a leap year or not. Calculate the root of a Quadratic Equation. To read any digit, display in the word.		
Outcome 2	**Use control structures such as if-else, switch-case, and loops to implement conditional and iterative logic in C programs**	**K1**

Unit-III		
Objectives 3	**To impact the concepts like looping, array, functions,**	
store elements in an array and print it. find the sum of all elements of the array show the basic declaration of pointer		
Outcome 3	**Students get knowledge of C element**	**K1**

Unit-IV		
Objectives 4	**To Evaluate file, structure**	
add numbers using call by reference print the current date and time		
Outcome 4	**Recognize the syntax and construction of C programming code.**	**K5**

Unit -V		
Objectives 5	**To knowledge the Quadratic Equation**	
show the simple structure of a function check whether a number is a prime number or not using the function		
Outcome 5	**Understand the programming concepts and logics**	**K1,K2**

Suggested Readings:

The Complete Reference By Herbert Schildt
Head First C: A Brain-Friendly Guide By Griffiths David
C Programming Language By Brain W. Kernighan

Online Resources::

https://www.freebookcentre.net/Language/Free-C-Programming-Books-Download-1.htm
https://wptripura.nic.in/C%20Programming%20Lab.pdf

K1- Remember	K2- understand	K3- Apply	K4- Analyze	K5-Evaluate	K6-Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	S(3)	S(3)	S(3)	L(1)	L(1)	M(2)	M(2)	M(2)	M(2)
CO2	S(3)	S(3)	M(2)	M(2)	M(2)	L(1)	L(1)	L(1)	L(1)	L(1)
CO3	S(3)	S(3)	S(3)	S(3)	M(2)	L(1)	M(2)	L(1)	M(2)	L(1)
CO4	L(1)	S(3)	S(3)	S(3)	S(3)	S(3)	S(3)	S(3)	S(3)	S(3)
CO5	S(3)	S(3)	S(3)	S(3)	M(2)	M(2)	M(2)	L(1)	L(1)	L(1)
W.AV	2.6	3	2.8	2.8	2	1.6	2	1.6	1.8	1.6

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	S(3)	S(3)	M(2)	L(1)
CO2	S(3)	S(3)	M(2)	L(1)	M(2)
CO3	S(3)	S(3)	L(1)	M(2)	L(1)
CO4	L(1)	M(2)	S(3)	S(3)	S(3)
CO5	S(3)	S(3)	L(1)	M(2)	L(1)
W.AV	**2.6**	**2.8**	**2**	**2**	**1.6**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - I					
DSE I	**Course code: 2MS1E2**	**Data structures and Analysis of Algorithms- Lab**	**Practical**	**C**	**H/W**
				4	**4**

Unit-I

Objectives 1	**To impart the knowledge about various data structures**	
1. Write a program that implement following operations (using separate functions) on a linear array: • Insert a new element at end as well as at a given position • Delete an element from a given whose value is given or whose position is given • To find the location of a given element • To display the elements of the linear array		
Outcome 1	**The representation and use of primitive data types**	**K1**

Unit-II

Objectives 2	**To enable the students to apply perform various operations on data structures using C++**	
Write a program that maintains a linear linked list whose elements are stored in on ascending order and implements the following operations (using separate functions): • Insert a new element Delete an existing element • Search an element Display all the elements Write a program to demonstrate the use of stack (implemented using linear array) in converting arithmetic expression from infix notation to postfix notation. Program to demonstrate the use of stack (implemented using linear linked lists) in evaluating arithmetic expression in postfix notation.		
Outcome 2	**Built in data structure and allocation, use in memory**	**K3,K5**

Unit-III

Objectives 3	**Formulate and Implemented using linear array**	
Program to demonstrate the implementation of operations on a linear queue represented using a lineararray. Program to demonstrate the implementation of operations on a circular queue represented using alinear array. Program to demonstrate the implementation of operations on a queue represented using a linear linkedlist (linked queue). Program that use recursive functions to traverse the given binary tree in a) Preorder b) inorderand c)postorder. Program to illustrate the traversal of graph using breadth-first search.		
Outcome 3	**Develop the concepts of tree, graph**	**K6**

Unit-IV		
Objectives 4	**Remember and use of stack**	
Program to illustrate the traversal of graph using depth-first search. Program to sort an array of integers in ascending order using bubble sort Program to sort an array of integers in ascending order using selection sort. Program to sort an array of integers in ascending order using insertion sort. Program to sort an array of integers in ascending order using radix sort. Program to sort an array of integers in ascending order using merge sort. Program to sort an array of integers in ascending order using quick sort. Program to sort an array of integers in ascending order using heap sort. Program to sort an array of integers in ascending order using shell sort.		
Outcome 4	**Develop and Implementation using data structure & algorithms using C++**	**K1,K6**
Unit -V		
Objectives 5	**Evaluate and Create circular queue represented**	
Program to demonstrate the use of linear search to search a given element in an array. Program to demonstrate the use of binary search to search a given element in a sorted array in ascending order		
Outcome 5	**Demonstrate the use of linear search to search a given element in an array**	**K5,K6**
Suggested Readings: "Introduction to Algorithms" by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein "The Algorithm Design Manual" by Steven S. Skiena "Data Structures and Algorithms Made Easy: Data Structures and Algorithmic Puzzles" by Narasimha Karumanchi		
Online Reference: **https://www.classcentral.com/report/best-algos-data-structure-courses/** **https://mrajacse.files.wordpress.com/2012/08/data-structures-and-algorithm-analysis-in-c-mark-allen-weiss.pdf** https://www.uoitc.edu.iq/images/documents/informatics-institute/Competitive_exam/DataStructures.pdf		
K1-Remember	**K2- Understand**	**K3- Apply**	**K4- Analyze**	**K5- Evaluate**	**K6- Create**
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Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L(1)	M(2)	M(2)	L(1)	L(1)	L(1)	S(3)	S(3)	S(3)	S(3)
CO2	M(2)	M(2)	L(1)	M(2)	S(3)	S(3)	S(3)	M(2)	M(2)	L(1)
CO3	L(1)	L(1)	L(1)	M(2)	M(2)	L(1)	S(3)	S(3)	S(3)	S(3)
CO4	S(3)	S(3)	S(3)	L(1)	L(1)	L(1)	M(2)	M(2)	S(3)	S(3)
CO5	L(1)	L(1)	L(1)	M(2)	M(2)	S(3)	S(3)	S(3)	S(3)	S(3)
W.AV	1.6	1.8	1.6	1.6	1.8	1.8	2.8	2.6	2.8	2.6

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	L(1)	L(1)	S(3)	L(1)
CO2	M(2)	S(3)	S(3)	S(3)	M(2)
CO3	M(2)	M(2)	L(1)	S(3)	M(2)
CO4	L(1)	L(1)	L(1)	M(2)	L(1)
CO5	M(2)	M(2)	S(3)	S(3)	M(2)
W.AV	**2**	**1.8**	**1.8**	**2.8**	**1.6**

S –Strong (3), M- Medium (2), L- Low (1)

Semester - I					
DSE I	**Course code: 2MS1E3**	**Object-Oriented Programming with C++ Lab**	**Practical**	**C**	**H/W**
				4	**4**

Unit-I

Objectives 1	**To understand how C++ improves C with object-oriented features.**

Write a C++ Program to display Names, Roll No., and grades of 3 students who have appeared in the examination. Declare the class of name, Roll No. and grade. Create an array of class objects. Read and display the contents of the array.

Write a C++ program to declare Struct. Initialize and display contents of member variables.

Outcome 1	**To Classify the advantage of a Hugh level language like C/C++ the programming process, and the compilation process**	**K2**

Unit-II

Objectives 2	**To Evaluate inline functions for efficiency and performance**

Write a C++ program to declare a class. Declare pointer to class. Initialize and display the contents of the class member.

Given that an EMPLOYEE class contains following members: data members: Employee number, Employee name, Basic, DA, IT, Net Salary and print data members.

Outcome 2	**Analyze the programme and declare a class in the function and get the data using keywords**	**K4,K5**

Unit-III

Objectives 3	**To operate the syntax and semantics of the C++ programming language**

Write a C++ program to read the data of N employee and compute Net salary of each employee (DA=52% of Basic and Income Tax (IT) =30% of the gross salary).

Write a C++ to illustrate the concepts of console I/O operations.

Write a C++ program to use scope resolution operator. Display the various values of the same variables declared at different scope levels.

Outcome 3	**Applying good programming principles to the design and implementation ofC/C++ programs**	**K3**

Unit-IV

Objectives 4	**To understand how to design C++ classes for code reuse.**

Write a C++ program to allocate memory using new operator.

Write a C++ program to create multilevel inheritance. (Hint: Classes A1, A2, A3)

Outcome 4	**Apply new operator and store the data**	**K2,K3**

Unit -V

Objectives 5	**To construct of the class member**

Write a C++ program to create an array of pointers. Invoke functions using array objects.

Write a C++ program to use pointer for both base and derived classes and call the member function. Use Virtual keyword.

Outcome 5	**Formulate a programme using virtual keyword**	**K6**

Suggested Readings:

Programming in an object-oriented environment/Author Raimund K. Ege

C++: The Complete Reference : Schildt, Herbert

C++ Primer : Lippman, Stanley, Lajoie, Josée, Moo, Barbara					
Online Resource: https://www.oreilly.com/library/view/c-primer-fifth/9780133053043/ https://zhjwpku.com/assets/pdf/books/C++.Primer.5th.Edition_2013.pdf https://www.goodreads.com/book/show/768080.C_Primer					
K1-Remember	**K2- Understand**	**K3- Apply**	**K4- Analyze**	**K5- Evaluate**	**K6- Create**

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L(1)	L(1)	M(2)	L(1)	L(1)	L(1)	S(3)	S(3)	S(3)	S(3)
CO2	M(2)	M(2)	L(1)	M(2)	S(3)	S(3)	S(3)	M(2)	M(2)	L(1)
CO3	L(1)	L(1)	L(1)	M(2)	L(1)	M(2)	S(3)	S(3)	S(3)	S(3)
CO4	M(2)	S(3)	M(2)	L(1)	L(1)	L(1)	M(2)	M(2)	S(3)	S(3)
CO5	L(1)	L(1)	L(1)	M(2)	M(2)	S(3)	S(3)	S(3)	S(3)	S(3)
W.AV	**1.4**	**1.6**	**1.4**	**1.6**	**1.6**	**1.8**	**2.8**	**2.6**	**2.8**	**2.6**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	S(3)	S(3)	M(2)	S(3)
CO2	L(1)	M(2)	S(3)	S(3)	L(1)
CO3	L(1)	L(1)	M(2)	M(2)	L(1)
CO4	M(2)	S(3)	S(3)	S(3)	M(2)
CO5	S(3)	S(3)	S(3)	M(2)	S(3)
W.AV	**2**	**2.4**	**2.8**	**2.4**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Semester – II					
Core	**Course code: 2MS2C1**	**Principles of Computer Networks & Cyber Security**	**Theory**	**C**	**H/W**
				4	**4**

Unit-I		
Objectives 1	**To provide overall knowledge in computer communication networks.**	
Introduction: Definition for the networks-Uses of Networks - Network Architecture-protocol hierarchies - Service Primitives – OSI Reference Model - ARPANET - Internet – Physical Layer Transmission Media - Telephone Systems.		
Outcome 1	**Obtain knowledge in network security.**	**K1**
Unit-II		
Objectives 2	**To impart knowledge in network security**	
Data link layer: Data link layer - Design Issues - Error Detection and Correction - Data Link Protocols - Sliding Window Protocols - Finite state Machine Model - Petri Networks-PPP - Polling - FDM.		
Outcome 2	**Develop and classify particular examples of attacks**	**K1,K3**
Unit-III		
Objectives 3	**To understand and classify particular examples of attacks**	
Network Layer: Design Issues - Routing Algorithms - Congestion Control-Algorithms – Inter network routing - Fragmentation.		
Outcome 3	**Illustrate various public key encryption techniques**	**K2**
Unit-IV		
Objectives 4	**To classify the terms vulnerability, threat and attack**	
Introduction to Network Security: Attacks – Services and Mechanisms – Image Processing Attacks - Threats – Vulnerabilities – Model for Network Security		
Outcome 4	**Generate various symmetric encryption techniques for given applications**	**K4**
Unit –V		
Objectives 5	**To Study the Technical aspects of Cyber Security and Evidence Aspects**	
Cryptography: Plaintext & Cipher text – Substitution Techniques – Transposition Techniques – Encryption & Decryption – Security Management Model - Message Authentication and Hash Functions.		
Outcome 5	**Understand the concepts of cyber security and legal systems of information technology.**	**K2**

Suggested Readings:

Andrew S Tanenbaum. (2013). *Computer Networks*. (6th ed.). Pearson Education.

Behrouz A Fourouzan. (2017). *Data Communications and Networking*, (5th ed.). McGraw Hill.

William Stallings. (2017). *Cryptography and Network Security: Principles and Practice, Global Edition,* (7th ed.). Pearson.

Online Resources:

https://csc-knu.github.io/sys-prog/books/Andrew%20S.%20Tanenbaum%20-%20Computer%20Networks.pdf

https://www.cs.vsb.cz/ochodkova/courses/kpb/cryptography-and-network-security_-principles-and-practice-7th-global-edition.pdf

K1-Knowledge	**K2-Understanding**	**K3-Apply**	**K4-Analyze**	**K5-Evaluate**	**K6-Create**

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M(2)	M(2)	S(3)	S(3)	L(1)	L(1)	M(2)	M(2)	S(3)	M(2)
CO2	M(2)	L(1)	M(2)	S(3)	S(3)	M(2)	M(2)	M(2)	S(3)	L(1)
CO3	M(2)	S(3)	M(2)	M(2)	M(2)	L(1)	S(3)	M(2)	M(2)	L(1)
CO4	S(3)	M(2)	M(2)	S(3)	M(2)	L(1)	M(2)	S(3)	L(1)	S(3)
CO5	M(2)	S(3)	L(1)	L(1)	S(3)	S(3)	L(1)	L(1)	M(2)	S(3)
W.AV	**2.2**	**2.2**	**2**	**2.4**	**2.2**	**1.6**	**2**	**2**	**2.2**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	M(2)	M(2)	L(1)	M(2)
CO2	M(2)	S(3)	L(1)	M(2)	S(3)
CO3	L(1)	M(2)	M(2)	S(3)	L(1)
CO4	M(2)	S(3)	L(1)	L(1)	S(3)
CO5	S(3)	L(1)	S(3)	M(2)	M(2)
W.AV	**2.2**	**2.2**	**1.8**	**1.8**	**2.2**

S –Strong (3), M-Medium (2), L- Low (1)

Semester-II					
Core	**Course Code: 2MS2C2**	**Fundamentals of Operating System**	**Theory**	**C**	**H/W**
				4	**4**
Unit –I					
Objective 1	**Familiarize students with the principles, design, and operation of operating systems**				
Introduction: Operating System – Batch System – Time Sharing – Personal Computer System– Parallel Systems – Real Time Systems – Distributed Systems – Computer System Operation – I/O Structure – Storage Structure – Storage Hierarchy – Hardware Protection – General System Architecture – System Components Operating System Services – System calls – system programs – system structure – virtual machines.					
Outcome 1	**Understand the fundamental concepts of operating systems, including batch systems, time-sharing, personal computer systems, parallel systems, real-time systems, and distributed systems.**				**K1 & K2**
Unit II					
Objective 2	**Students will gain insights into CPU scheduling concepts and various scheduling algorithms**				
Process Management: Process Concept – Process scheduling – operations on processes – Process Synchronization– interprocess communication – threads overview – benefits – user and kernel threads – Multithreading models – CPU scheduling concepts – scheduling criteria – Scheduling Algorithms					
Outcome 2	**Compare different process scheduling algorithms, including their advantages and limitations, and make informed decisions about selecting appropriate algorithms for specific scenario**				**K2**
Unit III					
Objective 3	**Explore the concepts of thread and process scheduling, synchronization mechanisms like semaphores, and classical synchronization algorithms.**				
Multiple processors scheduling – Real time scheduling – thread scheduling – process synchronization – critical section program – two task solutions – synchronization hardware –semaphores – classical synchronization – monitors.					
Outcome 3	**Apply their knowledge to 42 analyse and optimize the performance of multi-processor systems and real-time environments by employing suitable scheduling and synchronization strategies.**				**K3**
Unit IV					
Objective 4	**To compare deadlock prevention, avoidance, and detection techniques, as well as recovery methods.**				
Deadlocks – system model – deadlock characterization – methods for handling deadlocks – deadlock prevention – deadlock avoidance – deadlock detection – recovery from deadlock					
Outcome 4	**Analyze and characterize deadlocks, identifying the different types of resources involved and the potential causes of deadlock occurrences.**				**K4**

Unit V		
Objective 5	**Understand & compare the memory management techniques, including swapping, contiguous memory allocation, and paging**	
Storage Management: Memory Management – swapping – contiguous memory allocation – paging – segmentation with paging – Virtual Memory – Demand paging – Page replacement – Allocation of frames – Thrashing. Distributed Systems: Network Hardware – Network Services and Protocols –Document-Based Middleware – File-System-Based Middleware – Object-Based Middleware – Coordination-Based Middleware		
Outcome 5	**Demonstrate a thorough understanding of virtual memory, demand paging, and the page replacement algorithms used to optimize memory usage and performance.**	**K5**

Suggested Readings

Andrew S. Tanenbaum. (2006) *Operating System Design and Implementation*. 3rd Edition. PHI.

A Silberschatz Peter Galvin, Greg Gagne. (2000). *Applied Operating System Concepts*. John Wiley &

Sons.Harvey M. Deitel. *An introduction to Operating System*. Addison Wesley.

James L. Peterson, Abraham Silberschatz. *Operating System Concepts* Addison Wesley.

D.M. Dhandhare. (2006). *Operating Systems.* 2nd Edition, Tata McGraw Hill, New Delhi

Online Resources:

https://www.edx.org/learn/operating-systems

https://www.tutorialspoint.com/discrete_mathematics/discrete_mathematics_propositional_logic.htm

https://www.codecademy.com/learn/fundamentals-of-operating-systems

K1Remember	K2-Understand	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	S(3)	M(2)	L(1)	S(3)	M(2)	L(1)	L(1)	M(2)	L(1)
CO2	S(3)	M(2)	S(3)	S(3)	S(3)	M(2)	L(1)	M(2)	L(1)	S(3)
CO3	M(2)	L(1)	S(3)	M(2)	L(1)	L(1)	M(2)	L(1)	L(1)	M(2)
CO4	S(3)	M(2)	L(1)	S(3)	S(3)	M(2)	L(1)	S(3)	S(3)	L(1)
CO5	L(1)	S(3)	M(2)	S(3)	M(2)	S(3)	M(2)	S(3)	M(2)	S(3)
W.AV	**2.4**	**2.2**	**2.2**	**2.4**	**2.4**	**2**	**1.4**	**2**	**2**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	S(3)	M(2)	L(1)	S(3)
CO2	S(3)	M(2)	L(1)	S(3)	S(3)
CO3	M(2)	L(1)	S(3)	M(2)	L(1)
CO4	S(3)	M(2)	L(1)	S(3)	S(3)
CO5	L(1)	S(3)	M(2)	S(3)	M(2)
W.AV	**2.4**	**2.2**	**1.8**	**2.4**	**2.4**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - II					
Core	**Course code: 2MS2P1**	**UI & UX Design Lab**	**Practical**	**C**	**H/W**
				4	**4**

Unit-I		
Objectives 1	**To understand UI design processes and methodologies**	
Creating shapes. Demonstrate colors. Demonstrate Drawing Tools.		
Outcome 1	**Students learn to draw and sketch**	**K2,K3**
Unit-II		
Objectives 2	**To apply the evolution of UX design as an industry practice**	
Demonstrate Margin and Padding in UI UX Design Demonstrate Constraints and Resizing.		
Outcome 2	**Students learn to create and develop design**	**K3,K6**
Unit-III		
Objectives 3	**To Apply UX industry methods and styles**	
Demonstrate Styles and components. Demonstrate typography styles		
Outcome 3	**Implement the ideas and design the projects**	**K3**
Unit-IV		
Objectives 4	**To understand and design website and implement the design**	
Create a project application design. Create a website design. Create a Layout Design & Configuration for Websites		
Outcome 4	**Create high quality professional documents and artifacts related to the design process**	**K2,K6**
Unit -V		
Objectives 5	**To Execute industry practice and learning about UX industry experts.**	
Demonstrate Jakob's Principle of Design Demonstrate Layout Grids		
Outcome 5	**Create professional design and layouts**	**K3,K6**

Suggested Reading:

UX Book — Rex Hartson and Pardha Pyla

The Elements of User Experience — Jesse James Garrett

Online Resources::

https://www.interaction-design.org/literature/article/ux-design-books-guide#:~:text=in%20no%20time.UX%20for%20Beginners%3A%20A%20Crash%20Course%20in,Short%20Lessons%20by%20Joel%20Marsh&text=%22UX%20for%20Beginners%22%20is%20a,self%2Dcontained%2C%20engaging%20lessons.

https://www.coursera.org/articles/ux-design-books-blogs-podcasts

K1-Remember	K2-Understand	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	M(2)	L(1)	L(1)	S(3)	M(2)	S(3)	M(2)	M(2)	S(3)
CO2	M(2)	S(3)	S(3)	M(2)	L(1)	L(1)	M(2)	S(3)	M(2)	M(2)
CO3	S(3)	L(1)	M(2)	S(3)	M(2)	M(2)	L(1)	L(1)	S(3)	L(1)
CO4	M(2)	M(2)	S(3)	L(1)	S(3)	S(3)	M(2)	S(3)	L(1)	M(2)
CO5	M(2)	S(3)	M(2)	M(2)	M(2)	L(1)	S(3)	M(2)	M(2)	L(1)
W.AV	**2.4**	**2.2**	**2.2**	**1.8**	**2.2**	**1.8**	**2.2**	**2.2**	**2**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	M(2)	M(2)	L(1)	S(3)
CO2	M(2)	L(1)	S(3)	M(2)	S(3)
CO3	S(3)	L(1)	M(2)	L(1)	M(2)
CO4	L(1)	M(2)	L(1)	S(3)	L(1)
CO5	M(2)	S(3)	S(3)	L(1)	M(2)
W.AV	**2.2**	**1.8**	**2.2**	**1.6**	**2.2**

S –Strong (3), M-Medium (2), L- Low (1)

Semester-II					
Core	**Course code: 2MS2P2**	**Python Lab**	**Practical**	**C**	**H/W**
				3	**3**

Unit -I		
Objective 1	**To familiarize students to basic programming concepts in Python, focusing on arithmetic operations, different number data types, and string manipulation.**	
1. Write a python program for Arithmetic Operations. 2. Write a program to demonstrate different number data types in python. 3. Write a program to create, concatenate and print a string and accessing sub- string from a given string.		
Outcome 1	**Understand the limitations and advantages of each number data type in python and choose the appropriate data type for specific computation requirements.**	**K1 &K2**
Unit II		
Objective 2	**To provide students with the knowledge and practical skills to create, manipulate, and perform operations on lists and dictionaries. Additionally, students will learn about linear search algorithms**	
4. Write a python program to create, append and remove lists in python. 5. Write a program to demonstrate working with dictionaries in python 6. Find the maximum of a list of numbers using Linear search		
Outcome 2	**Apply their knowledge of lists, dictionaries, and linear search to solve practical programming challenges and develop applications with efficient data storage and retrieval capabilities.**	**K3**
Unit III		
Objective 3	**Students will be proficient in writing Python programs for Bubble Sort and Insertion Sort, and they will gain valuable insights into algorithm analysis and efficiency.**	
7.Write a python program for Bubble Sort 8.Write a python program for Insertion sort		
Outcome 3	**Analyze the time complexity of Bubble Sort and Insertion Sort algorithms, enabling students to evaluate their efficiency and performance for different data sets.**	**K4**
Unit IV		
Objective 4	**Students will learn how to design and implement a Python class to perform exponentiation using both iterative and recursive approaches.**	
9. Write a Python program to find the exponentiation of a number. 10.Write a Python class to implement pow(x, n)		
Outcome 4	**Evaluate the critical thinking and problem-solving skills by exploring various algorithms and optimization techniques for exponentiation.**	**K5**

Unit V		
Objective 5	**Students will be proficient in using Python for database connectivity and implementing various array operations using NumPy, enhancing their skills in data handling and manipulation.**	
11. Write a Python Program to demonstrate Database Connectivity. 12.Write a Python Program to Illustrate Array operations using Numpy 13.Write a Python Program to implement any 10 methods in Numpy		
Outcome 5	**Develop & create a solid foundation in Python programming for database connectivity and array operations, preparing them for more advanced topics in data management and scientific computing.**	**K6**
Suggested Reading: **Python Crash Course, 2nd Edition: A Hands-On, Project-Based Introduction to Programming Author Name: Eric Matthes** **Python Programming for Beginners Author Name: Philip Robbins** **Python Programming: An Introduction to Computer Science Author Name: John M Zelle**		
Online Resources:: **https://www.w3resource.com/python-exercises/** **https://pythoninstitute.org/study-resources** **http://python.berkeley.edu/resources/**		

K1-Remember	K2-Understand	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	L(1)	S(3)	M(2)	S(3)	M(2)	M(2)	S(3)	M(2)	L(1)
CO2	S(3)	M(2)	S(3)	L(1)	M(2)	S(3)	L(1)	S(3)	M(2)	S(3)
CO3	S(3)	M(2)	S(3)	L(1)	S(3)	L(1)	M(2)	S(3)	M(2)	S(3)
CO4	M(2)	S(3)	L(1)	M(2)	M(2)	S(3)	L(1)	M(2)	S(3)	L(1)
CO5	L(1)	S(3)	M(2)	S(3)	L(1)	M(2)	S(3)	M(2)	M(2)	M(2)
W.AV	**2.2**	**2.2**	**2.4**	**1.8**	**2.2**	**2.2**	**1.8**	**2.6**	**2.2**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	L(1)	M(2)	S(3)	L(1)
CO2	S(3)	L(1)	S(3)	L(1)	M(2)
CO3	L(1)	M(2)	M(2)	S(3)	L(1)
CO4	M(2)	S(3)	L(1)	M(2)	S(3)
CO5	S(3)	L(1)	M(2)	S(3)	L(1)
W.AV	**2.4**	**1.6**	**2**	**2.4**	**1.6**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - II				
Core	**Course code: 2MS2MP**	**Mini - Project**	**C**	**H/W**
			3	**3**
Objectives	➢ To provide students with an opportunity to apply the theoretical knowledge gained during the M.Voc Software Development program into a real-world software development project. ➢ The mini project aims to offer students hands-on experience in the software development lifecycle, including requirements gathering, design, implementation, testing, and deployment. ➢ Students should enhance their problem-solving skills by tackling real challenges faced in software development and coming up with effective solutions. ➢ The mini project will foster teamwork and collaboration among students as they work together to complete the software development task. ➢ The mini project will help students learn project management principles, such as planning, scheduling, resource allocation, and monitoring progress.			

The Head of the Department / Director will assign a faculty member as the Mini-project Guide to a particular student concerned in the beginning of the second semester. The student has to fix the project theme / title by submitting a proposal. The work flow of the chosen project and other related guidelines can be had from the Mini-project Guide. During this second semester, there will be two „Reviews" conducted by the Department and the students must present themselves in person and present the mini-project progress in the form of presentation in front of the mini-project guide. At the end of the semester, the student should prepare and submit a mini-project documentation report (not less than 30 pages, A4 size). The guide will award for 75 marks based on the performance in two reviews and the quality of the mini-project documentation report. The final mini- project viva-voce for 25 marks will be conducted by the Department with two examiners (one mini-project guide and another one designated by the COE) and the cumulative marks for 100 will be given by theDepartment to the COE.

Outcomes	**After Completing this course, the students are able to:** ➢ Students should be able to classify & demonstrate proficiency in software development, including programming languages, frameworks, and tools relevant to the project. – K2 ➢ Students should be able to analyze software requirements, design solutions, and create appropriate architecture and design documentation.- K4 ➢ Students should determine effective collaboration and communication skills within the project team and with stakeholders.- K5 ➢ Students should explain critical thinking abilities while resolving technical challenges and making decisions related to the project. – K5 ➢ Students should create comprehensive project documentation, including user manuals and technical guides, to aid in the understanding and maintenance of the developed software. – K6

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M(2)	M(2)	L(1)	S(3)	S(3)	L(1)	M(2)	S(3)	S(3)	L(1)
CO2	L(1)	M(2)	S(3)	L(1)	S(3)	M(2)	M(2)	L(1)	S(3)	S(3)
CO3	M(2)	L(1)	S(3)	M(2)	M(2)	L(1)	S(3)	M(2)	L(1)	S(3)
CO4	S(3)	M(2)	M(2)	L(1)	S(3)	S(3)	S(3)	M(2)	M(2)	L(1)
CO5	S(3)	S(3)	M(2)	M(2)	S(3)	M(2)	M(2)	L(1)	S(3)	M(2)
W.AV	**2.2**	**2**	**2.2**	**1.8**	**2.8**	**1.8**	**2.4**	**1.8**	**2.4**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	L(1)	M(2)	S(3)	S(3)
CO2	S(3)	M(2)	M(2)	S(3)	S(3)
CO3	M(2)	L(1)	S(3)	M(2)	M(2)
CO4	S(3)	S(3)	S(3)	M(2)	M(2)
CO5	S(3)	M(2)	M(2)	L(1)	S(3)
W.AV	**2.8**	**1.8**	**2.4**	**2.2**	**2.6**

S –Strong (3), M-Medium (2), L- Low (1)

Semester-II					
DSE II	**Course Code: 2MS2E1**	**RDBMS Lab**	**Practical**	**C**	**H/W**
				4	**4**
Unit -I					
Objective 1	**Students know the fundamentals of SQL and PL/SQL, focusing on Data Definition Language (DDL) and Data Manipulation Language**				
1.DDL: Table Creation and description of tables 2.DML: Data Insertion, Deletion, Updating and Selection. 3.DML Operators (Arithmetic, Relational, Logical)					
Outcome 1	**Describe database tables using DDL, ensuring proper data structure and integrity.**				**K1**
Unit II					
Objective 2	**To provide students with the skills to perform advanced data operations, such as set operations, join operations, and nested queries, to retrieve and manipulate data from multiple database tables.**				
DML: SQL Functions (Single Row Function, Group Functions). DML: Set operations DML: Join operations					
Outcome2	**Apply arithmetic, relational, and logical operators in SQL queries, along with single-row and group of set operations on data manipulation and analysis.**				**K2 & K3**
Unit III					
Objective 3	**To enable students to manage database tables, indexes, sequences, and views, and understand the importance of data organization and optimization**				
Creation of Nested queries Creation of Synonym, Sequence & Index Creation and manipulation of View.					
Outcome 3	**Analyze the significance of synonyms, sequences, and indexes, and create and manipulate them for data management and performance optimization**				**K4**
Unit IV					
Objective 4	**Students to work with PL/SQL control structures to implement procedural logic and conditional flow in database applications.**				
Working with control structures using PL/SQL block Creation and manipulation of Cursors Simple programs using Functions & Procedure					
Outcome 4	**Create and manipulate cursors to fetch and process data row by row in PL/SQL programs.**				**K6**
Unit V					
Objective 5	**Students to equip the knowledge and tools to work with PL/SQL, including packages, and triggers.**				
Creation and manipulation of Packages Creation and manipulation of Triggers					
Outcome 5	**Create and manipulate triggers to automate actions in response to data changes or events.**				**K6**

Suggested Readings: RDBMS - MRS. Shital Gujar-Takale (Author), ABHIJEET D. MANKAR (Author) A text book of RDBMS- Kaushik R. Roy (Author)					
Online Resources: https://www.scaler.com/topics/course/dbms/ . https://learnsql.com/blog/ways-to-practice-sql-online/ https://github.com/topics/dbms-project					
K1-Remember	K2-Understand	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	S(3)	M(2)	S(3)	L(1)	L(1)	M(2)	M(2)	M(2)	L(1)
CO2	M(2)	S(3)	S(3)	L(1)	L(1)	S(3)	L(1)	M(2)	L(1)	M(2)
CO3	S(3)	M(2)	S(3)	L(1)	L(1)	M(2)	S(3)	M(2)	M(2)	S(3)
CO4	S(3)	L(1)	M(2)	L(1)	M(2)	S(3)	S(3)	M(2)	M(2)	S(3)
CO5	S(3)	L(1)	L(1)	M(2)	S(3)	M(2)	M(2)	S(3)	S(3)	L(1)
W.AV	**2.8**	**2**	**2.2**	**1.6**	**1.6**	**2.2**	**2.2**	2.2	2	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	S(3)	M(2)	L(1)	M(2)
CO2	M(2)	S(3)	M(2)	M(2)	S(3)
CO3	S(3)	S(3)	M(2)	M(2)	S(3)
CO4	M(2)	M(2)	S(3)	S(3)	L(1)
CO5	S(3)	L(1)	M(2)	L(1)	M(2)
W.AV	**2.6**	**2.4**	**2.2**	**1.8**	**2.2**

S –Strong (3), M-Medium (2), L- Low (1)

Semester -II					
DSE II	**CourseCode: 2MS2E2**	**Web Graphics Lab**	**Practical**	**C**	**H/W**
				4	**4**

Unit -I

Objective 1	**Students will learn the basics of using Photoshop for graphic design and image editing.**

1. Design an Invitation using Photoshop
2. Draw an outline using Pen tool and paint using Brush tool.
3. Design a Webpage Header using Photoshop

Outcome 1	**Show the detailed outlines of objects using the Pen tool and apply various brush settings to paint them realistically.**	**K2**

Unit II

Objective 2	**To provide students with the knowledge and skills to adjust image quality, resize images, and optimize them for different purposes using Photoshop**

4. How to adjust image quality and resize an image using Photoshop.
5. Developing a commercial brochure with background tints and add text and shapes

Outcome 2	**To develop resize images and optimize them for different platforms, such as web or print, without compromising image quality.**	**K3**

Unit III

Objective 3	**Students will learn the basics of 3D modeling in various aspects using Blender.**

6. Design a 3D Model of Coffee mugs using Blender.
7. Design a 3D Model Car using Blender.
8. Design Box and Add Some Colours using Blender.

Outcome 3	**Analyze & create 3D models of coffee mugs, cars, and boxes using Blender's modeling tools.**	**K4 & K6**

Unit IV

Objective 4	**Students will work with the skills to animate objects and create simple cartoon animations using Blender's animation features.**

9. Create Animal using Blender.
10. Create Cartoon animation design using Blender.

Outcome 4	**Create 3D models of animals, cartoon animation using Blender's modeling tools.**	**K6**

Unit V

Objective 5	**Students will enable to design theme boards and color boards for visual representation and inspiration.**

11.Learn Selection tool, pen tool and other tools in CorelDraw.
12.Create different texture and patterns. Develop different background in CorelDraw.
13.Prepare theme board, colour board.
14.Design Banners and add photos in CorelDraw.
15.Create Different background based on theme.

Outcome 5	**Create custom textures, colour board ,patterns, and backgrounds using all CorelDRAW's tools and options.**	**K6**

Suggested Readings:

Graphics & Design, Jain, Maheshwary, Gautam, Khanna Publishing House

Drawing and Computer Graphics, Shah, Pearson

Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics, Fifth Edition [Paperback] Robbins, Jennifer Paperback – 21 June 2018

by Jennifer Robbins (Author)

Online Resources:

https://elearningindustry.com/9-online-resources-to-learn-web-design

https://www.udemy.com/topic/graphic-design/free/

https://www.coursera.org/courses?query=graphic%20design

K1- Remember	K2- Understand	K3- Apply	K4- Analyze	K5- Evaluate	K6- Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	M(2)	S(3)	L(1)	M(2)	M(2)	S(3)	M(2)	M(2)	S(3)
CO2	M(2)	L(1)	M(2)	L(1)	M(2)	S(3)	S(3)	M(2)	M(2)	S(3)
CO3	S(3)	L(1)	L(1)	M(2)	S(3)	M(2)	M(2)	S(3)	S(3)	L(1)
CO4	S(3)	M(2)	M(2)	L(1)	M(2)	M(2)	S(3)	M(2)	M(2)	S(3)
CO5	S(3)	L(1)	M(2)	L(1)	M(2)	S(3)	S(3)	M(2)	M(2)	S(3)
W.AV	**2.8**	**1.4**	**2**	**1.2**	**2.2**	**2.4**	**2.8**	2.2	2.2	**2.6**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	M(2)	S(3)	S(3)	M(2)	M(2)
CO2	S(3)	M(2)	M(2)	S(3)	S(3)
CO3	M(2)	M(2)	S(3)	M(2)	M(2)
CO4	M(2)	S(3)	S(3)	M(2)	M(2)
CO5	M(2)	S(3)	S(3)	M(2)	M(2)
W.AV	**2.2**	**2.6**	**2.8**	**2.2**	**2.2**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - II					
DSE II	**Course Code 2MS2E3**	**Distributed programming with .Net/ J2EE- Lab**	**Practical**	**C**	**H/W**
				4	**4**
Unit -I					
Objective 1	**To familiarize students with the development and deployment of servlets to handle HTTP requests and responses.**				
1.Remote Method Invocation (servlet) 2 Cookies 3.JDBC					
Outcome 1	**Understand the concepts of distributed computing and how RMI enables remote method invocation between Java objects on different JVMs**				**K2**
Unit II					
Objective 2	**Students to learn how to use Java Server Pages (JSP) to handle both GET and POST methods in web applications.**				
4.Get and Post method 5.Cookies 6. Servlets - Returning Information received from the client.					
Outcome 2	**Handle both GET and POST methods in JSP applications, processing user input and generating appropriate responses**				**K3**
Unit III					
Objective 3	**To enable students to integrate servlets with JDBC to access databases and construct dynamic responses in web applications**				
7. Servlets and JDBC – Constructing a response by accessing a database. 8. JSP – use of script let.					
Outcome 3	**Analyze the JDBC concepts and implement the scripts**				**K4**
Unit IV					
Objective 4	**Students to familiarize with JavaBeans and their role in encapsulating data and business logic for JSP applications**				
9. JSP - use of java beans. 10.JDBC					
Outcome 4	**Compare & create servlets with JDBC to interact with databases and construct dynamic responses based on retrieved data.**				**K5 & K6**
Unit V					
Objective 5	**To learn EJB, specifically Session Beans and Entity Beans, and their use in enterprise applications.**				
EJB 11. Session Bean 12. Entity Bean					
Outcome 5	**Develop JavaBeans to encapsulate data and business logic, promoting code reusability and maintainability in JSP applications.**				**K6**

Suggested Readings:

C# 6.0 and the .NET 4.6 Framework by Andrew Troelsen and Philip Japikse
Pro ASP.Net MVC 5 (Expert's Voice in ASP.Net) by Adam Freeman
C# in Depth by Jon Skeet

Online Resources:

https://www.c-sharpcorner.com/article/web-services-for-net-and-j2ee-interoperability/
https://www.tutorialspoint.com/software_architecture_design/distributed_architecture.htm
https://www.theserverside.com/news/1365389/J2EE-vs-MicrosoftNET-A-comparison-of-building-XML-based-web-services

K1-Remember	K2- Understand	K3- Apply	K4- Analyze	K5- Evaluate	K6- Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	S(3)	L(1)	L(1)	S(3)	L(1)	M(2)	L(1)	M(2)	S(3)
CO2	M(2)	S(3)	M(2)	S(3)	M(2)	S(3)	M(2)	M(2)	S(3)	M(2)
CO3	M(2)	M(2)	L(1)	M(2)	S(3)	S(3)	M(2)	M(2)	S(3)	L(1)
CO4	M(2)	L(1)	M(2)	S(3)	M(2)	M(2)	S(3)	S(3)	L(1)	L(1)
CO5	S(3)	S(3)	M(2)	M(2)	S(3)	L(1)	M(2)	L(1)	M(2)	S(3)
W.AV	2.4	2.4	1.6	2.2	2.6	2	2.2	1.8	2.2	2

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	M(2)	S(3)	M(2)	M(2)
CO2	M(2)	S(3)	S(3)	M(2)	M(2)
CO3	S(3)	M(2)	M(2)	S(3)	S(3)
CO4	M(2)	S(3)	L(1)	M(2)	L(1)
CO5	S(3)	L(1)	S(3)	M(2)	M(2)
W.AV	**2.6**	**2.2**	**2.4**	**2.2**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Semester -III					
DSE III	**Course Code 2MV2E4**	**CORPORATE ETIQUETTE SKILLS**	**Theory**	**C**	**H/W**
				5	**5**

Unit -I		
Objective 1	**Understand appropriate biz etiquette and biz communication**	
Professionalism: Professional approach & behaviour – rational vs. emotional decisions – analysis of self-competence and self confidence – qualities of an effective executive		
Outcome 1	**Students understand the Professionalism and Various approaches in it.**	**K2**
Unit II		
Objective 2	**Dress appropriate for different biz occasions**	
Corporate Etiquette: Dressing occasions – formal – semi formal and informal – Eating - habits– Table manners – Body language: Kinesics and proximity		
Outcome 2	**Learners interpret the different styles of Dressing and eating habits.**	**K4**
Unit III		
Objective 3	**Feel comfortable when diving in biz and formal situations**	
House Keeping Skills: Cleanliness at work place – Organizing the Work Table and Shelves – Spatial Utility and Energy Saving habits – Office Files and Personal Computer / Laptop management		
Outcome 3	**Students Generate new ideas on how to Organize the Work Table and She And Cleanliness at work place**	**K4**
Unit IV		
Objective 4	**Preparation to attend office meetings**	
Front Office Skills: Reception and Greeting – Telephone manners – effective visitor appointments management – Preparation to attend office meetings – preparation to hold office meetings		
Outcome 4	**Learners Examine the ways to hold meetings and express the Proce telephone Conversation and could be able to conduct office meeting skills.**	**K2**
Unit V		
Objective 5	**Report writing, writing minutes**	
Documentation: Objectives, Report writing, writing minutes, Preparation methods, and Report for media		
Outcome 5	**Students could be able to Evaluate the report writing methods and to interact to media.**	**K5**

Suggested Readings:

Barun Mithra, (2016). Personality Development and Soft Skills. New Delhi: Oxford University Press India.Lesikar & Flatley. (2005).2 Basic Business Communication. New Delhi: Tata McGraw Hill.

Naveen Kumar, & Sudan, A.S. (2004). Managerial Skill Development. New Delhi: Anmol Publications. Sarvesh Gulati, (2012). Corporate Grooming and Etiquette. Kolkatta: Rupa Publications. Fred Luthans, Organisational Behavior, McGraw Hill, 12 th Edition, 2005.

Online Resources:					
www.executiveworld.com. www.selfconfidence.co.uk. www.senselang.com.					
K1-Remember	**K2- Understand**	**K3- Apply**	**K4- Analyze**	**K5- Evaluate**	**K6- Create**

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	S (3)	L(1)	M (2)	L (1)	S (3)	L (1)	M (2)	L (1)	L (1)
CO2	L (1)	L (1)	M (2)	L (1)	L (1)	S (3)	L (1)	M (2)	L (1)	L (1)
CO3	M (2)	M (2)	(1)	L (1)	M (2)	S (3)	M (2)	M (2)	M (2)	L (1)
CO4	M (2)	M (2)	M (2)	L (1)	M (2)	S (3)	M (2)	M (2)	M (2)	L (1)
CO5	L (1)	L (1)	-	M (1)	M (2)	S (3)	M (2)	M (2)	M(2)	L (1)
W.AV	**1.8**	**1.6**	**1.2**	**1.2**	**1.6**	**3**	**1.6**	**2**	**1.6**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	S(3)	M(2)	L (1)	L (1)
CO2	M(2)	M(2)	M(2)	M(2)	M(2)
CO3	M(2)	M(2)	M(2)	L (1)	M(2)
CO4	M(2)	L (1)	M(2)	S(3)	M(2)
CO5	M(2)	L (1)	M(2)	S(3)	M(2)
W.AV	**2**	**1.8**	**2**	**2**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

Semester-II					
DSE III	**Course Code 2MV2E5**	**COMPETITIVE EXAMINATION SKILLS**	**Theory**	**C**	**H/W**
				5	**5**
Unit -I					
Objective 1	**To learn about Social skills and Conflict skills to become a successful person**				
Social Skills and Conflict Management Skills - Component of Social Skills, effective ways of dealing with people - Types of conflict (intrapersonal, intra group and inter group conflicts) - Basic concepts, cues, signals, symbols and secrets of body language - Significance of body language in communication and assertiveness training. - Conflict stimulation and conflict resolution techniques for effective conflict management					
Outcome 1	**Students Generate the effective ways of dealing with people and Significa of body language in communication**				**K2**
Unit II					
Objective 2	**To acquire interpersonal skills in order to improve the relationships with human behavior**				
Interpersonal Skills - Concept of team in work situation, promotion of team sprit, characteristics of team player - Awareness of ones own leadership style and performance - Nurturing leadership qualities - Emotional intelligence and leadership effectiveness- self awareness, self management, self motivation, empathy and social skills - Negotiation skills-preparation and planning, definition of ground rules, clarification and justification, bargaining and problem solving, closure and implementation					
Outcome2	**Learners interpret the different Nurturing leadership qualities and leadership effectiveness.**				**K4**
Unit III					
Objective 3	**To know Testing & Assessment**				
Intelligence, Creativity & Application, Testing & Assessment					
Outcome3	**Students compare various application of intelligence and examine the tes**				**K4**
Unit IV					
Objective 4	**To know about Verbal Abilities**				
Types, Verbal Abilities & Fluency, Numerical Ability					
Outcome4	**Learners operate ways to Verbal Abilities and express the Process of telephone Conversation and could be able to express the verbal abilities.**				**K2**
Unit V					
Objective 5	**Memory and Inductive Reasoning**				
Spatial and Perceptual Abilities, Situation reaction Test, Memory and Inductive Reasoning					
Outcome 5	**Students could be able to Prioritize The Perceptual Abilities and Justify The Reasoning.**				**K5**

Suggested Readings:

Barun Mithra, (2016).

Behavior, McGraw Hill, 12 th Edition, 2005.

Naveen Kumar, & Sudan, A.S. (2004). Managerial Skill Development. New Delhi: Anmol Publications. Sarvesh Gulati, (2012). Corporate Grooming and Etiquette. Kolkatta: Rupa Publications. Fred Luthans, Organisational 3.

Personality Development and Soft Skills. New Delhi: Oxford University Press India.Lesikar & Flatley. (2005).Basic Business Communication. New Delhi: Tata McGraw Hill.

Online Resource: www.executiveworld.com. www.selfconfidence.co.uk. www.senselang.com.					
K1-Remember	**K2- Understand**	**K3- Apply**	**K4- Analyze**	**K5- Evaluate**	**K6- Create**

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	S(3)	L(1)	M(2)	L(1)	S(3)	L(1)	M(2)	L(1)	L(1)
CO2	L(1)	L(1)	M(2)	L(1)	L(1)	S(3)	L(1)	M(2)	L(1)	L(1)
CO3	M(2)	M(2)	L(1)	L(1)	M(2)	S(3)	M(2)	M(2)	M(2)	L(1)
CO4	M(2)	M(2)	M(2)	L(1)	M(2)	S(3)	M(2)	M(2)	M(2)	L(1)
CO5	L(1)	L(1)	-	L(1)	M(2)	S(3)	M(2)	M(2)	M(2)	L(1)
W.AV	**1.8**	**1.6**	**1.2**	**1.2**	**1.6**	**3**	**1.6**	**2**	**1.6**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	S(3)	M(2)	L(1)	L(1)
CO2	M(2)	M(2)	M(2)	M(2)	M(2)
CO3	M(2)	M(2)	M(2)	L(1)	M(2)
CO4	M(2)	L(1)	M(2)	S(3)	M(2)
CO5	M(2)	L(1)	M(2)	S(3)	M(2)
W.AV	**2**	**1.8**	**2**	**2**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - III					
DSE III	**Course Code 2MV2E6**	**SOFT SKILLS AND ENTREPRENEURIAL SKILLS**	**Theory**	**C** 5	**H/W** 5

Unit -I		
Objective 1	**To know how to work well with others**	
Self Concept, Self Esteem and Leadership: Self Concept- Definition and Characteristics of Self Concept – Definition of Self-Esteem - Factors influence Self Esteem - Low Vs High Self Esteem - Step to raise Self Esteem - Leadership and Goal setting: Emergence and Functions of Leader - Characteristics of Leadership - Types of Leadership - Characteristics of Successful Leadership.		
Outcome 1	**Students generate the Steps to raise Self Esteem & Factors influence Self Esteem.**	**K2**
Unit II		
Objective 2	**To develop common communication skills.**	
Listening: Active listening –Barriers to listening –Listening and note taking. Speaking: Word stress and rhythm –Pauses and sense groups – Falling and rising tones – Fluency and pace of delivery – Art of small talk – Participating in conversations – Making a short formal speech. Reading: Reading with a purpose – Making predictions – Understanding text structure – Locating main points – Making inferences		
Outcome 2	**Learners classify the different styles of listening and Reading.**	**K4**
Unit III		
Objective 3	**To motivating others and helping they find their best selves.**	
Writing Models: Letters - Resume and Covering letters - e-mail - Filling application forms. Presentation Skills: Soft skills for academic presentations - Structuring the presentation - Choosing appropriate medium – Clarity and brevity		
Outcome 3	**Students could be able to *Distinguish* the Soft skills for academic presenta and And Structuring the presentations**	**K4**
Unit IV		
Objective 4	**Small Industries Service Institute (SISI)**	
Concepts of entrepreneur: Entrepreneur- Definitions-Characteristics of entrepreneur-Classification of entrepreneur-Entrepreneurial traits- Entrepreneurial functions - role of entrepreneurs in the economic development- Factor effecting entrepreneurial growth-Entrepreneurship - Meaningdefinition-Entrepreneur Vs Intrapreneur- Women Entrepreneurs- Recent development-Problems in Entrepreneurial Development Programmes-Objectives of EDP-Methods of training- Phases of EDP		
Outcome 4	**Learners Illustrate the ways to Factor effecting entrepreneurial growth ar express the Problems in Entrepreneurial Development.**	**K2**

Unit V		
Objective 5	**Functions of Software Technology Parks of India (STPI)**	
Institutional support and incentives to entrepreneurs- Functions of Department of Industries and Commerce (DIC) - Activities of Small Industrial Development Corporation (SIDCO)-Functions of National Small Industries Corporation(NSIC)-Functions of Small Industries Development Bank of India (SIDBI)- Small Industries Service Institute (SISI)- Activities of Science and Technology Entrepreneurship Development Project (STEDP)-Strategies of National entrepreneurship Development Board(NEDB)-Objectives of National Institute for entrepreneurship and small business development (NIESBUD)- Functions of Software Technology Parks of India (STPI) - Techno park-Functions of techno park Incentives-Importance- Classification of incentivesSubsidy- Types of Subsidy - Basics of Startups – principles – Government schemes: Startup India – principles – plans – policies – procedures – Non-Government schemes – other related schemes.		
Outcome 5	**Students Determine the various institutions supporting Entrepreneurs and to incentives to entrepreneurs.**	**K5**
Suggested Readings:- Chennai: ICRDCE Publication. Marilyn Anderson, Pramod K Nayar & Madhucchandra Sen. Critical Thinking, Academic Writing Presentation Skills, Pearson Education & Mahatma Gandhi University. Sangram KeshariMohanty. Fundamentals of Entrepreneurship. New Delhi: PHI. MSME Act 2006 Sasikumar .V, Kiranmai Dutt .P & Geetha Rajeevan. Communication Skills in English, Cambridg Shukla M.B. Entrepreneurship and small Business Management, KitabMahal Allahabad. University Press & Mahatma Gandhi University. Xavier Alphones S.J. (March 2004). We Shall Overcome A Textbook on Life Coping Skills.		
Online Resources: http://startupindia.gov.in/		

K1-Remember	K2- Understand	K3- Apply	K4- Analyze	K5- Evaluate	K6- Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	S(3)	L(1)	M(2)	L(1)	S(3)	L(1)	M(2)	L(1)	L(1)
CO2	L(1)	L(1)	M(2)	L(1)	L(1)	S(3)	L(1)	M(2)	L(1)	L(1)
CO3	M(2)	M(2)	L(1)	L(1)	M (2)	S(3)	M (2)	M (2)	M (2)	L(1)
CO4	M (2)	M (2)	M (2)	L(1)	M (2)	S(3)	M (2)	M (2)	M (2)	L(1)
CO5	M (2)	M (2)	-	M (2)	M (2)	S(3)	M (2)	M (2)	M (2)	L(1)
W.AV	**1.8**	**1.6**	**1.2**	**1.2**	**1.6**	**3**	**1.6**	**2**	**1.6**	**1**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	S(3)	M(2)	L(1)	L(1)
CO2	M(2)	M(2)	M(2)	M(2)	M(2)
CO3	M(2)	M(2)	M(2)	L(1)	M(2)
CO4	M(2)	L(1)	M(2)	S(3)	M(2)
CO5	M(2)	S(3)	M(2)	S(3)	M(2)
W.AV	**2**	**1.8**	**2**	**2**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - III					
Core	**Course code: 2MS3C1**	**Principles of IOT**	**Theory**	**C**	**H/W**
				4	**4**

Unit-I

Objectives 1	**To understand the Architecture of IoT**	
IoT & Web Technology- The Internet of Things Today- Time for Convergence- Towards the IoT Universe- Internet of Things Vision- IoT Strategic Research and Innovation Directions- IoT Applications- Future Internet Technologies- Infrastructure- Networks and Communication- Processes- Data Management- Security- Privacy & Trust- Device Level Energy Issues- IoT Related Standardization- Recommendations on Research Topics.		
Outcome 1	**Outline real world IoT applications**	**K2**

Unit-II

Objectives 2	**To gain knowledge in IoT technologies**	
IoT Architecture -State of the Art – Introduction, State of the art- Architecture. Reference Model Introduction- Reference Model and architecture- IoT reference Model- IoT Reference Architecture – Introduction- Functional View- Information View- Deployment and Operational View- Other Relevant architectural views.		
Outcome 2	**Develop and commercialize automation products using IoT**	**K1,K3**

Unit-III

Objectives 3	**To Understand about the use of devices in IoT Technology**	
Introduction to Smart Systems using IoT - IoT Design Methodology - IoT Boards (Raspberry Pi, Arduino) and IDE - Case Study: Weather Monitoring- Logical Designusing Python- Data types & Data Structures- Control Flow- Functions- Modules- Packages - File Handling – Date / Time Operations- Classes - Python Packages of Interest for IoT.		
Outcome 3	**Analyze about the use of devices in IoT Technology**	**K2,K3**

Unit-IV

Objectives 4	**To apply a value of an creation in IoT application**	
IoT Applications for Value Creations Introduction- IoT applications for industry: Future Factory Concepts- Brownfield IoT- Smart Objects- Smart Applications- Four Aspects in your Business to Master IoT- Value Creation from Big Data and Serialization- IoT for Retailing Industry- IoT For Oil and GasIndustry- Opinions on IoT Application and Value for Industry- Home Management- eHealth		
Outcome 4	**Students practice and develop a IoT application**	**K3**

Unit -V

Objectives 5	**To impart Knowledge about IoT security**	
Internet of Things Privacy- Security and Governance Introduction- Overview of Governance- Privacy and Security Issues- Contribution from FP7 Projects- Security- Privacy and Trust in IoT- Data-Platforms for Smart Cities- First Steps Towards a Secure Platform- Smartie Approach- Data Aggregation for the IoT in Smart Cities- Security.		
Outcome 5	**Recall the Internet of Things Privacy Security and Governance**	**K1**

Suggested Readings:

Vijay Madisetti and ArshdeepBahga. (2014). *Internet of Things (A Hands-on-Approach)*. (1st ed.). UniversitiesPress (INDIA) Private Limited.

Michael Miller. (2015). *The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart CitiesAre Changing the World*. Pearson Education.

Francis da Costa. (2013). *Rethinking the Internet of Things: A Scalable Approach to Connecting Everything*.(1st ed.). Apress Publications.

Waltenegus Dargie, Christian Poellabauer. (2014). *Fundamentals of Wireless Sensor Networks: Theory andPractice*. Wiley.

Online Resources:

1. https://www.kngac.ac.in/elearning-portal/ec/admin/contents/4_18KP2CS07_2021012902234424.pdf
2. http://uru.ac.in/uruonlinelibrary/Internet_of_Things/IOT%20How%20and%20Why.pdf

K1-Remember	K2-Understand	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L(1)	S(3)	M(2)	S(3)	L(1)	M(2)	S(3)	M(2)	M(2)	M(2)
CO2	M(2)	L(1)	S(3)	M(2)	L(1)	L(1)	M(2)	L(1)	L(1)	M(2)
CO3	S(3)	L(1)	M(2)	S(3)	M(2)	M(2)	L(1)	L(1)	S(3)	L(1)
CO4	S(3)	L(1)	S(3)	M(2)	S(3)	M(2)	M(2)	S(3)	M(2)	L(1)
CO5	S(3)	M(2)	S(3)	L(1)	M(2)	S(3)	L(1)	S(3)	M(2)	S(3)
W.AV	**2.4**	**1.6**	**2.6**	**2.2**	**1.8**	**2**	**1.8**	**2**	**2**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	**S(3)**	**M(2)**	**M(2)**	**L(1)**	**S(3)**
CO2	**M(2)**	**S(3)**	**M(2)**	**M(2)**	**S(3)**
CO3	**L(1)**	**M(2)**	**S(3)**	**M(2)**	**L(1)**
CO4	**M(2)**	**M(2)**	**S(3)**	**L(1)**	**M(2)**
CO5	**S(3)**	**S(3)**	**L(1)**	**S(3)**	**M(2)**
W.AV	**2.2**	**2.4**	**2.2**	**2**	**2.2S**

S –Strong (3), M-Medium (2), L- Low (1)

III –Semester					
Core	**Course Code: 2MS3C2**	**Fundamentals of Data Science**	**Theory**	**C**	**H/W**
				4	**4**

Unit -I		
Objective 1	**To familiarize students with the various roles and stages involved in a data science project**	
Introduction to Data Science: Data science process – roles, stages in data science project – working with data from files – working with relational databases – exploring data – managing -data – cleaning and sampling for modeling and validation – introduction to NoSQL.		
Outcome 1	**Define and understand the data science process, including the various stages involved in solving real-world problems using data-driven approaches.**	**K1 & K2**

Unit II		
Objective 2	**Students will learn about mapping problems to machine learning, evaluating clustering models, and validating models.**	
Modeling Methods: Choosing and evaluating models – mapping problems to machine learning, evaluating clustering models, validating models – cluster analysis – K-means algorithm, Naïve Bayes – Memorization Methods – Linear and logistic regression –unsupervised methods		
Outcome 2	**Apply Naïve Bayes, a probabilistic classifier, to solve classification problems and make predictions based on probabilistic assumptions.**	**K3**

Unit III		
Objective 3	**Students will learn about probability distributions and statistical models in R, as well as data manipulation techniques to effectively analyze and visualize data distributions.**	
Introduction to R: Reading and getting data into R – ordered and unordered factors – arrays and matrices – lists and data frames – reading data from files – probability distributions –statistical models in R - manipulating objects – data distribution.		
Outcome 3	**Analyze and manipulate objects in R, making use of functions and libraries available in the R ecosystem for data transformation and analysis.**	**K4**

Unit IV		
Objective 4	**Students will learn how to write Map Reduce programs, load data into HDFS (Hadoop Distributed File System), and execute the Map and Reduce phases for efficient distributed data processing.**	
Map Reduce: Introduction – distributed file system – algorithms using map reduce, Matrix Vector Multiplication by Map Reduce – Hadoop - Understanding the Map Reduce architecture - Writing Hadoop Map Reduce Programs - Loading data into HDFS - Executing the Map phase - Shuffling and sorting - Reducing phase execution.		
Outcome 4	**Analyze and classify the database file systems and HDFS**	**K4 & K5**

Unit V		
Objective 5	**Students will learn how to display and analyze multivariate data through matrix plots and handle multiple datasets efficiently.**	
Delivering Results: Documentation and deployment – producing effective presentations –Introduction to graphical analysis – plot () function – displaying multivariate data – matrix plots – multiple data.		
Outcome 5	**Demonstrate proficiency in documenting and deploying data analysis projects, ensuring reproducibility and sharing insights effectively.**	**K5**

Suggested Readings:

Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, Abhijit Dasgupta. (2014). *Practical Data ScienceCookbook*. Packt Publishing Ltd.

Jure Leskovec, Anand Rajaraman, Jeffrey D. Ullman. (2014). *Mining of Massive Datasets*. CambridgeUniversity Press.

Boris lublinsky, Kevin t. Smith, Alexey Yakubovich. (2013). *Professional Hadoop Solutions*. Wiley.

W. N. Venables, D. M. Smith and the R Core Team. (2013). *An Introduction to R*.

Online Resources:

https://elitedatascience.com/data-science-resources
https://archive.nptel.ac.in/courses/106/106/106106212/
https://www.dataschool.io/resources/

K1-Remember	K2-Understand	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	S(3)	M(2)	M(2)	L(1)	S(3)	M(2)	M(2)	L(1)	M(2)
CO2	S(3)	M(2)	M(2)	L(1)	M(2)	M(2)	S(3)	L(1)	M(2)	L(1)
CO3	M(2)	S(3)	L(1)	M(2)	S(3)	M(2)	M(2)	M(2)	L(1)	M(2)
CO4	M(2)	L(1)	M(2)	M(2)	S(3)	L(1)	M(2)	L(1)	M(2)	L(1)
CO5	S(3)	L(1)	M(2)	M(2)	S(3)	M(2)	L(1)	M(2)	M(2)	S(3)
W.AV	**2.6**	**2**	**1.8**	**1.8**	**2.4**	**2**	**2**	**1.6**	**1.6**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	M(2)	M(2)	L(1)	S(3)
CO2	M(2)	M(2)	L(1)	M(2)	M(2)
CO3	S(3)	L(1)	M(2)	S(3)	M(2)
CO4	L(1)	M(2)	M(2)	S(3)	L(1)
CO5	L(1)	M(2)	M(2)	S(3)	M(2)
W.AV	**2**	**1.8**	**1.8**	**2.4**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - III					
Core	**Course code: 2MS3C3**	**Fundamentals of AI & ML**	**Theory**	**C**	**H/W**
				4	**4**

Unit-I		
Objectives 1	**To gain the knowledge in fundamental aspects, principles of virtual reality technology.**	
Introduction- Definitions of Artificial Intelligence- Topics of Artificial Intelligence- Timelines of Artificial Intelligence- Branches of Artificial Intelligence- Applications of Artificial Intelligence- Artificial Intelligence Tree- Intelligent Agents- Structure of Agents- Types of Agents- Environment- Autonomous Agents- Nature Inspired Agents- Planning Agent- PEAS Representation- Intelligent Database.		
Outcome 1	**Students Recall the fundamentals of animation, virtual reality and related technologies.**	**K1**
Unit-II		
Objectives 2	**To understand the machine learning**	
Problem Solving- Production Systems- State Space Representation- Heuristic Search Techniques- Generate and Test- Hill Climbing- Simulated Annealing- Search Techniques- Problem Reduction- Constraints Satisfaction- Means- ends Analysis.		
Outcome 2	**Classify the applications of virtual reality, convert the basic geometrical primitives, and transformations**	**K2**
Unit-III		
Objectives 3	**To understand problem solving concepts**	
Knowledge Representation- Knowledge Management – Types of Knowledge- Knowledge Representation-Knowledgebase- Knowledge Representation structures- First Order Logic- Unification Algorithm- Frames- Conceptual Dependency- Scripts- Semantic Network.		
Outcome 3	**Understand problem solving concepts**	**K2**
Unit-IV		
Objectives 4	**To analyze the machine learning perspectives**	
Learning- Types of Learning- Machine Learning- Aspects of Machine Learning- Machine Learning Applications and Examples- Quantification of Classification- Case Studies. Supervised and Unsupervised Learning- Supervised Vs Unsupervised Learning- Supervised Learning Model- Unsupervised Learning Model- Semi-supervised Learning – A Comparison- Case Studies.		
Outcome 4	**Operate machine learning perspectives**	**K4**
Unit -V		
Objectives 5	**To understand the classification and clustering techniques**	
Reinforced Learning- Reinforced Learning Model- Markov Decision Problem- Q- Learning- Temporal Difference Learning- Learning Automata- Case Studies. Nature Inspired Learning- Nature Inspired Computing- Bio- inspired Models- Evolutionary Models- Swarm Models- Swarm and Evolutionary Algorithms- Important Nature Inspired Algorithms- Case Studies.		
Outcome 5	**Classify and clustering techniques**	**K2**

Suggested Readings:-

Vinod Chandra S.S. Anand Hareendran S. (2020). *Artificial Intelligence Principles and Applications.* (2nd Ed.).PHI Learning Pvt. Limited.

I. Bratko. Prolog. (2011). *Programming for Artificial Intelligence.* (4th ed.).Addison-Wesley EducationalPublishers Inc.

John Vince. (2001). *Virtual Reality Systems*. Pearson Education Asia.

S. Russell and P. Norvig. (2009). *Artificial Intelligence: A Modern Approach*. (3rd ed.). Prentice Hall.

T. Stephen Marsland,(2014). "*Machine Learning - An Algorithmic Perspective*", 2nd Edition, Chapman andHall/CRC Machine Learning and Pattern Recognition Series.

Online Resources:

https://content.kopykitab.com/ebooks/2016/06/7780/sample/sample_7780.pdf

https://silp.iiita.ac.in/wp-content/uploads/PROLOG.pdf

K1-Remember	K2-Understand	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	M(2)	S(3)	L(1)	S(3)	L(1)	M(2)	S(3)	M(2)	S(3)
CO2	M(2)	S(3)	S(3)	M(2)	L(1)	L(1)	M(2)	S(3)	M(2)	M(2)
CO3	S(3)	M(2)	S(3)	S(3)	M(2)	S(3)	L(1)	S(3)	M(2)	S(3)
CO4	M(2)	S(3)	M(2)	M(2)	M(2)	L(1)	S(3)	M(2)	M(2)	L(1)
CO5	M(2)	M(2)	S(3)	L(1)	S(3)	S(3)	M(2)	S(3)	L(1)	M(2)
W.AV	**2.4**	**2.4**	**2.8**	**1.8**	**2.2**	**1.8**	**2**	**2.8**	**1.8**	**2.2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	L(1)	M(2)	S(3)	L(1)
CO2	S(3)	L(1)	S(3)	L(1)	M(2)
CO3	L(1)	M(2)	M(2)	S(3)	L(1)
CO4	M(2)	L(1)	S(3)	M(2)	S(3)
CO5	M(2)	S(3)	S(3)	L(1)	M(2)
W.AV	**2.2**	**1.6**	**2.6**	**2**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - III					
Core	**Course Code: 2MS3P1**	**Mobile Application Development-Lab**	**Practical**	**C**	**H/W**
				4	**4**

Unit -I		
Objective 1	**Students will have a solid foundation in mobile app development with Dart and Flutter.**	
1. Create a program „Hello World" using dart in flutter framework 2. Write a dart program for stateless widget in flutter 3. Write a dart program for stateful widget in flutter		
Outcome 1	**Understand the Flutter development workflow and be able to utilize the framework's**	**K1 &K2**
Unit II		
Objective 2	**Familiarize participants with Flutter's UI customization capabilities.**	
4.Create custom App Bar in flutter 5.Create custom Side Menu in flutter 6.Write a program to demonstrate List View in flutter		
Outcome 2	**Apply best practices in UI design and implementation using Flutter**	**K3**
Unit III		
Objective 3	**Students will learn how to design and customize a bottom navigation bar**	
7.Create custom bottom navigation bar in flutter 8.Create page navigation in flutter		
Outcome 3	**Analyze the practical Flutter applications that utilize custom navigation features to enhance usability and user engagement.**	**K4**
Unit IV		
Objective 4	**Students to equip with the knowledge and skills to design and validate forms in Flutter**	
9.Design and Validate from using flutter 10. Include External image in a flutter project		
Outcome 4	**Evaluate and create dynamic and visually appealing Flutter applications that interactively respond to user input and display external images as per the app's requirements.**	**K5 & K6**
Unit V		
Objective 5	**Students will be able to build a BMI calculator app and a WhatsApp clone UI app**	
11.Create BMI calculator App 12.Create WhatsApp clone UI app		
Outcome 5	**Create a WhatsApp clone UI app with multiple screens, including a chat screen, contact list, and settings screen.**	**K6**

Suggested Readings:

Clean Code: A Handbook of Agile Software Craftsmanship by Robert C. Martin

iOS Programming: The Big Nerd Ranch Guide by Christian Keur and Aaron Hillegass

Building Progressive Web Apps Building Progressive Web Apps: Bringing the Power of Native to the Browser by Tal Ater

Online Resources:

https://www.coursera.org/courses?query=mobile%20app%20development

https://www.edx.org/learn/app-development

https://www.codecademy.com/catalog/subject/mobile-development

K1-Remember	K2-Understand	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	S(3)	M(2)	M(2)	L(1)	S(3)	M(2)	M(2)	L(1)	S(3)
CO2	M(2)	M(2)	M(2)	L(1)	S(3)	S(3)	M(2)	L(1)	M(2)	S(3)
CO3	S(3)	M(2)	M(2)	L(1)	M(2)	M(2)	S(3)	L(1)	M(2)	L(1)
CO4	M(2)	S(3)	L(1)	M(2)	S(3)	M(2)	M(2)	M(2)	L(1)	M(2)
CO5	M(2)	L(1)	M(2)	M(2)	S(3)	L(1)	M(2)	L(1)	M(2)	L(1)
W.AV	**2.4**	**2.2**	**1.8**	**1.6**	**2.4**	**2.2**	**2.2**	1.4	1.6	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	S(3)	M(2)	L(1)	M(2)
CO2	M(2)	M(2)	S(3)	L(1)	M(2)
CO3	S(3)	M(2)	M(2)	M(2)	L(1)
CO4	S(3)	L(1)	M(2)	L(1)	M(2)
CO5	S(3)	S(3)	M(2)	L(1)	M(2)
W.AV	**2.8**	**2.2**	**2.2**	**1.2**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - III					
Core	**Course code: 2MS3C4**	**Finishing Skills for Software Development #**	**P**	**C**	**H/W**
				2	**2**

Unit-I		
Objectives 1	**To refresh the knowledge of students in various fields of Computer Science**	
Intelligence - Creativity & Application - Testing & Assessment - Types-Verbal Abilities & Fluency - Numerical Ability: Numbers- HCF- LCM-Decimal Fractions- Simplification- Square Roots- cube roots- averages		
Outcome 1	**Understand the fundamentals of animation, virtual reality and related technologies.**	**K2**
Unit-II		
Objectives 2	**To understand Software Development**	
Problems in numbers and ages- Simple Interest- Compound Interest - True discount - Memory and Non-verbal Reasoning		
Outcome 2	**Develop the applications of virtual reality, convert the basic geometrical primitives, and transformations.**	**K2,K3**
Unit-III		
Objectives 3	**To prepare and analyze them to face their career interviews**	
Programming concepts in C, C++, JAVA		
Outcome 3	**Analysis the Software Engineering and Programming concepts**	**K4**
Unit-IV		
Objectives 4	**To understand programming concepts**	
Operations Research -Concepts of Database System – Computer Networks		
Outcome 4	**Students Develop of Database System**	**K2,K3**
Unit -V		
Objectives 5	**To Understand the Operations Research**	
Operating system Concepts - Software Engineering: Analysis, Design, Implementation and Testing		
Outcome 5	**Students understand the Intelligence - Creativity & Application.**	**K2**

Suggested Readings:

Aggarwal R. S. (2005). *Quantitative Aptitude for Competitive Examinations*. (7th ed.). New Delhi: S. Chand and Co. Ltd.

Bjarne Stroustrup. (1999). *The C++ Programming Language*. Addison-Wesley.

Brian W. Kernighan, Dennis M. Ritchie. (1989). *The C Programming Language*. New Delhi: Prentice Hall of India Pvt. Ltd.

K.K. Aggarwal &Yogesh Singh. (2005). *Software Engineering*. (2nd ed.). New Age International Publishers.

Patrick Naughton& Herbert Schildt. (2002). *JAVA 2 - The Complete Reference*. (5th ed.). New Delhi: Tata-McGraw-Hill.

Rathindra P. Sen. (2010). *Operations Research Algorithms and Applications.* PHI.

S.K. Singh. (2008). *Database Systems – Concepts, Design and Appplications*. (2nd ed.). Dorling Kindersley (India) Pvt. Ltd.

Online Resources: https://www.springboard.com/blog/software-engineering/5-soft-skills-every-software-engineer-needs/ http://chenweixiang.github.io/docs/The_C++_Programming_Language_4th_Edition_Bjarne_Stroustrup.pdf https://ug.its.edu.in/sites/default/files/SOFTWARE%20ENGINEERING.pdf					
K1-Remember	**K2-Understand**	**K3-Apply**	**K4-Analyze**	**K5-Evaluate**	**K6-Create**

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	M(2)	L(1)	L(1)	S(3)	M(2)	S(3)	M(2)	M(2)	S(3)
CO2	M(2)	S(3)	S(3)	M(2)	L(1)	L(1)	M(2)	S(3)	M(2)	M(2)
CO3	S(3)	L(1)	M(2)	S(3)	M(2)	M(2)	L(1)	L(1)	S(3)	L(1)
CO4	M(2)	M(2)	S(3)	L(1)	S(3)	S(3)	M(2)	S(3)	L(1)	M(2)
CO5	M(2)	S(3)	M(2)	M(2)	M(2)	L(1)	S(3)	M(2)	M(2)	L(1)
W.AV	**2.4**	**2.2**	**2.2**	**1.8**	**2.2**	**1.8**	**2.2**	**2.2**	**2**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	M(2)	M(2)	M(2)	L (1)
CO2	M(2)	S (3)	M(2)	S (3)	M(2)
CO3	M(2)	M(2)	M(2)	L (1)	M(2)
CO4	S (3)	M(2)	M(2)	M(2)	L (1)
CO5	M(2)	S (3)	M(2)	S (3)	M(2)
W.AV	**2.8**	**2.4**	**2**	**2.2**	**1.6**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - III					
DSE IV	**Course Code 2MS3E1**	**Principles of Bioinformatics**	**Theory**	**C**	**H/W**
				5	**5**
Unit -I					
Objective 1	**To familiarize students with the use of computers in biological research and data analysis.**				
Basics of Bioinformatics: Introduction to Bioinformatics- Computers in Biology to understand Biological System- Basic commands of Windows- Unix and Linux operating systems- Concept of open resources in Bioinformatics.					
Outcome 1	**Students will understand the fundamental principles and applications of bioinformatics in various biological disciplines.**				**K2**
Unit II					
Objective 2	**To enable students to perform database searching for sequence similarity analysis.**				
Sequence Analysis: Biological background for sequence analysis;-Sequence alignment: Global, Local, Pairwise and Multiple sequence analysis- Algorithm for alignments-Database Searching- Tools for Sequence alignment..					
Outcome 2	**To apply different types of sequence alignments and comprehend their applications**.				**K3**
Unit III					
Objective 3	**To provide insights into the retrieval of information from biological databases, using systems like Entrez, TCGA, and Bioportal.**				
Biological Databases: Database concepts- Introduction to Data types and source- Protein Sequence and Structural Databases-Nucleic acid databases- Genome databases-Specialized Databases- Carbohydrate Databases- Clinically relevant drug-drug interactions databases- Information retrieval from Biological databases: Entrez system, TCGA data bases, Bioportal					
Outcome 3	**To identify and distinguish between various types of biological databases.**				**K3 & K4**
Unit IV					
Objective 4	**To enable students to recognize and differentiate structural isomers.**				
Cheminformatics: Introduction- Chem informatics tools- Chemical structure representation (SMILES and SMARTS)- Chemical Databases: CSD, ACD, WDI, Chembank, PUBCHEM, Chemical Structure file formats- Structural Isomers- Structure visualization.					
Outcome 4	**Students will evaluate the significance of cheminformatics in drug development and related fields.**				**K5**
Unit V					
Objective 5	To raise awareness about ethical considerations in medical informatics.				
Medical and Pharmacy Informatics: Introduction to pharmacy informatics- Medical Transcription, Role of informatics to enhance the services provided by pharmaceutical care givers- Health Information Systems Architecture-Health Data Management- Medical Coding- Telemedicine and Telehealth- Ethics in medical informatics- Pharmacy systems and automation- Informatics applications in pharmacy- survey and evaluation of on-line resources.					
Outcome 5	**To measure the ethical considerations in the use of informatics in medical and pharmacy settings.**				**K5**

Suggested Readings:-

Alberts, B., Bray, D., Lews, J., Raff, M., Roberts, K.& Watson, JD. (1991). Molecular Biology of the cell. Oxford (3rd ed.).Garland publishers.

De Robertis, E. D., & De Robertis, E. M. (1987). Cell and molecular biology. Lea & Febiger.

Lehninger, A. L., Nelson, D. L., & Cox, M. M. (2004). Overhead Transparency Set for Lehninger Principles of Biochemistry (4th ed.). WH Freeman.

Murray, R. K., Granner, D. K., Mayes, P. A.,& Rodwell, V. W., (2006). Harper's Biochemistry (27th ed.).

McGraw Hill.

Online Resources:

https://bioboot.github.io/bioinf525_w16/module1/

https://bioinfo.uochb.cas.cz/teaching/bioinformatics_applications_2019/bioinformtics_fields.pdf/at_download/file

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1122955/

K1-Remember	K2- Understand	K3- Apply	K4- Analyze	K5- Evaluate	K6- Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	M(2)	S(3)	L(1)	M(2)	M(2)	S(3)	M(2)	M(2)	S(3)
CO2	M(2)	L(1)	M(2)	M(2)	M(2)	S(3)	S(3)	M(2)	L(1)	S(3)
CO3	S(3)	L(1)	L(1)	M(2)	S(3)	M(2)	M(2)	S(3)	S(3)	L(1)
CO4	S(3)	M(2)	M(2)	L(1)	M(2)	M(2)	S(3)	L(1)	M(2)	S(3)
CO5	S(3)	L(1)	M(2)	L(1)	M(2)	S(3)	S(3)	M(2)	L(1)	S(3)
W.AV	**2.8**	**1.4**	**2**	**1.4**	**2.2**	**2.4**	**2.8**	2	1.8	**2.6**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	L(1)	M(2)	M(2)	S(3)
CO2	S(3)	M(2)	M(2)	S(3)	S(3)
CO3	L(1)	M(2)	S(3)	M(2)	M(2)
CO4	M(2)	L(1)	M(2)	M(2)	S(3)
CO5	S(3)	L(1)	M(2)	S(3)	S(3)
W.AV	**2.4**	**1.4**	**2.2**	**2.4**	**2.8**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - III					
DSE IV	**Course Code 2MS3E2**	**Principles of Compiler Design**	**Theory**	**C**	**H/W**
				5	**5**

Unit -I		
Objective 1	**Students will learn the key concepts and techniques involved in the compilation process, starting from lexical analysis to code generation.**	
Introduction to Compilers: Compilers and Translators – Lexical analysis – Syntax analysis – Intermediate code generation – Optimization – code generation – Bookkeeping – Error handling – compiler writing tools. Finite Automata and Lexical Analysis: The role of the lexical analyzer – the design of the lexical Analyzers – Regular expressions – Finite automata – From regular expressions to finite automata – Minimizing the number of states of a DFA – A language for specifying lexical analyzers – Implementation of a lexical analyzer		
Outcome 1	**Understand the fundamental concepts of compilers, translators, and their role in software development.**	**K1 &K2**

Unit II		
Objective 2	**Learners will explore automatic construction techniques for efficient parsers, focusing on LR and LALR parsing methods.**	
The syntactic specification of Programming Languages: Context – free grammars – Derivations and parse trees – Capabilities of context – free grammars. Basic Parsing Techniques: Parses – Shift – reduce parsing – Operator – precedence parsing – Top-down parsing – Predictive parsers. Automatic construction of efficient parsers: LR parsers – Constructing SLR parsing tables – Constructing LALR parsing tables.		
Outcome 2	**Apply parsing techniques to analyze and validate the syntax of programming language constructs.**	**K3**

Unit III		
Objective 3	**Students will also gain insights into translating assignment statements, boolean expressions, and control flow statements using syntax-directed techniques and top-down parsing.**	
Syntax – Directed translation: Syntax Directed translation schemes – Implementation of syntax – directed translators – Intermediate code – Postfix notation – Parse trees and syntax trees – Three – address code, quadruples, and triples – Translation of assignment statements – Boolean expressions – Statements that alter the flow of control – Postfix translations – Translation with a top-down parser.		
Outcome 3	**Analyze parse trees and syntax trees to facilitate intermediate code generation.**	**K4**

Unit IV		
Objective 4	**Leaners to know the run-time storage allocation schemes, especially in block-structured languages, and understand how scopes are represented.**	
Symbol Tables: The contents of a symbol table – Data structures for symbol tables – Representing scope information. Run time storage administration: Implementation of a simple stack allocation scheme – Implementation of block – structured languages – Storage allocation in block – structured languages. Error Detection and Recovery: Errors – lexical – phase errors – Syntactic phase errors – Semantic errors.		
Outcome 4	**Compare lexical, syntactic, and semantic errors and understand their impact on language processing.**	**K5**

Unit V		
Objective 5	**Learners will learn about the key sources of optimization and techniques for optimizing code**	
Introduction to code optimization:- The principal sources of optimization – loop optimization– The DAG Representation of basic blocks. Code generation: object programs – Problems in code generation – A machine model – A simple code generator – Register allocation and assignment – Code generation from DAG"s –Peephole optimization.		
Outcome 5	**To develop a simple code generator to convert intermediate code into target machine code.**	**K6**
Suggested Readings: Alfred V. Aho, Monica S. Lam, Jeffrey D. Ullman & Ravi Sethi. (2011). *Compilers : Principles,Techniques and Tools*. Pearson/Addison Wesley. Dhamdhere D. M. (1981). *Compiler Construction Principles and Practice*. Macmillan India. Reinhard Wilhelm, Director Mauser. (1995). *Compiler Design*. Addison Wesley.		
Online Resources: **https://www.tutorialspoint.com/compiler_design/index.htm** **https://www.cse.iitd.ac.in/~sbansal/col728/references.html** **https://www.geeksforgeeks.org/introduction-of-compiler-design/**		

K1-Remember	K2- Understand	K3- Apply	K4- Analyze	K5- Evaluate	K6- Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	L(1)	L(1)	M(2)	S(3)	M(2)	M(2)	S(3)	S(3)	L(1)
CO2	S(3)	M(2)	M(2)	L(1)	M(2)	M(2)	S(3)	L(1)	M(2)	S(3)
CO3	M(2)	M(2)	S(3)	L(1)	M(2)	S(3)	S(3)	M(2)	L(1)	S(3)
CO4	S(3)	L(1)	L(1)	M(2)	S(3)	M(2)	M(2)	S(3)	S(3)	L(1)
CO5	S(3)	M(2)	S(3)	L(1)	M(2)	M(2)	S(3)	L(1)	M(2)	S(3)
W.AV	2.8	1.8	2	1.4	1.4	2.2	2.6	2	2.2	2.2

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	S(3)	M(2)	L(1)	S(3)
CO2	M(2)	M(2)	S(3)	S(3)	L(1)
CO3	M(2)	S(3)	L(1)	M(2)	S(3)
CO4	S(3)	S(3)	M(2)	L(1)	S(3)
CO5	S(3)	S(3)	M(2)	M(2)	S(3)
W.AV	2.6	2.8	2	1.8	2.6

S –Strong (3), M-Medium (2), L- Low (1)

Semester - III					
DSE IV	**Course Code 2MS3E3**	**CLOUD COMPUTING**	**Theory**	**C**	**H/W**
				5	**5**

Unit -I		
Objective 1	**To equip learners with the necessary knowledge to make informed decisions about migrating to cloud computing, selecting the appropriate cloud type.**	
Cloud Computing Foundation: Introduction to Cloud Computing – Move to Cloud Computing – Types of Cloud – Working of Cloud Computing		
Outcome 1	**Define Cloud Computing: Understand the fundamental concept of cloud computing, its history, and its significance in modern IT environments**.	**K1**
Unit II		
Objective 2	**Learners understanding the working of cloud computing systems and its architecture**	
Cloud Computing Architecture : Cloud Computing Technology – Cloud Architecture – Cloud Modeling and Design - Virtualization : Foundation – Grid, Cloud and Virtualization –Virtualization and Cloud Computing		
Outcome 2	**Understand various cloud migration strategies, including rehosting, refactoring, rearchitecting, and retiring. Evaluate the benefits and challenges associated with each strategy.**	**K2**
Unit III		
Objective 3	**To familiarize learners with various cloud storage technologies and services, enabling them to make informed decisions about data storage strategies**	
Data Storage and Cloud Computing : Data Storage – Cloud Storage – Cloud Storage from LANsto WANs – Cloud Computing Services : Cloud Services – Cloud Computing at Work		
Outcome 3	**Apply cloud computing concepts and data storage strategies to practical use cases in various industries, such as healthcare, finance, and e-commerce.**	**K3**
Unit IV		
Objective 4	**Learners should familiarize with the potential risks and vulnerabilities in cloud environments,**	
Cloud Computing and Security : Risks in Cloud Computing – Data Security in Cloud – Cloud Security Services – Cloud Computing Tools : Tools and Technologies for Cloud – Cloud Mashaps– Apache Hadoop – Cloud Tools		
Outcome 4	**Evaluate the security measures and certifications offered by cloud service providers to ensure their suitability for specific business requirements.**	**K5**
Unit V		
Objective 5	**Learners will gain the knowledge and skills necessary to leverage cloud platforms effectively for application development, deployment, and management.**	
Cloud Applications – Moving Applications to the Cloud – Microsoft Cloud Services – GoogleCloud Applications – Amazon Cloud Services – Cloud Applications		
Outcome 5	**Evaluate existing applications to determine their suitability for migration to the cloud.**	**K5**

Suggested Readings:

Alfred A.Srinivasan and J.Suresh. 2014. *Cloud Computing – A Practical Approach for Learning and Implementation.* Pearson India Publications.

Rajkumar Buyya, James Broberg, Andrzej. 2011. *Cloud Computing: Principles and Paradigms*. Wiley IndiaPublications.

Arshdeep Bahga and Vijay Madisetti. 2014. *Cloud Computing – A Hands on Approach*, Universities Press
(India) Pvt Ltd

Online Resources:

https://intellipaat.com/blog/cloud-computing-tutorial/
https://www.tutorialspoint.com/cloud_computing/
https://www.javatpoint.com/cloud-computing

K1-Remember	K2-Understand	K3-Apply	K4-Analyze	K5-Evaluate	K6-Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	L(1)	S(3)	M(2)	S(3)	M(2)	M(2)	S(3)	M(2)	L(1)
CO2	S(3)	M(2)	S(3)	L(1)	M(2)	S(3)	L(1)	S(3)	M(2)	S(3)
CO3	S(3)	M(2)	S(3)	L(1)	S(3)	L(1)	M(2)	S(3)	M(2)	S(3)
CO4	M(2)	S(3)	L(1)	M(2)	M(2)	S(3)	L(1)	M(2)	S(3)	L(1)
CO5	L(1)	S(3)	M(2)	S(3)	L(1)	M(2)	S(3)	M(2)	M(2)	M(2)
W.AV	**2.2**	**2.2**	**2.4**	**1.8**	**2.2**	**2.2**	**1.8**	2.6	2.2	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	M(2)	M(2)	S(3)	M(2)
CO2	M(2)	M(2)	L(1)	S(3)	M(2)
CO3	S(3)	L(1)	M(2)	M(2)	M(2)
CO4	M(2)	S(3)	L(1)	M(2)	S(3)
CO5	L(1)	M(2)	S(3)	M(2)	M(2)
W.AV	**2.2**	**2**	**1.8**	2.4	2.2

S –Strong (3), M-Medium (2), L- Low (1)

Semester - III					
DSE V	**Course code: 2MS3E4**	**Ethical Hacking Essentials Laboratory**	**Practical**	**C**	**H/W**
				5	**5**

Unit-I		
Objectives 1	**Understand Basic Linux Commands**	
Basic Linux Commands Advanced Linux commands Information Gathering		
Outcome 1	**Students gather the information from various source and get the outline of basic linux command**	**K2**

Unit-II		
Objectives 2	**To analyze ethical hacking application**	
Vulnerability Analysis Web Application Analysis Database Assessment		
Outcome 2	**Generate and implement web applications**	**K4**

Unit-III		
Objectives 3	**To Remember and Evaluate Ethical Hacking**	
Password Attacks Wireless Attacks		
Outcome 3	**Prove methods and prevent from the attack its counter measures**	**K5**

Unit-IV		
Objectives 4	**To Analyze various Hacking tools**	
Reverse Engineering Exploitation tools		
Outcome 4	**Student learn various Exploitation tools**	**K1, K4**

Unit -V		
Objectives 5	**To Develop Hacking tools**	
Sniffing & spoofing VM-WARE		
Outcome 5	**Students solve the issues and prevent the attack**	**K6**

Suggested Readings:

Ethical Hacking **A Comprehensive Beginner's Guide to Learn and Master Ethical Hacking By hein smith, hilary morrison** ·

Learn Ethical Hacking from Scratch: Your stepping stone to By Zaid Sabih · 2018

The Complete Ethical Hacking Book: A Comprehensive Beginner's Guide to Learn and Master in Ethical Hacking/Author Thirumalesh

Online Resource:

https://repo.zenk-security.com/Magazine%20E-book/EN-Ethical%20Hacking.pdf
https://www.upgrad.com/blog/ethical-hacking-books/
https://www.amazon.in/Complete-Ethical-Hacking-Book-Comprehensive/dp/935621204X

K1-Remember	**K2-Understand**	**K3-Apply**	**K4-Analyze**	**K5-Evaluate**	**K6-Create**

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	S(3)	M(2)	L(1)	S(3)	M(2)	L(1)	L(1)	M(2)	L(1)
CO2	S(3)	M(2)	S(3)	S(3)	S(3)	M(2)	L(1)	M(2)	L(1)	S(3)
CO3	M(2)	L(1)	S(3)	M(2)	L(1)	L(1)	M(2)	L(1)	L(1)	M(2)
CO4	S(3)	M(2)	L(1)	S(3)	S(3)	M(2)	L(1)	S(3)	S(3)	L(1)
CO5	L(1)	S(3)	M(2)	S(3)	M(2)	S(3)	M(2)	S(3)	M(2)	S(3)
W.AV	**2.4**	**2.2**	**2.2**	**2.4**	**2.4**	**2**	**1.4**	**2**	**2**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	L(1)	M(2)	M(2)	S(3)
CO2	M(2)	M(2)	S(3)	L(1)	S(3)
CO3	S(3)	L(1)	M(2)	S(3)	L(1)
CO4	M(2)	S(3)	M(2)	M(2)	M(2)
CO5	S(3)	L(1)	M(2)	M(2)	S(3)
W.AV	**2.6**	**1.6**	**2.2**	**2**	**2.4**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - III					
DSE V	**Course Code 2MS3E5**	**Data Analytics using Python Lab**	**Practical**	**C**	**H/W**
				4	**4**
Unit -I					
Objective 1	**To equip learners with the skills to identify and solve simple real-life, scientific, or technical problems using algorithmic thinking and flowchart development.**				
1. Identification and solving of simple real life or scientific or technical problems, and developing flow charts for the same. (Electricity Billing, Retail shop billing, Sin series, weight of a motorbike, Weight of a steel bar, compute Electrical Current in Three Phase AC Circuit, etc. 2. Python programming using simple statements and expressions (exchange the values of two Variables, circulate the values of n variables, distance between two points).					
Outcome 1	**Develop the ability to identify simple real-life, scientific, or technical problems.**				**K2&K3**
Unit II					
Objective 2	**To provide learners with the necessary skills to solve scientific problems using conditionals and iterative loops in Python.**				
3. Scientific problems using Conditionals and Iterative loops. (Number series, Number Patterns, pyramid pattern) 4. Implementing real-time/technical applications using Lists, Tuples. (Items present in a library/Components of a car/ Materials required for construction of a building -operations of list and tuples)					
Outcome 2	**Develop & classify Python programs to generate various pyramid patterns**.				**K3 & K4**
Unit III					
Objective 3	Learners will be proficient in utilizing sets, dictionaries, and functions to create practical applications and solve complex problems.				
5. Implementing real-time applications using Sets, Dictionaries. (Language, components of an automobile, Elements of a civil structure, etc.- operations of Sets and Dictionaries) 6. Implementing programs using Functions. (Factorial, largest number in a list, area of shape)					
Outcome 3	***Design and evaluate functions to calculate the area of various shapes, such as rectangles, triangles, and circles.***				**K5**
Unit IV					
Objective 4	**Students will learn to implement programs to work with strings, including reversing, checking for palindromes, character counting, and character replacement**				
7. Implementing programs using Strings. (reverse, palindrome, character count, replacing characters. 8. Implementing programs using written modules and Python Standard Libraries (pandas, numpy. Matplotlib, scipy)					
Outcome 4	**Construct and create various types of plots and visualizations using Matplotlib to convey data insights effectively.**				**K6**

Unit V		
Objective 5	**Learners will gain proficiency in handling exceptions to manage errors and create interactive game activities using Pygame.**	
9. Implementing real-time/technical applications using File handling. (copy from one file to another, word count, longest word) 10. Implementing real-time/technical applications using Exception handling. (divide by zero error, voters age validity, student mark range validation) 11.Developing a game activity using Pygame like bouncing ball, car race etc.		
Outcome 5	**Developing a Game Activity using Pygame**	**K6**

Suggested Readings:

The Hundred-Page Machine Learning Book By Andriy Burkov

Big Data: A Revolution That Will Transform How We Live, Work, and Think By Viktor Mayer-Schönberger and Kenneth Cukier

Creating Value With Social Media Analytics: Managing, Aligning, and Mining Social Media Text, Networks, Actions, Location, Apps, Hyperlinks, Multimedia, & Search Engines Data By Gohar F. Khan

Online Resources:

https://www.coursera.org/learn/data-analysis-with-python
https://www.edx.org/course/analyzing-data-with-python
https://www.linkedin.com/learning/python-data-analysis-2

K1-Remember	K2- Understand	K3-Apply	K4- Analyze	K5- Evaluate	K6- Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M(2)	S (3)	L (1)	M (2)	L (1)	S (3)	L (1)	M (2)	L (1)	L (1)
CO2	L (1)	L (1)	M (2)	L (1)	L (1)	S (3)	L (1)	M (2)	L (1)	L (1)
CO3	M (2)	M (2)	L (1)	L (1)	M (2)	S (3)	M (2)	L (1)	M (2)	L (1)
CO4	M (2)	M (2)	M (2)	L (1)	M (2)	S (3)	M (2)	S (3)	S(3)	M (2)
CO5	L (1)	L (1)	L(1)	L (1)	M (2)	S (3)	M (2)	M (2)	M (2)	L (1)
W.AV	**1.6**	**1.8**	**1.4**	**1.2**	**1.6**	**3**	**1.6**	2	1.8	**1.2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	M (2)	L (1)	L (1)
CO2	M (2)	S (3)	M (2)	M (2)	S (3)
CO3	L (1)	M (2)	L (1)	L (1)	M (2)
CO4	M (2)	L (1)	M (2)	S (3)	M (2)
CO5	M (2)	L (1)	M (2)	S (3)	M (2)
W.AV	**2**	**2**	**1.8**	**2**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - III					
DSE V	**Course Code 2MS3E6**	**IOT Lab**	**Practical**	**C**	**H/W**
				4	**4**

Unit -I		
Objective 1	**Students will learn how to connect and operate a motor using a relay with Arduino/Raspberry Pi**	
1. To interface motor using relay with Arduino/Raspberry Pi and write a program to turn ON motor when push button is pressed. 2. To interface OLED with Arduino/Raspberry Pi and write a program to print temperature and humidity readings on it.		
Outcome 1	**Show the OLED & Display Interfacing with Arduino/Raspberry Pi**	**K2**
Unit II		
Objective 2	**Students will learn how to send sensor data from Arduino/Raspberry Pi to a smartphone using Bluetooth.**	
3. To interface Bluetooth with Arduino/Raspberry Pi and write a program to send sensor data to smart phone using Bluetooth. 4. To interface Bluetooth with Arduino/Raspberry Pi and write a program to turn LED ON/OFF when '1/0' is received from smart phone using Bluetooth.		
Outcome 2	**Develop a program to receive commands ('1' for LED ON and '0' for LED OFF) from a smartphone and control LEDs accordingly.**	**K3**
Unit III		
Objective 3	**To teach learners how to set up and use a MySQL database on Raspberry Pi and perform basic SQL queries for data storage and retrieval.**	
5. Write a program on Arduino/Raspberry Pi to upload temperature and humidity data to thing speak cloud. 6. Write a program on Arduino/Raspberry Pi to retrieve temperature and humidity data from thing speak cloud. 7. To install MySQL database on Raspberry Pi and perform basic SQL queries.		
Outcome 3	**Develop a program to retrieve temperature and humidity data from the Thing speak cloud and display it on Arduino/Raspberry Pi.**	**K3**
Unit IV		
Objective 4	**Students will learn how to publish temperature data to an MQTT broker and subscribe to the MQTT broker to receive and print temperature data from other devices.**	
8. Write a program on Arduino/Raspberry Pi to publish temperature data to MQTT broker. 9. Write a program on Arduino/Raspberry Pi to subscribe to MQTT broker for temperature data and print it.		
Outcome 4	**Explain a program to subscribe to an MQTT broker and print temperature data received from other devices.**	**K5**
Unit V		
Objective 5	**Learners will create server applications that can respond to client requests for humidity data.**	
10. Write a program to create TCP server on Arduino/Raspberry Pi and respond with humidity data to TCP client when requested. 11. Write a program to create UP server on Arduino/Raspberry Pi and respond with humidity data to UP client when requested.		
Outcome 5	**Creating a TCP Server /UP serveron Arduino/Raspberry Pi and Responding with Humidity Data**	**K6**

Suggested Readings: Building the Internet of Things: Implement New Business Models, Disrupt Competitors, Transform Your Industry Book by Maciej Kranz **Precision: Principles, Practices and Solutions for the Internet of Things Book by Timothy Chou**					
Online Resources: **https://www.iotlab.eu/** **https://ces.itec.kit.edu/2512_2535.php** **https://onlinecourses.nptel.ac.in/noc22_cs53/preview**					
K1-Remember	**K2- Understand**	**K3- Apply**	**K4- Analyze**	**K5- Evaluate**	**K6- Create**

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	S (3)	L (1)	M (2)	L (1)	S (3)	L (1)	M (2)	L (1)	L (1)
CO2	L (1)	L (1)	M (2)	L (1)	S (3)	S (3)	L (1)	M (2)	L (1)	L (1)
CO3	M (2)	M (2)	L (1)	L (1)	M (2)	S (3)	M (2)	L (1)	M (2)	L (1)
CO4	M (2)	M (2)	M (2)	L (1)	M (2)	S (3)	M (2)	S (3)	S(3)	M (2)
CO5	L (1)	L (1)	L(1)	L (1)	M (2)	S (3)	M (2)	M (2)	M (2)	L (1)
W.AV	**1.8**	**1.8**	**1.4**	**1.2**	**2**	**3**	**1.6**	2	1.8	**1.2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	M (2)	L (1)	L (1)
CO2	M (2)	S (3)	S (3)	M (2)	S (3)
CO3	L (1)	M (2)	L (1)	L (1)	M (2)
CO4	M (2)	S (3)	M (2)	S (3)	M (2)
CO5	M (2)	L (1)	M (2)	S (3)	M (2)
W.AV	**2**	**2.4**	**2**	**2**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Semester – IV					
General	**Course code: 2MS4G1**	**Principles of Digital Marketing**	**Theory**	**C**	**H/W**
				6	**6**
Unit-I					
Objectives 1	**To understand the scope of digital marketing mainly for lead generation and retention activities in both business to business and business to consumer environments**				
Digital evolution of marketing - The changing face of advertising- The Technology behind Digital Marketing - Strategic thinking- Digital Marketing Strategy- business and digital marketing - Understanding the digital consumer- Digital World-website-the hub of digital marketing world- Building an effective website-Choosing domain name-Hosting website‟s home on the internet					
Outcome 1	**Leverage and understand the new models in business and e-commerce to increase profitability**				**K2**
Unit-II					
Objectives 2	**To impart the Knowledge Public relation and Reputation management in e-marketing.**				
E-Mail Marketing - The new direct mail- Planning campaign - Measuring success-vital component of e-mail marketing - Social media and online consumer engagement - social media -Different forms of social media - Social media dashboard					
Outcome 2	**Evaluate direct marketing efforts to know the ethical and legislation impacting direct marketing**				**K1,K5**
Unit-III					
Objectives 3	**To Analyze Social media and online consumer engagement**				
Online PR and Reputation management - Fostering a positive online Image - Promoting business through online channels - Monitoring the conversation - Reputation management-Affiliate marketing and strategic partnerships - Recognizing opportunities for strategic partnerships - Affiliate marketing					
Outcome 3	**Students generate the organizations marketing based on recent trends**				**K4**
Unit-IV					
Objectives 4	**To Understand E-payment systems and its processing**				
Payment Systems and web customers, Social, ethical and legal aspects- cyber wallets, mobile payment, NFC, payment service providers – PayPal, PayTM etc.- payment gateways- standards, integration, banking and legal issues - Access, adaptation and attitudes. Customer satisfaction and loyalty - Privacy, Intellectual Property Rights, trademarks, copyrights, network innovations and patents.					
Outcome 4	**Students get knowledge about E-Payment systems and its processing**				**K1,K2**

Unit -V		
Objectives 5	**To Apply and develop the ideas of digital marketing**	
The core concepts of creativity, design and innovation - Creativity Myths, Mistaken beliefs about creativity and why they‟re dangerous - Creative people, creative organizations - Ideas and tools to help both people and organizations work more creatively - : Design thinking for innovation - Experiments		
Outcome 5	**Develop the concept of marketing thinking for innovation – Experiments**	**K3**

Suggested Readings:

Anmarie Hanlon, (2019). *Digital Marketing - Strategic planning and Integration.* New Delhi: SAGEIndia Publication.

Damian Ryan, & Calvin Jones. (2012). *Understanding Digital Marketing - Marketing Strategies for Engaging the Digital Generation.* (Vol. 1). New Delhi: Kogan Page India.

Ian Dodson, (2016). *The Art of Digital Marketing - The Definitive Guide to Creating Strategies Targeted and Measurable Online Campaigns.* New Delhi: Wiley India Publications.

Jason Beaird. 2nd Edition. *The Principles of Beautiful Website Design* Sitepoint.

Rick Mathieson. *Creative thinking by Rod Jenkins The On-Demand Brand: 10 Rules for Digital MarketingSuccess.*

Online Resources:

https://www.academia.edu/30511847/Understanding_Digital_Marketing_DAMIAN_RYAN_and_CALVIN_JONES

https://www.perlego.com/book/990602/the-art-of-digital-marketing-the-definitive-guide-to-creating-strategic-targeted-and-measurable-online-campaigns-pdf

K1-Remember	K2-Understand	K3- Apply	K4-Analyze	K5-Evaluate	K6- Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	L(1)	S(3)	M(2)	S(3)	M(2)	M(2)	S(3)	M(2)	L(1)
CO2	S(3)	M(2)	S(3)	L(1)	M(2)	S(3)	L(1)	S(3)	M(2)	S(3)
CO3	S(3)	M(2)	S(3)	L(1)	S(3)	L(1)	M(2)	S(3)	M(2)	S(3)
CO4	M(2)	S(3)	L(1)	M(2)	M(2)	S(3)	L(1)	M(2)	S(3)	L(1)
CO5	L(1)	S(3)	M(2)	S(3)	L(1)	M(2)	S(3)	M(2)	M(2)	M(2)
W.AV	**2.2**	**2.2**	**2.4**	**1.8**	**2.2**	**2.2**	**1.8**	**2.6**	**2.2**	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	M(2)	M(2)	L(1)	S(3)
CO2	M(2)	L(1)	S(3)	M(2)	S(3)
CO3	S(3)	L(1)	M(2)	L(1)	M(2)
CO4	M(2)	S(3)	L(1)	M(2)	S(3)
CO5	S(3)	L(1)	M(2)	S(3)	L(1)
W.AV	**2.6**	**2**	**2**	**1.8**	**2.4**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - IV					
General	**CourseCode: 2MS4G2**	**Fundamentals of Industry 4.0 and 3D Printing**	**Theory**	**C**	**H/W**
				6	**6**

Unit -I	
Objective 1	**Students will learn the emerging trends of industrial big data and predictive analytics**

Introduction to Industry 4.0

The Various Industrial Revolutions - Digitalization and the Networked Economy - Drivers, Enablers, Compelling Forces and Challenges for Industry 4.0 - The Journey so far: Developments in USA, Europe, China and other countries - Comparison of Industry 4.0 Factory and Today's Factory - Trends of Industrial Big Data and Predictive Analytics for Smart Business Transformation

Outcome 1	**Understand the historical context and evolution of various industrial revolutions leading up to Industry 4.0.**	**K2**

Unit II	
Objective 2	**Students will learn the concepts of smart manufacturing, smart devices and products, smart logistics, smart cities, and the application of predictive analytics in IoT and IIoT systems.**

Road to Industry 4.0

Internet of Things (IoT) & Industrial Internet of Things (IIoT) & Internet of Services - Smart Manufacturing - Smart Devices and Products - Smart Logistics - Smart Cities - PredictiveAnalytics

Outcome 2	**Applying predictive analytics techniques to analyze IoT and IIoT data and make data-driven decisions for predictive maintenance and operational efficiency.**	**K3**

Unit III	
Objective 3	**Students will have a strong grasp of the foundational technologies and disciplines necessary to build smart and connected systems in the Industry 4.0 era.**

Related Disciplines, System, Technologies for Enabling Industry 4.0.

Cyber physical Systems - Robotic Automation and Collaborative Robots - Support System for Industry 4.0 - Mobile Computing - Related Disciplines - Cyber Security

Outcome 3	**Analyze the real-world examples of successful Industry 4.0 implementations to understand best practices and lessons learned**	**K4**

Unit IV	
Objective 4	**Students will learn about the generic 3D printing process, the benefits of 3D printing, and how it differs from CNC machining.**

Introduction and Basic Principles

3D Printing, Generic 3D Printing Process, Benefits of 3D Printing, Distinction Between 3D Printing and CNC Machining, Other Related Technologies Development of 3D Printing Technology: Introduction, Computers, Computer-Aided Design Technology, Other Associated Technologies, The Use of Layers, Classification of 3D Printing Processes, Metal Systems, Hybrid Systems, Milestones in 3D Printing Development, 3D Printing around the World.

Outcome 4	**Evaluate the potential future trends and innovations in 3D printing technology, enabling participants to stay informed about the evolving landscape of additive manufacturing.**	**K5**

Unit V		
Objective 5	**Learners will explore the various rapid prototyping processes and their classification**	
3D Printing Machines & Processes Introduction to 3D Printing Machines: Historical Perspectives, Rapid Prototyping - An IntegralPart of Time Compression Engineering, RP Information Workflow. Rapid Prototyping Processes: Classification of Rapid Prototyping Processes.		
Outcome 5	**Explain the concept of rapid prototyping and its importance in reducing product development time through additive manufacturing.**	**K5**
Suggested Readings: Alasdair Gilchrist. (February, 2017). *Industry 4.0: The Industrial Internet of Things*. Francisco Rodriguez-Diaz. Computing Reviews. ISBN-13: 978-1484220467 Ian Gibson, David W Rosen, Brent Stucker. (2010). *Additive Manufacturing Technologies: Rapid Prototypingto Direct Digital Manufacturing*, Springer. Chee Kai Chua, Kah Fai Leong, 2014. *3D Printing and Additive Manufacturing: Principles and Applications:*Fourth Edition of Rapid Prototyping.		
Online Resources:: **https://www.mdpi.com/2071-1050/10/11/3960** **https://www.sciencedirect.com/science/article/pii/S2666721521000272** **https://www.3dnatives.com/en/3d-printing-in-industry-4-0-150220215/**		

K1- Remember	K2- understand	K3- Apply	K4- Analyze	K5-Evaluate	K6-Create

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	S(3)	M(2)	L(1)	M(2)	M(2)	M(2)	S(3)	S(3)	M(2)
CO2	M(2)	M(2)	S(3)	S(3)	L(1)	L(1)	S(3)	L(1)	M(2)	L(1)
CO3	S(3)	M(2)	L(1)	M(2)	M(2)	M(2)	S(3)	S(3)	S(3)	M(2)
CO4	S(3)	M(2)	S(3)	L(1)	S(3)	M(2)	S(3)	S(3)	S(3)	M(2)
CO5	S(3)	M(2)	L(1)	M(2)	M(2)	M(2)	S(3)	S(3)	M(2)	S(3)
W.AV	**2.8**	**2.2**	**2**	**1.8**	**2**	**1.8**	**2.8**	2.6	2.6	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	S(3)	L(1)	M(2)	S(3)
CO2	S(3)	M(2)	M(2)	S(3)	M(2)
CO3	S(3)	L(1)	S(3)	L(1)	S(3)
CO4	L(1)	M(2)	M(2)	M(2)	S(3)
CO5	S(3)	S(3)	L(1)	M(2)	S(3)
W.AV	**2.6**	**2.2**	**1.8**	**2**	**2.8**

S –Strong (3), M-Medium (2), L- Low (1)

<table>
<tr><th colspan="5">Semester - IV</th></tr>
<tr><td rowspan="2">Core</td><td rowspan="2">Course code:
2MS4MR</td><td rowspan="2">Industrial Internship with Project Work</td><td>C</td><td>H/W</td></tr>
<tr><td>18</td><td>18</td></tr>
<tr><td>Objectives</td><td colspan="4">1. P Practical Exposure: To offer learners hands-on experience in an industrial environment, allowing them to apply the knowledge and skills acquired during their academic studies to real-world projects.

2. Industry Relevance: To align the internship projects with the specific industry's needs and demands

3. Skill Enhancement: To enhance learners technical, problem-solving, communication, and teamwork skills through project work and interactions with industry professionals.

4. Professional Development: To help students develop a professional attitude, work ethic, and adaptability to the workplace environment.

1) Networking Opportunities: To provide learner with opportunities to network with industry professionals, potentially leading to future career prospects.</td></tr>
<tr><td colspan="5">The student has to attach himself / herself with an organization related to his / her specialization approved by the (Alagappa Institute of Skill Development) Department for a period of entire semester for Industrial Internship Training with Project. One personnel of that industry and a faculty of the Department will be external and internal guides of the project respectively. The project theme, work flow and other related guidelines can be had from the Industry. During this Internship period there will be two „Project Reviews‟ conducted by the Department and the students must present themselves in person and present the project progress in the form of presentation in front of the internal guide. At the end of the internship, the student should prepare a project documentation report (not less than 50 pages, A4 size). Student should also produce a certificate of internship from the organization. The internal guide will award for 100 marks based on the performance in two reviews and the quality of the project documentation report. The external guide (industry personnel) of the particular student will award for 50 marks. The cumulative of these two marks for 150 will be considered as Internal mark. The final project viva-voce for 50 marks will be conducted by the Department with two examiners and the cumulative 200 marks will be given by the Department.</td></tr>
<tr><td>Outcomes</td><td colspan="4">1) Practical Experience: Students will have gained practical experience by working on real industry projects, enhancing their understanding of how theoretical concepts are applied in real-world scenarios.

2) Industry Knowledge: Learners will have a deeper insight into the workings of the specific industry they interned in, including its processes, challenges, and best practices.

3) Project Execution: Students will have successfully completed an industry project, showcasing their ability to plan, execute, and deliver results within the given timeframe.

4) Enhanced Skills: students will have honed their technical skills and soft skills, such as communication, problem-solving, teamwork, and time management.

5) Professional Network: learners will have expanded their professional network</td></tr>
</table>

	through interactions with industry professionals, potentially leading to job opportunities or referrals.

Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	M(2)	M(2)	L(1)	S(3)	S(3)	S(3)	M(2)	M(2)	L(1)
CO2	M(2)	S(3)	M(2)	M(2)	S(3)	L(1)	M(2)	L(1)	S(3)	M(2)
CO3	S(3)	M(2)	M(2)	L(1)	S(3)	M(2)	S(3)	M(2)	M(2)	L(1)
CO4	S(3)	M(2)	L(1)	S(3)	M(2)	M(2)	L(1)	S(3)	M(2)	S(3)
CO5	M(2)	M(2)	S(3)	L(1)	M(2)	L(1)	S(3)	M(2)	M(2)	M(2)
W.AV	**2.6**	**2.2**	**2**	**1.6**	**2.6**	**1.8**	**2.4**	**2**	**2.2**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	S(3)	L(1)	M(2)	L(1)
CO2	L(1)	S(3)	M(2)	S(3)	M(2)
CO3	S(3)	M(2)	M(2)	L(1)	S(3)
CO4	S(3)	M(2)	S(3)	S(3)	M(2)
CO5	M(2)	S(3)	M(2)	M(2)	L(1)
W.AV	**2.4**	**2.6**	**2**	**2.2**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)

I - Semester					
NME	**CourseCode:**	**Web Designing**	**T**	**Credits:2**	**Hours: 3**
Unit -I					
Objective 1	**To provide students with an introduction and overview of computer networking, focusing on the growth of the Internet, the complexity of networking**				
Introduction and Overview: Growth of Computer Networking – Why Networking Seems Complex – The Five Key Aspects of Networking – Public And Private Parts of The Internet – Networks, Interoperability, And Standards – Protocol Suites And Layering Models – How Data Passes Through Layers – Headers And Layers – ISO and the OSI Seven Layer Reference Model – The Inside Scoop – Remainder of The Text **Internet Trends:** Introduction – Resource Sharing – Growth of The Internet – From Resource Sharing to Communication – From Text to Multimedia – Recent Trends					
Outcome 1	**Understand the historical growth and development of computer networking, gaining insights into the evolution of the Internet and its significance in modern society.**				**K1 & K2**
Unit II					
Objective 2	**To familiarize students with application-layer protocols, document representation using HTML, web protocols like HTTP, file transfer protocols like FTP**				
Traditional Internet Applications: Introduction – Application-Layer Protocols – Representation and Transfer – Web Protocols – Document Representation with HTML – Uniform Resource Locators and Hyperlinks – Web Document Transfer with HTTP – Caching In Browsers. – Browser Architecture – File Transfer Protocol (FTP) – FTP Communication Paradigm – Electronic Mail – The Simple Mail Transfer Protocol (SMTP) – ISPs, Mail Servers, And Mail Access – Mail Access Protocols (POP, IMAP) – Email Representation Standards (RFC2822, MIME) –Domain Name System (DNS) – Domain Names That Begin with www – The DNS Hierarchy And Server Model – Name Resolution.					
Outcome 2	**Apply their understanding of traditional Internet applications and protocols to troubleshoot common networking issues and design efficient and reliable networked applications.**				**K3**
Unit III					
Objective 3	**Students will be proficient in designing and developing basic web pages using HTML/XHTML**.				
Introduction to HTML/XHTML: Basic Syntax – Standard HTML Document Structure – Basic Text Markup – Images – Hypertext Links – Lists – Tables – Forms – The audio Element – Thevideo Element – Organization Elements – The time Element					
Outcome 3	**Design and analyze the basic web pages with appropriate HTML/XHTML elements, enabling them to build a solid foundation for web development and design skills.**				**K4**

Unit IV		
Objective 4	**Students with a comprehensive understanding of JavaScript syntax, primitives, operations, expressions, control statements, object-oriented concepts, arrays, functions, and constructors.**	
The Basics of JavaScript: Overview of JavaScript – Object Orientation and JavaScript – General Syntactic Characteristics – Primitives, Operations, and Expressions – Screen Output and Keyboard Input – Control Statements – Object Creation and Modification – Arrays – Functions – Constructors **JavaScript and HTML Documents:** Events and Event Handling – Handling Events from Body Elements – Handling Events from Button Elements – Handling Events from Text Box and Password Elements		
Outcome 4	**Analyze and evaluate the JavaScript code to identify and fix common programming errors, developing critical thinking and problem-solving skills in JavaScript programming.**	**K4 & K5**
Unit V		
Objective 5	**Students will learn how to install and customize Bootstrap system for responsive layouts, and Base CSS provided by Bootstrap using LESS variables.**	
Getting Started with Bootstrap: Mobile-first design – Why Bootstrap **Installing and Customizing Bootstrap:** Including Bootstrap in your HTML file – The Bootstrap CDN – Overriding with custom CSS – Using the Bootstrap customizer – Deep customization of Bootstrap **Using the Bootstrap Grid:** Using the Bootstrap Grid classes – Using the Bootstrap variables and mixins – Creating a blog layout with the Bootstrap Grid mixins and variables. **Using the Base CSS:** Implementing the Bootstrap Base CSS – Customizing the Base CSS using LESS variables		
Outcome 5	**Design and create responsive and visually engaging web pages using Bootstrap, showcasing practical skills in front-end web development and design.**	**K6**
Suggested Readings:- Aravind Shenoy. Ulrich Sossou. (2014). Learning Bootstrap - Unearth the potential of Bootstrap create responsive web pages using modern techniques. Packt Publishing Ltd. Douglas E. Comer. Computer Networks and Internets. (5th ed.). Pearson Education. Robert W. Sebesta. Programming the World Wide Web. (8th ed.). Pearson Education		
Online Resources: https://www.pluralsight.com/browse/software-development/web-development https://www.udemy.com/course/the-complete-web-development-bootcamp/ https://github.com/topics/web-designing		
K1-Remember	**K2-Understand**	**K3-Apply**	**K4-Analyze**	**K5-Evaluate**	**K6-Create**
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Course Outcome VS Programme Outcomes

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	M(2)	S(3)	M(2)	S(3)	L(1)	M(2)	S(3)	M(2)	L(1)
CO2	M(2)	M(2)	M(2)	L(1)	M(2)	S(3)	L(1)	M(2)	M(2)	S(3)
CO3	S(3)	M(2)	S(3)	L(1)	S(3)	L(1)	M(2)	S(3)	M(2)	S(3)
CO4	M(2)	S(3)	M(2)	M(2)	M(2)	S(3)	L(1)	M(2)	S(3)	L(1)
CO5	M(2)	S(3)	S(3)	S(3)	L(1)	M(2)	S(3)	M(2)	M(2)	M(2)
W.AV	**2.4**	**2.4**	**2.6**	**1.8**	**2.2**	**2**	**1.8**	2	2.2	**2**

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S(3)	L(1)	M(2)	M(2)	S(3)
CO2	M(2)	M(2)	S(3)	L(1)	S(3)
CO3	S(3)	L(1)	M(2)	S(3)	L(1)
CO4	M(2)	S(3)	M(2)	M(2)	M(2)
CO5	S(3)	L(1)	M(2)	M(2)	S(3)
W.AV	**2.6**	**1.6**	**2.2**	**2**	**2.4**

S –Strong (3), M-Medium (2), L- Low (1)

Semester - III					
NME	**Course code:**	**Principles of Digital Marketing**	**Theory**	**C**	**H/W**
				2	**3**

Unit-I		
Objectives 1	**To understand the scope of digital marketing mainly for lead generation and retention activities in both business to business and business to consumer environments**	
Digital evolution of marketing - The changing face of advertising- The Technology behind Digital Marketing - Strategic thinking- Digital Marketing Strategy- business and digital marketing - Understanding the digital consumer- Digital World-website-the hub of digital marketing world- Building an effective website-Choosing domain name-Hosting website‟s home on the internet		
Outcome 1	**Leverage and understand the new models in business and e-commerce to increase profitability**	**K2**

Unit-II		
Objectives 2	**To impart the Knowledge Public relation and Reputation management in e-marketing.**	
E-Mail Marketing - The new direct mail- Planning campaign - Measuring success-vital component of e-mail marketing - Social media and online consumer engagement - social media -Different forms of social media - Social media dashboard		
Outcome 2	**Evaluate direct marketing efforts to know the ethical and legislation impacting direct marketing**	**K1,K5**

Unit-III		
Objectives 3	**To Analyze Social media and online consumer engagement**	
Online PR and Reputation management - Fostering a positive online Image - Promoting businessthrough online channels - Monitoring the conversation - Reputation management-Affiliate marketing and strategic partnerships - Recognizing opportunities for strategic partnerships - Affiliate marketing		
Outcome 3	**Students generate the organizations marketing based on recent trends**	**K4**

Unit-IV		
Objectives 4	**To Understand E-payment systems and its processing**	
Payment Systems and web customers, Social, ethical and legal aspects- cyber wallets, mobile payment, NFC, payment service providers – PayPal, PayTM etc.- payment gateways- standards, integration, banking and legal issues - Access, adaptation and attitudes. Customer satisfaction and loyalty - Privacy, Intellectual Property Rights, trademarks, copyrights, network innovations and patents.		
Outcome 4	**Students get knowledge about E-Payment systems and its processing**	**K1,K2**

Unit -V		
Objectives 5	**To Apply and develop the ideas of digital marketing**	
The core concepts of creativity, design and innovation - Creativity Myths, Mistaken beliefs about creativity and why they‟re dangerous - Creative people, creative organizations - Ideas and tools to help both people and organizations work more creatively - : Design thinking for innovation - Experiments		
Outcome 5	**Develop the concept of marketing thinking for innovation – Experiments**	**K3**

Suggested Readings:-

Anmarie Hanlon, (2019). *Digital Marketing - Strategic planning and Integration.* New Delhi: SAGEIndia Publication.

Damian Ryan, & Calvin Jones. (2012). *Understanding Digital Marketing - Marketing Strategies forEngaging the Digital Generation.* (Vol. 1). New Delhi: Kogan Page India.

Ian Dodson, (2016). *The Art of Digital Marketing - The Definitive Guide to Creating Strategies*

Targetedand Measurable Online Campaigns. New Delhi: Wiley India Publications. Jason Beaird. 2nd Edition. *The Principles of Beautiful Website Design* Sitepoint. Rick Mathieson. *Creative thinking by Rod Jenkins The On-Demand Brand: 10 Rules for Digital MarketingSuccess.*					
Online Resources https://www.academia.edu/30511847/Understanding_Digital_Marketing_DAMIAN_RYAN_and_CALVIN_JONES https://www.perlego.com/book/990602/the-art-of-digital-marketing-the-definitive-guide-to-creating-strategic-targeted-and-measurable-online-campaigns-pdf					
K1-Remember	**K2- Understand**	**K3- Apply**	**K4- Analyze**	**K5- Evaluate**	**K6- Create**

Course Outcome VS Programme Outcomes

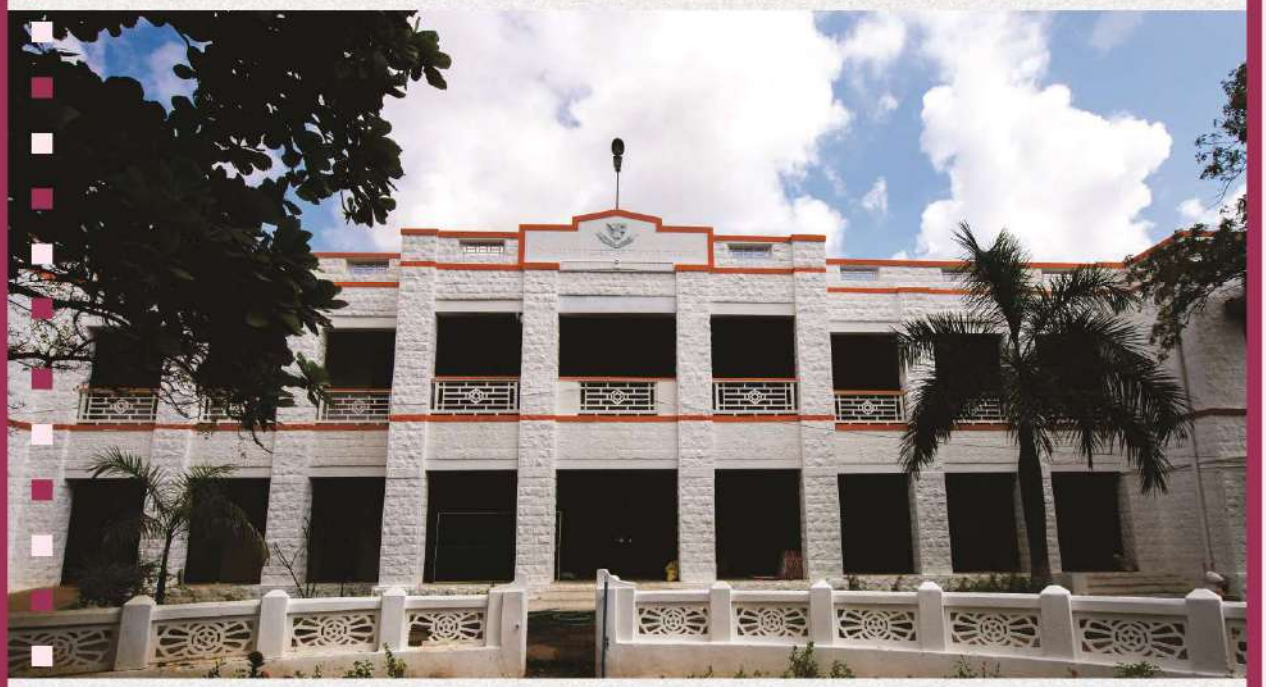
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	S(3)	S (3)	L (1)	M (2)	L (1)	S (3)	L (1)	M (2)	L (1)	L (1)
CO2	M(2)	L (1)	M (2)	L (1)	S (3)	S (3)	L (1)	M (2)	L (1)	L (1)
CO3	M (2)	M (2)	M(2)	L (1)	M (2)	S (3)	M (2)	L (1)	M (2)	L (1)
CO4	M (2)	M (2)	M (2)	L (1)	M (2)	S (3)	M (2)	S (3)	S(3)	M (2)
CO5	L (1)	L (1)	L(1)	L (1)	M (2)	S (3)	M (2)	M (2)	M (2)	L (1)
W.AV	2	1.8	1.8	1.2	2	3	1.6	2	1.8	1.6

S –Strong (3), M-Medium (2), L- Low (1)

Course Outcome VS Programme Specific Outcomes

CO	PSO1	PSO2	PSO3	PSO4	PSO5
CO1	S (3)	S (3)	L (1)	M (2)	L (1)
CO2	M (2)	S (3)	M (2)	L (1)	M (2)
CO3	M (2)	M(2)	M (2)	S (3)	S(3)
CO4	M (2)	S (3)	M (2)	M (2)	M (2)
CO5	S (3)	S (3)	L (1)	M (2)	L (1)
W.AV	**2.4**	**2.8**	**1.6**	**2**	**1.8**

S –Strong (3), M-Medium (2), L- Low (1)



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