PONDICHERRY UNIVERSITY (A CENTRAL UNIVERSITY)

B.Sc. Information Technology(Honors)

B.Sc. Information Technology (Honors with Research)

REGULATIONS, CURRICULUM & SYLLABUS (For Affiliated Colleges)

(Under the National Education Policy 2020)

Effective from the Academic Year 2023 - 2024



Revised in June 2024

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Table of Contents

| S.No | Contents | Page No. |
|------|--|-------------|
| 1 | PREAMBLE & PROGRAMME OUTCOMES | 4 |
| 2 | DEFINITIONS | 5 |
| 3 | DURATION, ELIGIBILITY & AWARD OF UNDER GRADUATE (UG) | 7 |
| | DEGREE / DIPLOMA / CERTIFICATE | |
| | 3.1. Duration of the Programme | 7 |
| | 3.2. Eligibility | 7 |
| | 3.3. Awarding of UG Certificate, UG Diploma and Degrees, Nomenclature | 7 |
| | 3.3.1. UG Certificate | 8 |
| | 3.3.2. UG Diploma | 8 |
| | 3.3.3. Three-year UG Degree | 8 |
| | 3.3.4. Four-year UG Degree (Honors) | 8 |
| | 3.3.5. Four-year UG Degree (Honors with Research) | 8 |
| | 3.3.6. Programme overview | 8 |
| | 3.3.7. Degree and Nomenclature | 9 |
| | 3.3.8. Degree with Specialization | 10 |
| | 3.3.9. Exit Options and Nomenclature of Certificate, Diploma | 10 |
| 4 | STRUCTURE OF THE UNDERGRADUATE PROGRAMME | 11 |
| | 4.1. Types of courses | 12 |
| | 4.2. Description of courses | 12 |
| | 4.3. Levels of the courses | 14 |
| | 4.4. Credit-hours for different types of courses | 15 |
| | 4.5. Semester-wise break up of courses of 3 year and 4 year programmes | 17 |
| 5 | ADMISSION ELIGIBILITY, LATERAL ENTRY | 18 |
| | 5.1 Admission Eligibility | 18 |
| | 5.2 Admission by Lateral Entry | 19 |
| 6 | EVALUATION | 19 |
| | 6.1. Category of courses | 19 |
| | 6.2. Learning Assessment | 20 |
| | 6.3. Marks for Attendance | 21 |
| | 6.4. Internal Test Scheme | 21 |
| | 6.5. End Semester University Exam | 21 |
| | 6.6. Break up of End Semester Marks | 21 |
| 7 | CONSOLIDATION OF MARKS, PASSING MINIMUM, ARREAR EXAM | 23 |
| 8 | LETTER GRADES AND RANGE OF MARKS | 23 |
| 9 | CALCULATION OF SGPA AND CGPA | 25 |
| 10 | DECLARATION OF RESULTS | 27 |
| 11 | MINIMUM CREDIT REQUIREMENTS | 28 |
| 12 | COURSE CODE | 28 |
| 13 | CURRICULUM | 29 |
| 14 | SYLLABUS | 39 |

1. PREAMBLE & PROGRAMME OUTCOMES

1.1 Preamble

In the ever-evolving landscape of the digital age, Information Technology (IT) stands as a cornerstone of innovation, efficiency, and transformation. The B.Sc. Information Technology program is designed to prepare students for the challenges and opportunities of this dynamic field. This program provides a commitment to nurture the next generation of IT professionals capable of addressing the complex technological needs of today's world. The main objectives of the course are to:

- Develop technical proficiency in Information Technology, covering areas such as IT fundamentals, Enterprise IT infrastructure, cloud computing, IoT, Cybersecurity, Data Center Management, and more.
- Nurture critical thinking, problem-solving, and innovation to empower the graduates to adapt and thrive in the ever-changing IT industry.
- Introduce students to the niche areas of IT and keep them abreast of the developments in the IT industry.
- Prepare students for successful careers in IT by offering practical hands-on experiences and opportunities for professional growth.
- Cultivate an interest for lifelong learning to ensure that our graduates remain at the forefront of technological advancements throughout their careers.
- Enable holistic, multidisciplinary, and skill-oriented knowledge development in the students.

The B.Sc Information Technology at Pondicherry University offers a diverse curriculum that combines theoretical knowledge with hands-on experience. Some of the prominent career paths and job opportunities for B. Sc. Information Technology graduates include:

- IT Administrator
- Troubleshooting Engineer
- IT Manager
- Cloud Engineer
- Network Engineer
- Data Center Manager
- AI Engineer
- HPC Engineer
- Cyber Security Manager

1.2. Programme Outcomes

Upon completion of the Bachelor of Science (B.Sc.) programme in Information Technology, students will demonstrate the following outcomes at:

UG Certificate Level

- Attain foundational knowledge in Information Technology.
- Demonstrate fundamental skills in problem-solving and programming relevant to IT.

UG Diploma Level

- Develop intermediate-level understanding and skills in various domains of information technology.
- Apply problem-solving techniques and programming concepts to practical IT scenarios.

UG Degree Level

- Achieve advanced knowledge and proficiency in diverse areas of information technology.
- Demonstrate expertise in deploying and managing IT infrastructure.

UG Degree with Honors / Honors with Research

- Understand the fundamentals of computing infrastructure and its management
- Thoroughly understanding the conventional and modern networking infrastructure and its management.
- Comprehend the storage infrastructure and its management.
- Acquire the knowledge of managing cloud environments.
- Knowledge of security threats to the IT infrastructure and its management.
- Understand Artificial Intelligence and its uses for infrastructure management.

2. DEFINITIONS

Terms used in the NEP Regulations shall have the meaning assigned to them as given below unless the context otherwise requires:

A. Credit: A credit is the number of hours of instruction required per week for the given subject in a given semester of 16-18 weeks. One credit is equivalent to 15 hours of teaching (lecture or tutorial) or 30 hours of practice/field work/community engagement and service per Semester.

B. Academic Year: Means the year starting on 1st day of July and ends on the 30th day of June in the succeeding year.

C. Residence time: Means the time a student spends for attending classes in the College/Institution (either Online/Offline) as a full-time student and enrolled in any Academic programme of the Institution.

D. Semester: Means 18 weeks (90 Working days) of teaching-learning sessions of which two weeks shall be set apart for examinations and evaluation.

E. Grade: Means a letter grade assigned to a student in a Course for his/her performance at academic sessions as denoted in symbols of: O(Outstanding), A+ (Excellent), A (Very good), B+ (Good), B (Above average), C (Average), P (Pass), F (Fail), and Ab (Absent) with a numeric value of O=10, A+=9, A=8, B+=7, B=6, C=5, P=4, and F=0, Ab=0.

F. Grade Point Average (GPA): Means an average of the Grades secured by a student in all courses in a given academic session duly weighted by the number of credits associated to each of the courses.

G. Cumulative GPA (CGPA): Means the weighted average of all courses the student has taken in a given Programme.

H. A Common Course: Means the set of courses that all students who are admitted to any Programme of the University are required to study these courses include, Languages (English-Modern Indian Languages), NEP specific courses- viz. Understanding India, Environmental sciences/Education, Health and Wellbeing/Yoga, Digital & Technological solutions.

I. Major Discipline: Means the core subjects mandatory for the programme, Major discipline may be a single discipline or interdisciplinary/ multidisciplinary courses. Eg. B.Sc. (Physics) or B.Sc. (Physics, Maths and Chemistry).

J. Minor Discipline: Means the courses which are specific to the specialization in Computer Science.

K. Credit Requirement: For a Degree/Diploma/Certificate Programme means the minimum number of credits that a student shall accumulate to achieve the status of being qualified to receive the said Degree, Diploma/Certificate as the case may be.

L. Exit option: Means the option exercised by the students, to leave the Programme at the end of any given Academic year.

M. Lateral entry: Means a student being admitted into an ongoing Programme of the University otherwise than in the 1st year of the programme.

N. Vocational Studies/Education: This refers to set of activities for participation in an approved project or practical or lab, practices of application of scientific theories, studio activities involving students in creative artistic activities, workshop-based activities, field-based shop-floor learning, and Community engagement services, etc. (These courses are expected to enable students to incorporate the learned skills in daily life and start up entrepreneurship.)

O. Skill-based learning/project: This refers to activities designed to understand the different socioeconomic contexts, first-hand understanding of the policies, regulations, organizational structures, processes, and programmes that guide the development process.

P. Work-based internship: Means structured internships with Software Companies, Research and Higher Educational Institution Laboratories, Corporate offices, etc. which will further improve employability.

3. DURATION, ELIGIBILITY & AWARD OF UG DEGREE/DIPLOMA/CERTIFICATE

3.1. Duration of the Programme

The duration of the UG programme is 4 years or 8 semesters. Students who desire to undergo a Threeyear UG Programme will be allowed to exit after completion of the 3rd year. If a student wants to leave after the completion of the first or second year, the student will be given a UG Certificate or UG Diploma, respectively, provided they secure the prescribed number of credits (as given in the Table 1).

3.2. Eligibility

Senior Secondary School Leaving Certificate or Higher Secondary (12th Grade) Certificate obtained after successful completion of Grade 12 or equivalent stage of education corresponding to Level-4 (Levels in NHEQF). For detailed eligibility, refer the Admissions and Lateral Entry Section 5.

3.3. Awarding of UG Certificate, UG Diploma and Degrees Nomenclature

Four years B.Sc. Degree Programme shall have options for earning a Certificate / Diploma / UG Degree / UG Degree (Honors) / UG Degree (Honors with Research) based on the exit option exercised by the candidates.

3.3.1. UG Certificate

Students who opt to exit after completion of the first year (2 Semesters) and have earned a minimum of 40 credits will be awarded a UG certificate in IT Devices and Troubleshooting if, in addition, they complete work based vocational courses / internship of 4 credits during the summer vacation of the first year.

3.3.2. UG Diploma

Students who opt to exit after completion of the second year (4 Semesters) and have earned a minimum of 80 credits will be awarded the UG diploma in IT Infrastructure Management if, in addition, they complete work based vocational courses / internship of 4 credits during the summer vacation of the second year.

3.3.3. Three-year UG Degree

Students who wish to discontinue after the 3-year (6 Semesters) UG programme will be awarded a UG Degree in Information Technology after successful completion of three years, earning a minimum of 120 credits and satisfying the minimum credit requirements as mentioned in Table1.

3.3.4. Four-year UG Degree (Honors)

A four-year UG Honors degree in the Information Technology will be awarded to those who complete a four-year (8 Semesters) degree programme, earning a minimum of 160 credits and have satisfied the credit requirements as mentioned in Table 1.

3.3.5. Four-year UG Degree (Honors with Research)

Students who secure a minimum of 7.5 CGPA in the first six semesters and wish to undertake research at the undergraduate level can choose a research stream in the fourth year. They should do a research project or dissertation under the guidance of a faculty member of the University.

The research project/dissertation will be in the major discipline, Information Technology. The students who secure a minimum of 160 credits, including 12 credits from a research project/dissertation, will be awarded UG Degree in Information Technology (Honors with Research).

3.3.6. Programme overview

As per the guidelines of NEP, students are mandated to complete 120 credits to complete a basic Bachelor's Degree in 3 years. With an additional 40 credits of course work one can pursue 4th Year Honors or Honors with Research Degree. The UG Programme will consist of the following categories

of courses and the minimum credit requirements for 3-year UG and 4-year UG(Honors) or UG (Honors with Research) programmes are given in Table 1.

| Fable 1: Breakup of Credits and | Courses – Minimum Requirements |
|---------------------------------|---------------------------------------|
|---------------------------------|---------------------------------------|

| S.No. | Component | 3 Year UG | 4 Year UG (Honors/ Honors with research) |
|-------|--|---|---|
| 1 | Major Disciplinary - Computer Science | 60 Credits (15 Courses of 4 credits) | 80 Credits (20 Courses of 4 credits) |
| 2 | Minor Disciplinary – Specialization Courses | 24 Credits (6 Courses of 4 Credits) | 32 Credits (8 Courses of 4 credits) |
| 3 | Multi-Disciplinary Courses | 9 Credits (3 courses of 3 credits) | 9 Credits (3 courses of 3 credits) |
| 4 | Ability Enhancement Courses | 8 Credits (4 courses of 2 credits) | 8 Credits (4 courses of 2 credits) |
| 5 | Skill Enhancement Course – On the chosen Specialization | 9 Credits (3 courses of 3 credits) | 9 Credits (3courses of 3 credits) |
| 6 | Value-added courses | 8 Credits (4 courses of 2 credits) | 8 Credits (4 courses of 2 credits) |
| 7 | Summer internship | 4 Credits (Included in Major courses of 60 credits) | 4 Credits (Included in Major courses of 80 credits) |
| 8 | Community engagement and service | 2 Credits (1 Field based Course) | 2 Credits (1 Field based Course) |
| 9 | Research Dissertation Project | - | 12 Credits |
| | Total | 120 | 160 |

Note: Honors students not undertaking research will do 3 courses for 12 credits in lieu of a Research Project / Dissertation.

3.3.7. Degree and Nomenclature

Candidates who complete Eight semesters and earn a minimum of 160 credits and have satisfied the credit requirements as mentioned in the Table 1 will be awarded either of the following degrees.

- B.Sc. Information Technology *
- B.Sc. Information Technology (Honors) [#]
- B.Sc. Information Technology (Honors with Research) ##

* for candidates who wish to exit at the end of third year with 120 credits earned and satisfied the other minimum requirements given in 3.3.9.

[#] for candidates who complete 3 theory courses (MJD 21, MJD 22, and MJD 23) instead of the research project work in the Eighth Semester.

^{##} for candidates who complete a research project work in the Eighth Semester.

3.3.8. Degree with Specialization

Out of the above said 160 credits (Table1) the candidates shall earn 103 credits (83 credits out of 120 credits in the case of 3 year UG) from the Hardcore courses (Major Disciplinary, Multi-disciplinary, Ability Enhancement, Value added Courses and Community Engagement and Service) and the remaining 57 credits (37 credits in the case of 3 year UG) shall be earned from the subjects they choose to study from the list of softcore courses. These 57 credits shall be earned through studying the specialization courses in Minor Disciplinary – Specialization Courses, Skill Enhancement Courses in all the semesters and the Research Project or the Courses the candidates choose to study in the Eighth Semester. The Programme Structure is detailed in the following Figure 1.





3.3.9. Exit Options and Nomenclature of Certificate, Diploma

Candidates can exercise the following exit options and obtain the said certificate or diploma or degree, if the minimum required credits are earned and other conditions are met. Students exercising the option of exit at the end of 2nd semester or 4th semester need to have completed an internship for atleast 8 weeks along with the necessary credit requirements to qualify for the relevant certificate or diploma. In any case, every student, whenever exit (or complete the 4 year programme), should have completed atleast one internship for a minimum period of 8 weeks.

Exit after 2^{nd} Semester: Certificate in IT Devices and Troubleshooting will be awarded for candidates who exit the course at the end of 2^{nd} semester and earned a minimum of 40 credits and have completed a Summer Internship of 4 credits for a minimum period of 8 weeks, during the summer vacation post 2^{nd} semester.

Exit after 4th Semester: Diploma in IT Infrastructure Management will be awarded for candidates who exit the course at the end of 4th semester and earned a minimum of 80 credits and have completed a Summer Internship of 4 credits for a minimum period of 8 weeks, during the summer vacation post 4th semester.

Exit after 6th Semester: UG Degree in Information Technology (B.Sc. (IT)) will be awarded for candidates who exit the course at the end of 6th semester and earned a minimum of 120 credits and have completed a Summer Internship of 4 credits for a minimum period of 8 weeks, during the summer vacation post 4th semester.

| Exit after | Credits and other requirements | Awards |
|--------------------------|--------------------------------|--|
| 2 nd Semester | Min: 40 Credits & Internship | Certificate in IT Devices and Troubleshooting |
| 4 th Semester | Min: 80 Credits & Internship | Diploma in IT Infrastructure Management |
| 6 th Semester | Min: 120 Credits & Internship | B.Sc. Information Technology |

4. STRUCTURE OF THE UNDERGRADUATE PROGRAMME

This B.Sc Honors programme is offered in the affiliated colleges shall confirm to the structure specified hereunder. As per the decided programme mandate, the students to complete 120 credits to complete a basic Bachelor's Degree in 3 years. With an additional 40 credits of course work one can pursue 4th Year Honors or Honors with Research Degree. The UG Programme will consist of the categories of courses and the minimum credit requirements for 3-year UG and 4-year UG(Honors) or UG (Honors with Research) programmes as given in Table1 at Section 3.3.6.

| Hardcore Courses | Softcore Courses (Specialization specific) |
|---|--|
| Major Disciplinary – Information Technology | Minor Disciplinary |
| Multi-Disciplinary Courses | Skill Enhancement Courses |
| Ability Enhancement Courses | Summer Internship |
| Value Added Courses | Research Dissertation Project |
| Community Engagement and Service | |

4.2. Description of Courses

The following are the types of courses in this programme:

4.2.1. Major Discipline: 60 Credits - 3 Year UG, & 72 Credits - 4 Year UG

Major discipline (Information Technology): Students should secure the prescribed number of credits (not less than 50% of the total credits) through core courses in the major discipline. The major discipline would provide the opportunity for a student to pursue in-depth study of a particular subject or discipline. A student may choose to change the major discipline within the broad discipline at the end of the second semester provided all the prerequisites of the respective degree programme are fulfilled.

4.2.2. Minor Discipline / Specialization: 24 Credits - 3 Year UG & 40 Credits - 4 Year UG

Minor discipline helps a student to gain a broader understanding beyond the major discipline.

4.2.3. Multidisciplinary courses (MD): 9 Credits

All undergraduate students are mandated to pursue 9 credits worth of courses in such multidisciplinary areas / Courses out of 9/10 NEP defined subjects. Colleges may identify any 3 multiple disciplinary streams listed below based on availability of resources and manpower.

| a) Natural Sciences | b) Physical Sciences |
|-----------------------------|----------------------------------|
| c) Mathematics & Statistics | d) Computer Science/Applications |
| e) Data Analysis | f) Social Sciences |
| g) Humanities | h) Commerce & Management |
| i) Library Science | j) Media Sciences, etc. |

Students are expected to learn basic/introductory courses designed by other departments for this purpose. Colleges may list any 3 introductory courses (one each in Natural Sciences, Physical Sciences & Humanities) for uniform adoption of all UG students.

4.2.4. Ability Enhancement Courses (AEC): 8 credits

All Undergraduate (UG) students are mandated to complete at least 8 Credits worth of Courses which focus on Communication and Linguistic skills, Critical reading, and Writing skills. These courses are expected to enhance the ability in articulation and presentation of their thoughts at workplace. Colleges may design these ability enhancement courses tuned to the requirements of given major discipline. For example, a course in Business Communication is more appropriate in place of literature/prose/poetry.

| Ability Enhancement Course | | |
|--|---|--|
| I. English Language | II. Modern Indian Language (two | |
| a. English Language & Literature - 1 and 2 | courses) | |
| b. Functional English - 1 and 2 | a. Indian language & Literature - 1 and 2 | |
| c. Communicative English - 1 and 2 | b. Functional language - 1 and 2 | |
| | c. Communicative language - 1 and 2 | |

4.2.5. Skill Enhancement Courses (SEC): 9 credits

These courses are aimed at imparting practical skills, hands-on training, soft skills, and other skills to enhance the employability of students. Courses are designed as per the students' needs with the available resources. Students can choose these courses from the list of courses offered in the chosen specialization as said in 4.2.2. Colleges may also outsource the Skill Enhancement Courses to AICTE approved agencies for conducting short term Training Workshops, Skill India initiatives of GOI and approved Trades by Skill development of corporation are to be considered.

4.2.6. Value-Added Courses (VAC) Common to All UG Students: 8 credits

Under NEP, the UGC has proposed for 6 to 8 credits worth of common courses which are likely to add value to overall knowledge base of the students. These courses include:

- a) Understanding India
- b) Environmental Sciences / Education / Higer Order Thinking
- c) Digital and Technological solutions
- d) Health, Wellness, Yoga Education, Sports & Fitness / Universal Human Values

The course structure and coverage of topics are suggested by UGC in its draft documents, colleges/UG Boards of Studies may design the methodology for conducting these value added courses.

4.2.7. Summer Internship: 4 Credits

All students will undergo Internships / Apprenticeships in a firm, industry, or organization or Training in labs with faculty and researchers in their own or other Higher Education Institutions / Research Institutions during the summer term. Students will be provided with opportunities for internships to actively engage with the practical side of their learning. Such Summer Internship is to be conducted in between 4th semester and 5th semester. A review report and award of grade on Work based learning by students is to be recorded during the 5th Semester. Students who exercise the option of exit at the end of 1st year or 2nd year need to do the internships as specified in the respective section.

4.2.8. Community Engagement and Service: 2 Credits

The curricular component of 'Community Engagement and Service' seeks to expose students to the socio-economic issues in society so that the theoretical learnings can be supplemented by actual life experiences to generate solutions to real-life problems. This can be part of summer term activity or part of a major or minor course. Community Engagement shall be conducted for a minimum of 2 weeks.

4.2.9. Research Project / Dissertation: 12 Credits

Students choosing a 4 Year Bachelor's degree (Honors with Research) are required to take up research projects under the guidance of a faculty member. The students are expected to complete the Research Project in the eighth semester.

4.2.10. Audit courses: 0 credits

Audit courses offered do not carry any credits. Evaluation will be based on continuous assessment. Students may be given a Pass or Fail (P/F) based on the assessment that may consist of class tests, homework assignments, and/or any other innovative assessment methodology suitable to the expected learning outcome, as determined by the faculty in charge of the course of study.

4.3. Levels of the Courses

Course codes are based on the academic rigor. The first four letters of the course code indicate the department/Centre, followed by the academic rigor level code in digits. The coding structure follows:

4.3.1. 0-99: Pre-requisite courses

It is required to undertake an introductory course which will be a pass or fail course with no credits. It will replace the existing informal way of offering bridge courses that are conducted in some of the colleges/ universities.

4.3.2. 100-199: Foundation or introductory courses

These are courses which are intended for students to gain an understanding and basic knowledge about the subjects and help decide the subject or discipline of interest. These courses generally would focus on foundational theories, concepts, perspectives, principles, methods, and procedures of critical thinking in order to provide a broad basis for taking up more advanced courses.

4.3.3. 200-299: Intermediate-level courses including subject-specific courses

These courses are intended to meet the credit requirements for minor or major areas of learning. These courses can be part of a major and can be pre-requisite courses for advanced-level major courses.

4.3.4. 300-399: Higher-level Courses

These courses are required for majoring in a disciplinary/interdisciplinary area of study for the award of a degree.

4.3.5. 400-499: Advanced Courses

These courses which would include lecture courses with practicum, seminar-based course, term papers, research methodology, advanced laboratory experiments/software training, research projects, hands-on-training, internship/apprenticeship projects at the undergraduate level or first year post-graduate theoretical and practical courses.

4.4. Credit-hours for different types of courses

A three-credit lecture course in a semester means three one-hour lectures per week with each onehour lecture counted as one credit. One credit for tutorial work means one hour of engagement per week. A one-credit course in practicum or lab work, community engagement and services, and fieldwork in a semester mean two-hour engagement per week.

The Faculty to Student Ratio in all the practical / laboratory shall be maintained at 1:25.

In a semester of 15 weeks duration, a one-credit practicum in a course is equivalent to 30 hours of engagement. A one-credit of Seminar or Internship or Studio activities or Field practice / projects /

community engagement and service means two-hour engagements per week. Accordingly, in a semester of 15 weeks duration, one credit in these courses is equivalent to 30 hours of engagement.

4.4.1. Pedagogical Styles

In order to achieve the expected Learning outcomes, UGC Framework has specified different Pedagogical approaches for different courses at undergraduate level. These approaches include:

| a) Lecture course | b) Tutorial course |
|---------------------------------------|---------------------------------|
| c) Practice cum or laboratory courses | d) Seminar Course |
| e) Internship course | f) Studio activity-based course |
| g) Field practicing | h) Project work courses |
| | |

i) Community engagement and service course

The details of these different types of Pedagogical methods are as follows:

| COURSE TYPES | APPROACH |
|----------------------|---|
| Lecture Courses | Regular classroom lectures by qualified / experienced Expert Teachers These Lectures may also include classroom discussion, demonstrations, case analysis Use of Models, Audio-Visual contents, Documentaries, PPTs may supplement. |
| Tutorial Courses | Problem solving Exercise classes guided discussion, supplementary readings vocational training, etc. |
| Practical / Lab work | Practical Lab activity with Theoretical support Mini projects, Activity based engagement, Program executions, Data processing and presentation exercise. |
| Seminar Course | A course requiring student to design and participate in discussions, Group Discussions, Elocution and Debate, Oral Communication Paper presentations, Poster Presentation, Role play participation, Quiz competitions, Business plan preparation/presentation, etc. |
| Internship course | Courses requiring students to <i>Learn by Doing</i> in the workplace external to the educational Institutions. Internships involve working in Software Companies, Research and Higher Educational Institution Laboratories, Corporate Offices, etc. All Internships should be properly guided and inducted for focused learning. |
| Research Project | Students need to study and analyze the recent research publications from indexed/peer reviewed journals in their area of specialization. Outcome of the study and analysis need to be presented as a thesis or research report with necessary experimental results. |

Table2: Pedagogical Approaches

4.5. Semester-wise Break: for courses of 3 year UG and 4 Year UG(Hons) Degree programmes

Incorporating the focus of NEP in terms of different categories of courses and award of Certificates, Diplomas and Degrees during different stages of 4 year Degree programmes, a template for Semesterwise course work was designed by the UGC and presented in para 5.3 of "Curriculum Framework". Salient features of it are as follows:

- All courses shall carry specified number of credits.
- Every Semester shall have a minimum of 20 credits worth of courses.
- Credits for a course shall be decided on the basis of number of Contact hours of the teaching in a classroom.
- One credit means one hour of Teaching in case of Theory subject and at least 2 hours of conducting Practical in hours case of Lab subjects.
- All Major and Minor disciplinary Courses shall have 4 credits with 6 hours of work load (including 2 hours of tutorials)
- Language courses, ability enhancement, skill enhancement and value added common course also will have 2 hours of hands on training.
- Progress of Learning is measured in terms of credits earned by the students on successful completion of the course.
- Students can exercise his/her choice for exiting the course at the end of every Academic year.
- Graduate attributes listed by UGC shall be the focus of Teaching-Learning process.
- Semester I and II shall focus on introductory courses/subjects in Major/Minor disciplines and shall focus on providing knowledge in Multidisciplinary areas, skill enhancement and ability enhancement courses.
- Semester III and IV shall focus on Core disciplinary courses with a focus on building strong foundation in the given Discipline.
- Semester V and VI shall focus on providing in-depth knowledge and skills required for taking up a career in the given discipline.

• Semester VII and VIII shall focus on Advanced knowledge and shall direct the students to take up socially relevant projects/Research works newer applications of the knowledge.

5. ADMISSION ELIGIBILITY, LATERAL ENTRY

5.1 Admission Eligibility

The candidates for admission to this programme shall be required to have passed 10+2/10+3 system of examinations or equivalent with Mathematics / Business Mathematics / Computer Science / Computer Applications / Informatics Practices / or Equivalent as one of the subjects of study.

Students shall be admitted to this programme based on admissions criteria fixed by the University / Government of Puducherry from time to time.

5.2 Admissions by Lateral Entry

In this programme, where admission was carried out adopting approved procedures in preceding years, subject to availability, lateral entry admission shall be permitted, subject to:

Candidates seeking entry at the second, third and fourth year, should meet the necessary eligibility criteria with respect to the certificate / diploma / degree they possess, with necessary minimum credits banked in the Academic Bank of Credits (ABC). Such students who get admitted in later years, other than first year will be guided by the following clauses:

- that the University shall notify the admission process and number of vacancies open for lateral entry.
- that the Lateral entrants shall be admitted only after such transparent screening process and such procedure that the University may prescribe from time to time. University may prescribe different methods of screening for different programmes depending on the circumstances prevailing in each case.
- Lateral entry shall be permissible only in the beginning of years 2, 3, 4 of the Under Graduate / Honors programme; provided that the students seeking lateral entry shall have obtained the minimum pass marks / grades fixed by the University in their previous academic years.

6. EVALUATION

All Credit courses are evaluated for 100 marks. Internal Assessment component is for 25 marks and the End Semester University exam is for 75 marks. In case of Practicals, Project work etc., it is 50 marks for and 50 Marks for End-Semester Exams.

6.1. Category of Courses

There are three category of courses as shown in 6.2. Category A, theory courses with lecture hours and tutorials are evaluated for an Internal assessment component of 25 Marks and End Semester University Exam for 75 Marks.

| Category A | Theory Courses with Lecture hours and hours allotted for Tutorials wherever required. |
|------------|---|
| Category B | Practical Courses with only Practical hours or Laboratory hours. Laboratory Courses, Internships, Research Project Works and other courses allotted only with practical hours in the curriculum shall be under this category. |
| Category C | Theory & Practice combined Courses where Lecture and Practical hours allotted. |

6.2. Learning Assessment

| Course Types | Internal Assessment | End Semester Assessment | |
|------------------------------|--|-------------------------|--|
| | 25 Marks | | |
| | | | |
| Category A | Evaluation Component M | arks | 75 Marks |
| IA: 25 Marks | I. Mid Semester Exam (one) | 20 | (Evaluation Details given in |
| EA: 75 Marks | II. Percentage of Attendance | 05 | Table 3) |
| | Total | 25 | |
| | | | |
| | 50 Marks | | |
| | For Practical / Internshin Cou | rses | |
| | Evaluation Component | Marks | |
| | I. Weekly Observation Book / | 15 | |
| | Report | | |
| | II. Practical Record / Internship | 15 | |
| | Report | 1.7 | |
| Category B | III. Model Practical Exam | 15 | 50 Marks |
| Category D | IV. Percentage of Attendance | 05 | SU IVIALKS |
| IA: 50 Marks | 10181 | 50 | (Evaluation Details given in |
| EA: 50 Marks | | | Table 3) |
| | For Research Project Work Co | urse | |
| | Evaluation Component | Marks | |
| | I. Monthly Review (3 Reviews – 10 Marks each) | 30 | |
| | II. Project Report | 10 | |
| | III. Project Work | 10 | |
| | Total | 50 | |
| | 25 Marks | | |
| | | | |
| | Evaluation Component | Marks | |
| Catagory C | Theory | 10 | 75 Mortes |
| Category C | II. Observation Book, Record Book | 10 | 75 Marks |
| IA: 25 Marks EA: 75 Marks | III. Percentage of Attendance | 05 | (Evaluation Details given in Table 3) |
| | Total | 25 | |
| | | | |

6.3. Marks for Attendance

| Attendance % | Marks |
|--------------|-------|
| Below 75% | 0 |
| 75% - 80% | 1 |
| 81% - 85% | 2 |
| 86% - 90% | 3 |
| 91% - 95% | 4 |
| 96% - 100% | 5 |

6.4. Internal Test Scheme

Principal of the College schedules the Mid-Semester Exam for all courses during 8/9th week of start of classes. All faculty members are expected to conduct this Mid-Semester exam for 1½ hour duration and evaluate, upload the marks to Controller of Examinations of University. Colleges need to preserve the answer books of Mid-Semester exams until declaration of results by the University.

6.5. End Semester University Exam

Controller of Examinations (COE) of Pondicherry University schedules the End-Semester exams for all three category of courses. **For Category C courses, theory and practical exams will be conducted separately by the Controller of Examinations of Pondicherry University.**

A detailed Exam Time Table shall be circulated to all Colleges atleast 15 days before the start of exams mostly during 15/16th week of the Semester. Question Papers shall be set externally based on BOS approved syllabus. All students who have a minimum of 70% attendance are eligible to attend the end-semester exams. The breakup of end semester marks is as given below.

6.6. Break up of end semester marks (All End Semester Exams shall be conducted by the Pondicherry University)

The question paper shall be set as per Bloom's Taxonomy. Table 3 below gives the details of evaluation methods for Category A, B, and C courses. Various levels, along with their description and sample questions, are as follows:

Knowledge: Recall or remember previously learned information.

Example: List the basic data types in Python

Comprehension: Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions, and stating the main ideas.

Example: Explain how a stack data structure works.

Application: Apply knowledge and concepts to solve problems in new situations. Use learned information in a different context.

Example: Write a Python program to solve the deadlock problem.

Analysis: Break down information into parts and examine the relationships between the parts. Identify motives or causes.

Example: Analyse the efficiency of two sorting algorithms and compare their advantages and disadvantages.

Synthesis: Create a new whole by combining elements in novel ways. Use creativity to produce something original.

Example: Design a web application that can generate a time table of a school.

Table3: End Semester Assessment examination details for all three categories of courses

| Course Components | Marks | Duration |
|--|-------------|----------|
| Category A. Theory subjects: Sec A: 10 Questions of 2 Marks each (20 Marks) (<i>Knowledge: 3, Comprehension: 2, Application: 3, Analysis:2</i>) Sec B: 5 out of 7 Questions of 5 Marks each (25 Marks) (<i>Knowledge: 1, Comprehension: 2, Application: 1, Analysis:3</i>) Sec C: 2 Either/OR choice questions of 15 Marks each (30 Marks) (<i>Application: 2 Analysis:2</i>) Questions from all units of the Syllabus are equally distributed. | 75 Marks | 3 Hours |
| Category B. Skill Enhancement / Practical Courses Based on Practical Exams conducted by COE of University | | 3 Hours |
| Internship / Research Project Work: Presentation of the work / Report / Viva-voce examinations conducted by COE of University | 50 Marks | |
| Category C. Theory Subjects with Practical Components: | | |
| i. Theory Component: Sec A: 5 Questions of 2 Marks each (10 Marks) (<i>Knowledge: 3, Comprehension: 2, Application: 3, Analysis:2</i>) | 50 Marks | 3 Hours |
| Sec B: 5 out of 7 Questions of 4 Marks each (20 Marks) (Comprehension: 2, Application: 3, Analysis:2) | | |
| Sec C: 2 Either or type questions of 10 Marks each (20 Marks) (Analysis / Synthesis) Questions from all units of Syllabus equally distributed. | | |
| ii. Practical Component: Based on Practical Exams conducted by COE of University | 25 | 2 11 |
| The examination shall be conducted for 50 Marks and reduced to 25 Marks. | Marks | 5 HOUIS |
| Total Marks: 75 (Theory: 50 Marks + Practical: 25 Marks) | | |

7. CONSOLIDATION OF MARKS, PASSING MINIMUM AND ARREAR EXAM

Controller of Examinations of the University consolidates the Internal Assessment marks uploaded by the Colleges and marks secured by students in end-semester examination. The total marks will be converted into letter grades as shown in the Section 8.1.

7.1. Passing Minimum

As per NEP Regulations, the passing minimum is 50% marks (IA + End semester put together). However, Pondicherry University considers 40% marks as pass during first 3 years of study and students who secured less than 50 will be awarded 'P' (Pass Grade).

7.2. Arrear Exam

A student who failed to secure 50% marks in aggregate is declared as Failed. Failed students are eligible to take up supplementary examination by registering to the failed course in the following Semester. All other candidates who failed due to shortage of attendance, those who are seeking to improve the grade shall repeat the course.

8. LETTER GRADES AND RANGE OF MARKS

Total Marks secured by a student in each subject shall be converted into a letter grade. UGC Framework has suggested a Country wide uniform letter grades for all UG courses.

8.1. Letter Grades

The following Table shows the seven letter grades and corresponding meaning and the grade points for calculation of CGPA.

| Letter Grade | Grade Point |
|-------------------|-------------|
| O (outstanding) | 10 |
| A+ (Excellent) | 9 |
| A (Very good) | 8 |
| B+ (Good) | 7 |
| B (Above average) | 6 |
| C (Average) | 5 |
| P (Pass) | 4 |
| F (Fail) | 0 |
| Ab (Absent) | 0 |

In order to work out the above letter grades, the marks secured by a student (Total of Internal Assessment and End Semester Assessment) would be categorized for relative grading.

8.2. Range of Marks for each letter grades

| Highest marks in the given subject | X | | | |
|------------------------------------|---|--|--|--|
| Cut of marks for grading purpose | 50 Marks | | | |
| Passing mark (for 3 year UG) | 40 Marks | | | |
| Number of grades G (Excl. P grade) | Grades: O, A+, A, B+, B, C, Hence, G = 6 | | | |
| Range of marks | К | | | |
| K = (X - 50) / G | | | | |

The ranges of marks for each grade would be worked as follows:

The following table gives the range of marks and letter grades. According to K value, one of the following grading scheme will be followed.

(i) If $K \ge 5$, then the grades shall be awarded as given in the following table.

| Range of Marks in % | Letter Grade Points for | Grade Points for |
|-----------------------------|-------------------------|------------------|
| X to (X-K) + 1 | Ο | 10 |
| (X-K) to $(X-2K) + 1$ | A+ | 9 |
| (X-2K) to (X-3K) + 1 | А | 8 |
| (X-3K) to (X-4K) + 1 | B+ | 7 |
| (X-4K) to (X-5K) + 1 | В | 6 |
| (X-5K) to 50 | С | 5 |
| 40-49 | Р | 4 |
| Below 40 | F | 0 |
| Absent (Lack of Attendance) | Ab | 0 |

| Range of Marks in % | Letter Grade Points for | Grade Points for |
|-----------------------------|-------------------------|------------------|
| 80-100 | 0 | 10 |
| 71-79 | A+ | 9 |
| 66-70 | А | 8 |
| 61-65 | B+ | 7 |
| 56-60 | В | 6 |
| 50-55 | С | 5 |
| 40-49 | Р | 4 |
| Below 40 | F | 0 |
| Absent (lack of attendance) | Ab | 0 |

(ii) If K< 5, then the grades shall be awarded as given in the following table.

9. CALCULATION OF SGPA & CGPA

Semester Grade Point Average (SGPA) is calculated by taking a weighted average of all grade points secured by a candidate from all subjects registered by him/her in the given Semester. The weights being the number of credits that each subject carries.

Cumulative Grade Point Average (CGPA) shall be calculated as the weighted average of credits that course carries and the value of Grade points averaged for all subjects.

9.1. Procedure of computation of SGPA and CGPA

The following procedure shall be followed to compute the Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):

The SGPA is the ratio of the sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e. SGPA (Si) = Σ (Ci x Gi) / Σ Ci

Where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course.

| Semester | Course | Credit | Letter Grade | Grade Point | Credit Point (Credit x Grade) |
|----------|----------|--------|-----------------|----------------|----------------------------------|
| Ι | Course 1 | 3 | А | 8 | 3 X 8 = 24 |
| Ι | Course 2 | 4 | B+ | 7 | 4 X 7 = 28 |
| Ι | Course 3 | 3 | В | 6 | 3 X 6 = 18 |
| Ι | Course 4 | 3 | 0 | 10 | 3 X 10 = 30 |
| Ι | Course 5 | 3 | С | 5 | 3 X 5 = 15 |
| Ι | Course 6 | 4 | В | 6 | 4 X 6 = 24 |
| | | 20 | | | 139 |
| | SGPA | | | | 139/20=6.95 |

9.2. Example for Computation of SGPA where candidate has not failed in any course.

9.3. Example for Computation of SGPA where candidate has failed in one course.

| Semester | Course | Credit | Letter Grade | Grade Point | Credit Point (Credit x Grade) |
|----------|----------|--------|-----------------|----------------|----------------------------------|
| Ι | Course 1 | 3 | А | 8 | 3 X 8 = 24 |
| Ι | Course 2 | 4 | B+ | 7 | 4 X 7 = 28 |
| Ι | Course 3 | 3 | В | 6 | 3 X 6 = 18 |
| Ι | Course 4 | 3 | 0 | 10 | 3 X 10 = 30 |
| Ι | Course 5 | 3 | С | 5 | 3 X 5 = 15 |
| Ι | Course 6 | 4 | F | 0 | 4 X 0 = 00 |
| | | 20 | | | 115 |
| | SGPA | | | | 115/20=5.75 |

9.4. Example for Computation of SGPA where candidate has failed in two courses.

| Semester | Course | Credit | Letter Grade | Grade point | Credit Point (Credit x Grade) |
|----------|----------|--------|-----------------|----------------|----------------------------------|
| Ι | Course 1 | 3 | А | 8 | 3 X 8 = 24 |
| Ι | Course 2 | 4 | B+ | 7 | 4 X 7 = 28 |
| Ι | Course 3 | 3 | F | 0 | 3 X 0 = 00 |
| Ι | Course 4 | 3 | В | 6 | 3 X 6 = 18 |
| Ι | Course 5 | 3 | С | 5 | 3 X 5 = 15 |
| Ι | Course 6 | 4 | F | 0 | 4 X 0 = 00 |
| | | 20 | | | 85 |
| | SGPA | | | | 85/20=4.25 |

The CGPA shall also be calculated in similar way as shown in examples (i), (ii) and (iii) of SGPA for all subjects taken by the students in all the semesters. However, if any student fails more than once in the same subject, then while calculating CGPA, the credit and grade point related to the subject in which the student fails in multiple attempts will be restricted to one time only. The SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.

In case of audit courses offered, the students may be given (P) or (F) grade without any credits. This may be indicated in the mark sheet. Audit courses will not be considered towards the calculation of CGPA.

10. DECLARATION OF RESULTS

Controller of Examinations (COE) of the University shall declare the results of given UG programme following the CGPA secured by students by the end of 6th Semester and 8th Semester.

Pass Classes:

| Range of CGPA | Result |
|---------------|------------------------------|
| 9.0 -10 | First Class with distinction |
| 6.0 - 8.99 | First Class |
| 5.0 - 5.99 | Second Class |
| 4.0 - 4.99 | Pass Class |

11. MINIMUM CREDIT REQUIREMENTS

| S.No | Component | | 3-years U | G | 4-years UG (Honors / Honors With research | | | | |
|------|--|---------|-----------|-----------|--|------------|---------------------------|--|--|
| | | Credits | Courses | Cr/Course | Credits | Courses | Cr/Course | | |
| 1 | Major Disciplinary/ Interdisciplinary Courses | 56 | 14 | 4 | 76 | 19 | 4 | | |
| 2 | Minor Disciplinary/ Interdisciplinary Courses | 24 | 6 | 4 | 32 | 8 4 | | | |
| 3 | Multi-Disciplinary Courses | 9 | 3 | 3 | 9 | 3 3 | | | |
| 4 | Ability Enhancement Courses | 8 | 4 | 2 | 8 | 4 | 2 | | |
| 5 | Skill Enhancement Courses | 9 | 3 | 3 | 9 | 3 | 3 | | |
| 6 | Value-added courses | 8 | 4 | 2 | 8 | 4 | 2 | | |
| 7 | Summer Internship (MJD 11) | 4 | 1 | 4 | 4 | 1 | 4 | | |
| 8 | Community Engagement and Service | 2 | 1 | 2 | 2 | 1 2 | | | |
| 9 | Research Project/Dissertation | | | | 12 | Project of | r 3 Courses ^{##} | | |
| | Total | | 120 | | | 160 | | | |

<u>""Note:</u> Honors students not undertaking research will do 3 courses for 12 credits in lieu of a research project/Dissertation.

- MJD: Major Disciplinary (Compulsory Hardcore Subjects)
- MID: Minor Disciplinary (Specialization Specific Softcore Subjects)
- MLD: Multi-Disciplinary
- AEC: Ability Enhancement Courses
- SEC: Skill Enhancement Courses
- VAC: Value Added Courses

12. COURSE CODE

- Course code : 7 Characters: 4 Alphabets and 3 Digits. Ex: ABCD123
- Alphabets : 1st and 2nd Alphabets: Major domain 3rd and 4th Alphabets: Specialization
- Digits : 1st Digit: Levels (100, 200, 300, 400...)

 2^{nd} and 3^{rd} Digits: Serial number of the courses in the given year

Example: CSIT312: Computer Science Information Technology, Level - 300, Serial number of the course in the given year (12).

B.Sc. INFORMATION TECHNOLOGY CURRICULUM

| | FIRST SEMESTER | | | | | | | | | | |
|-------|-------------------|---------------------|--|-----|---------|----|-------|------|--|--|--|
| S No | Component | Course | Title of the Course | ц/c | Crodits | Но | urs/V | /eek | | | |
| 3.100 | component | Code | The of the course | пуз | creats | L | т | Ρ | | | |
| 1 | MJD 1 | CSIT101 | Digital Logic Fundamentals | н | 4 | 3 | | 2 | | | |
| 2 | MID 1 | CSIT102 | IT Essentials | S | 4 | 3 | | 2 | | | |
| 3 | MLD 1 | | One course from the MLD streams (Table 10) | н | 3 | 4 | | | | | |
| 4 | AEC 1 | | English I/ Modern Indian Language I | н | 2 | 4 | | | | | |
| 5 | SEC 1 | CSIT103/ CSIT104 | S.No. 1 or 2 from Table 7 | S | 3 | 2 | | 2 | | | |
| 6 | VAC 1 | | Understanding India | н | 2 | 4 | | | | | |
| 7 | VAC 2 | | Environmental Sciences/Education/ Higher Order Thinking | н | 2 | 4 | | | | | |
| | Total 20 30 Hours | | | | | | | | | | |

| | | | SECOND SEMESTER | | | | | |
|------|-------|---------------------|---|-------|---------|----|-------|-----|
| S.No | Comp | Course Code | Title of the Course | H/S | Credits | Но | urs/W | eek |
| | onent | | | | | L | т | Ρ |
| 1 | MJD 2 | CSIT105 | Problem Solving and Programming Fundamentals | н | 4 | 3 | | 2 |
| 2 | MID 2 | CSIT106 | PC, Network and Mobile Troubleshooting | S | 4 | 3 | | 2 |
| 3 | MLD 2 | | One course from the MLD streams except the stream chosen in MLD1 (Table 10) | н | 3 | 4 | | |
| 4 | AEC 2 | | English I /Modern Indian Language I | н | 2 | 4 | | |
| 5 | SEC 2 | CSIT107/ CSIT108 | S.No. 3 or 4 from Table 7 | S | 3 | 2 | | 2 |
| 6 | VAC 3 | | Health & Wellness/Yoga Education/ Universal Human Values | н | 2 | | | 4 |
| 7 | VAC 4 | CSVA101 | Digital Technologies | н | 2 | 4 | | |
| | | | 1 | Fotal | 20 | 3 | 0 Hou | irs |

| | THIRD SEMESTER | | | | | | | | | |
|------|----------------|---------------------|---|-------|---------|----|-------|-----|--|--|
| S.No | Comp | Course | Title of the Course | H/S | Credits | Но | urs/W | eek | | |
| | onent | Code | | | | L | т | Р | | |
| 1 | MJD 3 | CSIT201 | Object Oriented Programming | н | 4 | 3 | | 2 | | |
| 2 | MJD 4 | CSIT202 | Data Structures | Н | 4 | 3 | | 2 | | |
| 3 | MID 3 | CSIT203 | Enterprise IT infrastructure | S | 4 | 3 | | 2 | | |
| 4 | MLD 3 | | One course from the MLD streams except the streams chosen in MLD1 and MLD2 (Table 10) | н | 3 | 4 | | | | |
| 5 | AEC 3 | | English II / Modern Indian Language II | н | 2 | 4 | | | | |
| 6 | SEC 3 | CSIT204/ CSIT205 | S.No. 5 or 6 from Table 7 | S | 3 | 2 | | 2 | | |
| | | | | Total | 20 | 2 | 7 Hou | rs | | |

| | FOURTH SEMESTER | | | | | | | | | |
|-------------|-----------------|-------------|---|-----|---------|--------|-----|---|--|--|
| S.No | Compo | Course Code | Title of the Course | H/S | Credits | Hours/ | | | | |
| | nent | | | | | L | т | Ρ | | |
| 1 | MJD 5 | CSIT206 | Computer System Architecture | н | 4 | 3 | | 2 | | |
| 2 | MJD 6 | CSIT207 | Design and Analysis of Algorithms | н | 4 | 3 | | 2 | | |
| 3 | MJD 7 | CSIT208 | Database Management Systems | н | 4 | 3 | | 2 | | |
| 4 | MID 4 | CSIT209 | IT Infrastructure Management | S | 4 | 4 | 1 | | | |
| 5 | AEC 4 | | English II / Modern Indian Language II | н | 2 | 4 | | | | |
| 6 | CES 1 | CSIT210 | Community Engagement and Service | н | 2 | | | 6 | | |
| Total 20 30 | | | | | | 0 Hou | Irs | | | |

| | FIFTH SEMESTER | | | | | | | | |
|------|----------------|-------------|---|-------|---------|----|-------|-----|--|
| S.No | Compo | Course Code | Title of the Course | H/S | Credits | Но | urs/W | eek | |
| | nent | | | | | L | т | Ρ | |
| 1 | MJD 8 | CSIT301 | Operating Systems | н | 4 | 3 | | 2 | |
| 2 | MJD 9 | CSIT302 | Mathematical Foundations of Computer Science | н | 4 | 4 | 1 | | |
| 3 | MJD 10 | CSIT303 | Computer Networks | н | 4 | 3 | | 2 | |
| 4 | MID 5 | CSIT304 | Remote Infrastructure Management | S | 4 | 3 | | 2 | |
| 5 | MJD 11 | CSIT305 | Summer Internship | н | 4 | | | 6 | |
| | | | • | Total | 20 | 2 | 6 Hou | irs | |

| | | | SIXTH SEMESTER | | | | | |
|------|--|---------------------|---|----|---------|----|-------|-----|
| S.No | No Compo Course Code Title of the Cour | | Title of the Course | Н/ | Credits | Но | urs/W | eek |
| | nent | | | 3 | | L | т | Ρ |
| 1 | MJD 12 | CSIT306 | Management Strategies and Concepts | н | 4 | 5 | | |
| 2 | MJD 13 | CSIT307 | Software Engineering Theory and Practice | н | 4 | 3 | | 2 |
| 3 | MJD 14 | CSIT308 | Distributed Systems | н | 4 | 3 | | 2 |
| 4 | MJD 15 | CSIT309 | Operations Research | н | 4 | 4 | 1 | |
| 5 | MID 6 | CSIT310/ CSIT311 | Any one course from Table 1 | s | 4 | 3 | | 2 |
| | Total | | | | | 2 | 5 Hou | irs |

| | | | SEVENTH SEMESTER | | | | | |
|------|--------|---------------------|---------------------------------|-------|---------|------|-----|-----|
| S.No | Compon | Course Code | Title of the Course | H/S | Credits | Houi | s/W | eek |
| | ent | | | | | L | т | Ρ |
| 1 | MJD 16 | CSIT401 | Web Engineering | н | 4 | 3 | | 2 |
| 2 | MJD 17 | CSIT402 | System Modeling and Simulation | н | 4 | 3 | | 2 |
| 3 | MJD 18 | CSIT403 | Wireless Communication Networks | н | 4 | 3 | | 2 |
| 4 | MID 7 | CSIT404/ CSIT405 | Any one course from Table 2 | S | 4 | 3 | | 2 |
| | | | | | 4 | 3 | | 2 |
| 5 | MID 8 | CSIT406/ CSIT407 | Any one course from Table 3 | S | | (or) | | |
| | | | | | 4 | 4 | 1 | |
| | • | - | | Total | 20 | 25 | Hou | rs |

| | EIGHTH SEMESTER B.Sc Information Technology (Honors) | | | | | | | | | | |
|------|--|---------------------|-----------------------------|-------|---------|----|-------|------|--|--|--|
| S.No | Compon | Course Code | Title of the Course | H/S | Credits | Но | urs/\ | Veek | | | |
| | ent | | | | | L | Т | Ρ | | | |
| 1 | MJD 19 | CSIT408/ CSIT409 | Any one course from Table 4 | s | 4 | 3 | | 2 | | | |
| 2 | MJD 20 | CSIT410/ CSIT411 | Any one course from Table 5 | s | 4 | 3 | | 2 | | | |
| 3 | MJD 21 | CSIT412 | Drone Technologies | н | 4 | 3 | | 2 | | | |
| 4 | MJD 22 | CSIT413 | Modern Networking | н | 4 | 3 | | 2 | | | |
| 5 | MJD 23 | CSIT414 | Storage Technologies | н | 4 | 4 | 1 | | | | |
| | | | | Total | 20 | 25 | 5 Ho | urs | | | |

| | EIG | HTH SEMESTER | R B.Sc Information Technology (Honors | s with | Research | ו) | | |
|------|--------|---------------------|---------------------------------------|--------|------------|------|------|------|
| S.No | Compo | Course Code | Title of the Course | H/S | Credits | Но | urs/ | Week |
| | nent | | | | | L | Т | Ρ |
| 1 | MJD 19 | CSIT408/ CSIT409 | Any one course from Table 4 | S | 4 | 3 | | 2 |
| | | | | | 4 | 3 | | 2 |
| 2 | MID 20 | CSIT410/ | Any one course from Table 5 | S | | (or) | | |
| 2 | | CSIT411 | Any one course non rusic s | | | | 1 | |
| | | | | | 4 | 4 | 1 | |
| 3 | MJD 21 | CSIT415 | Research Project | Н | 4 | | | 5 |
| 4 | MJD 22 | CSIT416 | Project Report | Н | 4 | | | 5 |
| 5 | MJD 23 | CSIT417 | Project Viva-Voce | Н | 4 | | | 5 |
| | | | | Total | 20 25 Hour | | | |

| | | | Table 1: MID 6 – SIXTH SEMESTER | | | | | |
|------|--------|-------------|---|-----|---------|----|-------|------|
| S.No | Compon | Course Code | Title of the Course | H/S | Credits | Но | urs/V | Veek |
| | ent | | | | | L | т | Ρ |
| 1 | MID 6 | CSIT310 | Cryptography & Cybersecurity | S | 4 | 3 | | 2 |
| 2 | MID 6 | CSIT311 | Artificial Intelligence and Machine Learning | S | 4 | 3 | | 2 |

| | Table 2: MID 7 – SEVENTH SEMESTER | | | | | | | | | | |
|------|-----------------------------------|-------------|-----------------------|-----|---------|------------|---|---|--|--|--|
| S.No | Compon ent | Course Code | Title of the Course | H/S | Credits | Hours/Week | | | | | |
| | | | | | | L | т | Р | | | |
| 1 | MID 7 | CSIT404 | Cloud computing | S | 4 | 3 | | 2 | | | |
| 2 | MID 7 | CSIT405 | Big Data technologies | S | 4 | 3 | | 2 | | | |

| Table 3: MID 8 – SEVENTH SEMESTER | | | | | | | | | | |
|-----------------------------------|---------------|-------------|-------------------------|-----|---------|------------|---|---|--|--|
| S.No | Compon ent | Course Code | Title of the Course | H/S | Credits | Hours/Week | | | | |
| | | | | | | L | Т | Ρ | | |
| 1 | MID 8 | CSIT406 | Blockchain Technologies | S | 4 | 3 | | 2 | | |
| 2 | MID 8 | CSIT407 | IT Management Standards | S | 4 | 4 | 1 | | | |

| Table 4: MJD 19 – EIGHTH SEMESTER | | | | | | | | | | | |
|-----------------------------------|---------------|-------------|-------------------------------|-----|---------|------------|---|---|--|--|--|
| S.No | Compon ent | Course Code | Title of the Course | H/S | Credits | Hours/Week | | | | | |
| | | | | | | L | т | Ρ | | | |
| 1 | MJD 19 | CSIT408 | 5G Communication Technologies | S | 4 | 3 | | 2 | | | |
| 2 | MJD 19 | CSIT409 | Hadoop Ecosystem | S | 4 | 3 | | 2 | | | |

| Table 5: MJD 20 – EIGHTH SEMESTER | | | | | | | | | | | |
|-----------------------------------|--------|-------------|----------------------------|-----|---------|------------|---|---|--|--|--|
| S.No Compor ent | Compon | Course Code | Title of the Course | H/S | Credits | Hours/Week | | | | | |
| | ent | | | | | L | Т | Ρ | | | |
| 1 | MJD 20 | CSIT410 | High Performance Computing | S | 4 | 3 | | 2 | | | |
| 2 | MJD 20 | CSIT411 | Data Center Management | S | 4 | 4 | 1 | | | | |

| Table 6: MJD 21 / MJD 22 / MJD 23 – EIGHTH SEMESTER | | | | | | | | | | |
|---|---------------|-------------|----------------------|-----|---------|------------|---|---|--|--|
| S.No | Compon ent | Course Code | Title of the Course | H/S | Credits | Hours/Week | | | | |
| | | | | | | L | т | Ρ | | |
| 1 | MJD 21 | CSIT412 | Drone Technologies | н | 4 | 3 | | 2 | | |
| 2 | MJD 22 | CSIT413 | Modern Networking | н | 4 | 3 | | 2 | | |
| 3 | MJD 23 | CSIT414 | Storage Technologies | н | 4 | 4 | 1 | | | |

| Table 7: SEC 1 / SEC 2 / SEC 3 – I / II / III SEMESTERs | | | | | | | | | | |
|---|--------|--------------------|---|-----|---------|------------|---|---|--|--|
| S.No | Compon | pon Course Code | Title of the Course | H/S | Credits | Hours/Week | | | | |
| | ent | | | | | L | т | Ρ | | |
| 1 | SEC 1 | CSIT103 | Python Programming | S | 3 | 3 | | 2 | | |
| 2 | SEC 1 | CSIT104 | Content Authoring Tools | S | 3 | 3 | | 2 | | |
| 3 | SEC 2 | CSIT107 | Web Designing and Desktop Publishing Tools | S | 3 | 3 | | 2 | | |
| 4 | SEC 2 | CSIT108 | Visual programming with C# | S | 3 | 3 | | 2 | | |
| 5 | SEC 3 | CSIT204 | Server Administration | S | 3 | 3 | | 2 | | |
| 6 | SEC 3 | CSIT205 | 3D Modeling and Animation | S | 3 | 3 | | 2 | | |

| Table 8: List of Major Disciplinary Courses | | | | | | |
|---|-----------|----------------|--|-----|--|--|
| S.No | Component | Course Code | Title of the Course | H/S | | |
| 1. | MJD 1 | CSIT101 | Digital Logic Fundamentals | н | | |
| 2. | MJD 2 | CSIT105 | Problem Solving and Programming Fundamentals | н | | |
| 3. | MJD 3 | CSIT201 | Object Oriented Programming | н | | |
| 4. | MJD 4 | CSIT202 | Data Structures | н | | |
| 5. | MJD 5 | CSIT206 | Computer System Architecture | н | | |
| 6. | MJD 6 | CSIT207 | Design and Analysis of Algorithms | н | | |
| 7. | MJD 7 | CSIT208 | Database Management Systems | н | | |
| 8. | MJD 8 | CSIT301 | Operating Systems | н | | |
| 9. | MJD 9 | CSIT302 | Mathematical Foundations of Computer Science | н | | |
| 10. | MJD 10 | CSIT303 | Computer Networks | Н | | |
| 11. | MJD 11 | CSIT305 | Summer Internship | н | | |
| 12. | MJD 12 | CSIT306 | Management Strategies and Concepts | н | | |
| 13. | MJD 13 | CSIT307 | Software Engineering Theory and Practice | н | | |
| 14. | MJD 14 | CSIT308 | Distributed Systems | н | | |
| 15. | MJD 15 | CSIT309 | Operations Research | н | | |

| 16. | MJD 16 | CSIT401 | Web Engineering | н |
|-----|--------|---------------------|---|---|
| 17. | MJD 17 | CSIT402 | System Modeling and Simulation | н |
| 18. | MJD 18 | CSIT403 | Wireless Communication Networks | н |
| 19. | MJD 19 | CSIT408/ CSIT409 | 5G communication Technologies / Hadoop Ecosystem | S |
| 20. | MJD 20 | CSIT410/ CSIT411 | High Performance Computing / Data Center Management | S |

| Table 9: List of Minor Disciplinary Courses | | | | | | | |
|---|---------------|---------------------|---|-----|--|--|--|
| S.No | Compo nent | Course Code | Title of the Course | H/S | | | |
| 1. | MID 1 | CSIT102 | IT Essentials | S | | | |
| 2. | MID 2 | CSIT106 | PC, Network and Mobile Troubleshooting | S | | | |
| 3. | MID 3 | CSIT203 | Enterprise IT infrastructure | S | | | |
| 4. | MID 4 | CSIT209 | IT Infrastructure Management | S | | | |
| 5. | MID 5 | CSIT304 | Remote Infrastructure Management | S | | | |
| 6. | MID 6 | CSIT310/ CSIT311 | Cryptography and Cybersecurity / Artificial Intelligence and Machine Learning | S | | | |
| 7. | MID 7 | CSIT404/ CSIT405 | Cloud Computing/ Big Data Technologies | S | | | |
| 8. | MID 8 | CSIT406/ CSIT407 | Blockchain Technologies / IT Management Standards | S | | | |
| | *Table 10: MLD 1 / MLD 2 / MLD 3 in Sem 1 / Sem 2 / Sem 3 | | | | |
|--------------|---|---------------------------------------|-----|--|--|
| Streams | Course Code | Title of the Course | H/S | | |
| Natural | | Biology | н | | |
| Science | | Botany | Н | | |
| | | Zoology | Н | | |
| | | Biotechnology | Н | | |
| | | Biochemistry | Н | | |
| Physical | | Chemistry | Н | | |
| Sciences | | Physics | Н | | |
| | | Biophysics | Н | | |
| | | Astronomy | Н | | |
| | | Astrophysics | Н | | |
| | | Earth and Environmental Sciences | Н | | |
| Mathematics | | STATA | Н | | |
| & Statistics | | SPSS | Н | | |
| | | Tally | Н | | |
| Computer | COMS101 | Introduction to Python Programming | Н | | |
| Science | COMS102 | Foundations of Information Technology | Н | | |
| Social | | Political Sciences | Н | | |
| Sciences | | History | Н | | |
| | | Social work | Н | | |
| | | Sociology | Н | | |
| Humanities | | Anthropology | Н | | |
| | | Psychology | Н | | |
| | | Economics | Н | | |
| Commerce & | | Business Management | Н | | |
| Management | | Accountancy | Н | | |
| | | Finance | Н | | |
| | | Financial Institutions | Н | | |
| Media | | Journalism | н | | |
| Sciences | | Mass Media | Н | | |
| | | Communication | Н | | |

*Courses will be announced after the approval of the respective boards.

| | Table 11: List of Ability Enhancement Courses | | | | | |
|------|---|-------------|--|-----|--|--|
| S.No | Component | Course Code | Title of the Course | H/S | | |
| 1. | AEC 1 | | English I / Modern Indian Language I | Н | | |
| 2. | AEC 2 | | English I / Modern Indian Language I | н | | |
| 3. | AEC 3 | | English II / Modern Indian Language II | н | | |
| 3. | AEC 4 | | English II / Modern Indian Language II | Н | | |

| | Table 12: List of Value-Added Courses | | | | |
|------|---------------------------------------|----------------|-----------------------------|-----|--|
| S.No | Component | Course Code | Title of the Course | H/S | |
| 1. | SEC 1 | CSIT103 | Python Programming | S | |
| 2. | SEC 1 | CSIT104 | Content Authoring Tools | S | |
| 3. | SEC 2 | CSIT107 | Web Designing and DTP tools | S | |
| 4. | SEC 2 | CSIT108 | Visual programming with C# | S | |
| 5. | SEC 3 | CSIT204 | Server Administration | S | |
| 6. | SEC 3 | CSIT205 | 3D Modeling and Animation | S | |

| | Table 13: List of Skill Enhancement Courses | | | | |
|------|---|----------------|---|-----|--|
| S.No | Component | Course Code | Title of the Course | H/S | |
| 1. | VAC 1 | | Understanding India | н | |
| 2. | VAC 2 | | Environmental Sciences / Education/ Higher Order Thinking | н | |
| 3. | VAC 3 | | Health & Wellness / Yoga Education/ Universal Human Values | н | |
| 4. | VAC 4 | CSVA101 | Digital Technologies | н | |

| | Table 14: Project (WP/ Internship) | | | | |
|------|------------------------------------|----------------|----------------------------------|-----|--|
| S.No | Component | Course Code | Title of the Course | H/S | |
| 1. | CES 1 | CSIT210 | Community Engagement and Service | н | |

B.Sc. Information Technology

SYLLABUS

SEMESTER I

| Year | I | Course Code: CSIT101 | Course Code: CSIT101 Cred | | 4 |
|------------------------------------|--|---|--|---------------|------------|
| 6 | | Course Title: Digital Logic Fundamentals Categ | | Hours | 75 |
| Sem. | I | | | Category | С |
| Course Prerequisites, if any | • | Basic knowledge of Computers | | | - |
| Internal | End Sem | ester Marks: 75 | Duration of ESA (Theor | y): 03 hrs. | |
| Assessment | | | Duration of ESA (Practi | cal): 03 hrs. | |
| Marks: 25 | | Understand and describe the pri | nciples of digital system | and hinary | |
| Outcomes | • | number operations | nuples of digital systems | s and binary | |
| | • | Apply Karnaugh mapping to sim | olify Boolean expressions | s and optim | ize |
| | | digital circuits | , , | | |
| | • | Analyze and design basic combin | national circuits using var | rious digital | |
| | | components | | | |
| | • | Synthesize and evaluate synchro elements and HDL | nous sequential circuits | using storag | <u>;</u> e |
| | • | Design and implement various ty | /pes of registers and cou | nters using | HDL |
| Unit No. | | Course Conte | nt | | |
| | | Theory Composition | • | Ho | Jrs |
| | Digital | I neory Componen Systems and Binary Numbers | t | - | |
| | Digital | Systems – Binary Numbers – Num | ber-Base Conversions – | Octal | |
| | and Hexadecimal Numbers – Complements of Numbers – Signed | | | | |
| Unit I | Binary Numbers – Binary Codes – Binary Storage and Registers – | | | | 9 |
| | Binary Logic – Axiomatic Definition of Boolean Algebra – Basic | | | | |
| | Canoni | ms and Properties of Boolean Al | gebra – Boolean Functions – Digital | ons – | |
| | Gates – | - Integrated Circuits | | LUGIC | |
| | Gate-Le | evel Minimization | | | |
| | Map M | ethod – Four-Variable K-Map – Pi | roduct-of-Sums Simplific | ation | 9 |
| Unit II | – Don'i | t-Care Conditions – NAND and N | IOR Implementation – C | Other | |
| | I wo-Le | vel Implementations – Exclusiv | e-OR Function – Hard | ware | |
| | Combin | national Logic | | | |
| 11.5.4.111 | Analysi | s Procedure – Design Procedure | – Binary Adder–Subtra | ctor – | |
| Unit III | Decima | ll Adder – Binary Multiplier – Mag | , nitude Comparator – Dec | oders | 9 |
| | – Encod | ders – Multiplexers – HDL Models | of Combinational Circui | ts | |
| | Synchro | onous Sequential Logic | | | 0 |
| Unit IV | Storage | e Elements – Latches – Flip-Fl | lops – Analysis of Clo Models of Sequential Cir | ocked | 9 |
| | – State | Reduction and Assignment – Des | ign Procedure | cuits | |
| | Register | s and Counters | 0 | | |
| | Register | s – Shift Registers – Ripple Count | ers – Synchronous Coun | ters – | 9 |
| Unit V | Other Co | ounters – HDL for Registers and C | ounters | | |
| | | | | | |

| Practical Component | | | | |
|---------------------|---|--------|--|--|
| | 1. Binary to Decimal and vice-versa in Python | | | |
| | 2. Decimal to Hexadecimal and Vice-Versa in Python | | | |
| | 3. Digital Logic Gates in Python | | | |
| | 4. Simplification of Boolean Functions in Python | | | |
| | 5. Combinational Logic Circuits in Python | | | |
| | i. Code Converters | | | |
| | ii. Arithmetic (Adders, | | | |
| | Subtractors, Multipliers, | | | |
| | Comparators) | | | |
| Exercises | iii. Data Handling (Multiplexers, | 30 | | |
| | Demultiplexers, Encoders & | | | |
| | Decoders) | | | |
| | 6. Combinational Logic Circuit Design in Python | | | |
| | 7. Binary Adder-Subtractor Simulation in Python | | | |
| | 8. Decimal Adder Simulation in Python | | | |
| | 9. Binary Multiplier Simulation in Python | | | |
| | 10. Sequential Circuit Storage Elements: Flip-Flop Simulation | | | |
| | in Python | | | |
| | Recommended Learning Resources | | | |
| | 1. M. Morris Mano, Michael D. Ciletti, "Digital design with an introd | uction | | |
| Print | to the Verilog HDL", Pearson, Sixth Edition, 2018. | | | |
| Resources | 2. M. Rafiquzzaman, "Fundamentals of Digital Logic and Microcomp | outer | | |
| | Design", John Wiley & Sons, Inc., Fifth Edition, 2009. | | | |
| Syllabus design | : Dr. M.Sathya, Assistant Professor, PUDoCS | | | |

| Year | Ι | Course Code: CSIT102 | | Credits | 4 |
|-------------------|---|---|--------------------------|--------------|----|
| Som | | | | Hours | 75 |
| Sem. | I | Course Title: IT Essentials | | Category | С |
| Course | | | | | |
| Prerequisites, if | • | Basic Knowledge of Computers a | nd Mobile Devices | | |
| any | | | | | |
| Internal | End Semester Marks: 75 Duration of ESA (Theory): 03 hrs. | | | | |
| Assessment | | | Duration of ESA (Practic | al): 03 hrs. | |
| Marks: 25 | | | | | |
| Course | Understand the components of IT infrastructure and configure them | | | | |
| Outcomes | • | • Learn to Install and configure proprietary and open-source Operating | | | |
| | | Systems | | | |
| | • | Design an infrastructure deployment as per specified requirements | | | |
| | • | Apply the basic knowledge of IT infrastructure for creating new deployments | | | |
| | • | Analyze the functions of IT infrastructure to optimize them | | | |

| Unit No. | Course Content | Hours |
|----------|--|-------|
| | Theory Component | |
| Unit I | IT Concepts and Infrastructure Understanding Motherboards- Processors-Memory- Cooling System- Configuring Expansion Cards- Storage Devices- Power Supplies- Peripheral, Cables, and Connectors - Printers and Multifunction Devices - Installing and Maintaining Printers | 9 |
| Unit II | Operating Systems and Applications Operating Systems, Terms and Concepts- System Requirements- Applications- Installation- Security Concerns- Introduction to Windows 10- Windows Configuration- Interacting with OS- Windows Registry - Disk Management - Windows Administration- Installing and Upgrading Windows - Command line tools - Working with Linux - Basic Linux Commands- Linux and Windows | 9 |
| Unit III | Networking Concepts Networking Principles- Identifying Common Network Hardware- Network Introduction to TCP/IP - Understanding TCP/IP- Understanding Virtual Networks | 9 |
| Unit IV | Wireless Networks and Network Services Wireless and SOHO Networks- Understanding Wireless Networking Technologies - Installing and Configuring SOHO Networks - Network Services and Cloud Computing- Understanding Network Services- Understanding Cloud Computing- Concepts of Cloud Computing | 9 |
| Unit V | Mobile Devices and Connectivity Working with Laptop and Mobile Device Hardware- Differences between Device Types- Disassembling and Reassembling Laptops- Installing and Configuring Laptop Hardware- Setting Up and Configuring Accessories and Ports - Mobile Connectivity and Application Support - Understanding Mobile Connectivity- Understanding Mobile App Support | 9 |

| | Practical Component |
|-------------------|--|
| | 1. Demonstrating disassembling a computer, explaining its |
| | various parts, and reassembling it |
| | 2. Installing printer and demonstrating successful printing of |
| | documents |
| | 3. Demonstrating the installation and configuration of the |
| | Windows operating system |
| | 4. Demonstrating the use of various Windows command-line |
| | functions |
| | 5. Demonstrating the installation of the Linux operating system |
| | 6. Demonstrating the use of basic Linux commands 30 |
| | 7. Performing study of various networking hardware - routers, |
| Exercises | switches, etc. |
| | 8. Demonstrating the installation and configuration of routers, |
| | switches, etc. |
| | 9. Demonstrating the creation of a SOHO network and |
| | configuring the same |
| | 10. Creating an account in any cloud service provider |
| | 11. Demonstrating the creation of infrastructure as a service by |
| | creating suitable computing configuration in the cloud |
| | 12. Demonstrating the disassembling of laptops, explaining their |
| | parts and reassembling of laptops |
| | 13. Demonstrating the disassembling of a mobile phone, |
| | explaining its parts, and reassembling it |
| | Recommended Learning Resources |
| | 1. Quentin Docter, Jon Buhagiar, "CompTia A+ COMPLETE study GUIDE", core 1 |
| Print Resources | exam 220-1101 and core 2 exam 220-1102, whey sybex Publication, 2022. |
| | Edition (Exams 220-1001 & 220-1002) McGraw-Hill Education 2019 |
| Syllabus design : | Dr. T. Chithralekha, Professor, PUDoCS |
| | Dr.S.L.Jayalakshmi, Assistant Professor, PUDoCS |

| Year | I | Course Code: CSIT103 | | Credits | 3 | |
|-------------------------------------|---|---|--|-------------|----|--|
| Sem. | I | Course Title: Python Programming | | Hours | 60 | |
| | | | | Category | В | |
| Course Prerequisites , if any | • Basio | c Knowledge of Programming | | | | |
| Internal Assessment Marks: 50 | End Semeste | er Marks: 50 | Duration of ESA (Practica | l) :03 hrs. | | |
| Course Outcomes | Under Implei Under Ability Under | Understand the basics of writing Python code Implement programs using lists, tuples and dictionaries Understand the use of control structures Ability to write programs using packages Understand the file manipulation | | | | |
| Unit No. | Course Content | | | Hours | | |
| | | Theory Componer | nt | | | |
| Unit I | Introduction Introduction Python Progr Fundamenta | a , Data types to Python – Advantages of u rams – Python's Core data type Is. | using Python – Executing s – Numeric Types – String | 6 | | |
| Unit II | Lists, Tuples, Dictionaries Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing – list comprehension. | | | | | |
| Unit III | Control Flow, Functions, Modules Python Statements: Assignments – Expressions – If condition – While and for Loops. Functions: Definition, Calls – Scopes – Arguments – Recursive Functions– Functional Programming tools. Classes and Object Oriented programming with Python - Modules and Packages: Purpose, using packages– Exception Handling with Python. | | | | | |
| Unit IV | Packages Packages: NumPy, Pandas, Scikit learn - Machine learning with Python – Cleaning up, Wrangling, Analysis, Visualization - Matplotlib package – Plotting Graphs. | | | | | |

| Unit V | File Handling Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions | 6 | | |
|--|---|----|--|--|
| | Practical Component | | | |
| Exercises | Exchange the values of two variables Finding minimum among n variables Perform Simple sorting Generate Students' marks statement Find square root, GCD, exponentiation Sum the array of numbers Perform linear search, binary search Perform Matrix operations using NumPy Perform Dataframe operations using Pandas Use Matplotlib on the dataset and visualize Perform Word count, copy file operations | 30 | | |
| | Recommended Learning Resources | | | |
| Text Books Mark Lutz, "Learning Python", Fifth Edition, O'Reilly, 2013. Daniel Liang, "Introduction to programming using Python", Pearson, First edition, 2021. Wes Mc Kinney, "Python for Data Analysis", O'Reilly Media, 2012. Reference Books Tim Hall and J-P Stacey, "Python 3 for Absolute Beginners", Apress, First Edition, 2009. Magnus Lie Hetland, "Beginning Python: From Novice to Professional", Apress, Second Edition, 2005. | | | | |
| Syllabus desig | gn: Dr.V.Uma, Associate Professor, PUDoCS. | | | |

| Year | Course Code: CSIT104 | Credits | 3 | |
|-------------------------------------|---|--|-------------------------|--|
| Som | | Hours | 60 | |
| Sem. | Course Title: Content Authoring Tools | Category | В | |
| Course Prerequisites, if any | Basic knowledge of working with computer based to | ols | | |
| Internal Assessment Marks: 50 | End Semester Marks: 50 Duration of ESA (Practica | al): 03 hrs. | | |
| Course Outcomes | Understand the key features of content authoring to Learn to Install and use Open source and commercitools Demonstrate the ability to use various content auth create engaging and interactive content Analyze the impact of design choices on user engage outcomes using the various mind-mapping tools Design and produce multimedia content using in authoring tools to enhance creativity and interactivity | ools al image autho oring tools to ement and lean nteractive cor | oring rning ntent | |
| Unit No. | Course Content | Hours | | |
| | Theory Component | | | |
| Unit I | IntroductionAuthoring Tools Introduction - Classification of Authoring6tools: Web Authoring tools - Media and Application tools -6Course authoring tools - Features of Authoring tools -6Elements of Authoring tools.6 | | | |
| Unit II | Image Authoring tools6Introduction to various Image authoring tools - Open6source vs commercial authoring tools - Image enhancing6with Open Source Tools : GIMP features.6 | | | |
| Unit III | Audio & Video Authoring ToolsAudio : Recording basics - Open Source Tools - A case studywith Audacity - Video Types - Video features - Screenrecording - Open Broadcaster Software studio : Features -Recording - Streaming - Mobile specific video features. | | | |
| Unit IV | Mind Maps Mind Maps : Introduction - Comparative analysis of various mind mapping tools - Xmind : Building various types of mindmaps - Features - Exporting. | 6 | | |
| Unit V | Interactive Content AuthoringIntroduction to Interactive content building - H5P : Usecases - Building Interactive presentation - Building flashcards - Interactive Videos - Building interactive 360 degreevirtual tours | | | |
| | Practical Component | | | |
| Exercises | Practical Component 1. Perform a survey on various types of authoring tools 30 2. Design a banner highlighting the features of your department 3. 3. Enhance an input image by applying various filters 4. 4. Build a podcast on a specific topic 5. 5. Enhance an audio file by removing various types of noises 6. 6. Build your video resume in 3 different styles 1. | | | |

| | 7. Build mind maps of the courses that you are studying in | | | | |
|--------------------------------|--|--|--|--|--|
| | this semester | | | | |
| | 8. Create an interactive video about your department | | | | |
| | 9. Using H5P build interactive content | | | | |
| | 10. Case Study: Build a multimedia placement brochure for | | | | |
| | your department. | | | | |
| Recommended Learning Resources | | | | | |
| | 1. Elkins, D., & Pinder, D, " E-learning fundamentals: A practical guide", | | | | |
| | Association for Talent Development, 2015. | | | | |
| Print Resources | 2. Buzan, T, "Mind map mastery: The complete guide to learning and using | | | | |
| | the most powerful thinking tool in the universe", Watkins Media Limited, | | | | |
| | 2018. | | | | |
| Syllabus design: D | r.K.S.Kuppusamy, Associate Professor, PUDoCS | | | | |

SEMESTER II

| Year | I | Course Code: CSIT105 | | Credits Hours | 4 |
|-------------------------------------|--|--|--|------------------|---|
| Sem. | п | Course Title: Problem Solving & Programming Fundamentals | | Category | c |
| Course Prerequisites, if any | | Basic knowledge of Computers | | | |
| Internal Assessment Marks: 25 | End | nd Semester Marks: 75 Duration of ESA (Theory): 03 hrs. Duration of ESA (Practical): 03 hrs. | | | |
| Course Outcomes | | Analyze problems and de | velop top-down designs | | |
| | | • Write, compile, and debu | ıg basic programs | | |
| | | • Implement logic with cor | ditionals and loops | | |
| | | • Manipulate arrays of vari | ous dimensions | | |
| | | • Design and implement fu | nctions with recursion | | |
| Unit No. | | Course Co | ntent | Hours | |
| | 1 | Theory Compo | nent | | |
| Unit I | Intr Prol Imp Effic | oduction to Computer Proble blem-solving Aspect – lementation of Algorithms ciency of Algorithms – Analysi | e m-Solving Top-down Design – – Program Verification – s of Algorithms | 9 | |
| Unit II | Basi Basi — I/0 | Basic programming constructsBasic Data types (Numerical, String) – Variables – Expressions9– I/O statements – Compile and Run – Debugging | | | |
| Unit III | Dec Dec stat loop | Decision Making – Branching & LoopingDecision making – Relational Operators – Conditional9statement, Looping Statements – Nested loops – Infiniteloops – Switch Statements | | | |
| Unit IV | Arra Arra Arra Cha | Array TechniquesArray Manipulation – Different operations – One dimensional9Array – Two-dimensional Array – Multi-dimensional Array –Character – Arrays and Strings | | | |
| Unit V | Modular solutions Introduction to Functions – Importance of Design of Functions – Arguments – Parameters – Return Values – Local and Global Scope – Recursion | | | 9 | |
| | | Practical Compo | onent | | |
| Exercises | | Program to array counting find the maximum number. Program for removal of contrary & to partition and array & to partition and the key and the second sec | ng, array order reversal & er in a set luplicates from an ordered ray nallest element e values of two variables able : of numbers as input and of elements in the list factorial of a given integer sine of an angle (in degrees) Fibonacci sequence up to reger as input and reverses | 30 | |

| | 10. | Program that converts a number from one base to another (e.g., binary to decimal, decimal to binary) | | |
|---|-----|--|--------------------------------|--|
| Recommended Learning Resources | | | | |
| Print Resources 2. Allen B. Downey, "Think Python: How to Think like a Comp Scientist" Third Edition, O'Beilly Publishers, 2020 | | | rson Education e a Computer | |
| Syllabus design: Dr. M.Sathya, Assistant Professor, PUDoCS | | | | |

| Year | I Course Code: CSIT106 Credit | | | Credits | 4 | |
|----------------|---|--|----------------------------|-------------|-------|--|
| Sem. | II | Hou Hou | | Hours | 75 | |
| | | Course Title : PC, Network, and Mobile Device | | | | |
| Course | | Basic knowledge of using computers, internet and mobile devices | | | | |
| Prerequisites, | | | ····, ···· | | | |
| if any | | | | | | |
| Internal | Enc | End Semester Marks: 75 Duration of ESA (Theory) : 03 h | | | | |
| Assessment | | Duration of ESA (Practical) : 03 hrs | | | | |
| Marks: 25 | | - Understand the seminar bardu | l | | | |
| Outcomes | | Onderstand the common hardw networks, and mobile devices | are and software issues i | n PCS, | | |
| | | Learn the principles of troublest | nooting in PCs. Operating | system. | | |
| | | networks, and mobile devices | | oyoceni) | | |
| | | • Apply diagnostic tools and techr | niques to identify and res | olve hardw | are | |
| | | and software problems on PCs, | networks, and mobile dev | vices | | |
| | | Evaluate the security implication | ns of various troubleshoo | ting action | s on | |
| | | PCs, networks, and mobile devic | ces | | | |
| | | Design and implement prevention | ve maintenance plans to | minimize f | uture | |
| | | technical issues | | | | |
| Unit No. | | Course Content Ho | | | ours | |
| | | Theory Compone | nt | | | |
| | Tro | ubleshooting Methodology and | Resolving Core Hard | dware | | |
| | Pro | blems | | | | |
| 11.5.4.1 | Usi | ng the Troubleshooting Best Practice | Methodology, Troublesh | ooting | 0 | |
| Unit I | Sto | prage Devices and RAID Arrays Troubleshooting Video Projector and | | | 9 | |
| | Dis | play Issues. Troubleshooting Printe | rs Problems. Troublesh | poting | | |
| | Cor | nmon Mobile Device Issues. | , | 0 | | |
| | | | | | | |
| | Se | curity Issues for Troubleshooting | | | | |
| | Se | curity Concepts - Physical Security (| Concepts, Physical Securi | ty for | ~ | |
| Unit II | Sta | ff, Logical Security, Malware, Mitig | ating Software Threats, | Social | 9 | |
| | Thr | eats Security Best Practices Best Pr | actices for Malware Remo | oval | | |
| | | | | , van | | |
| | Net | twork Troubleshooting | | | | |
| | Tro | oubleshooting Networking Pre | oblems -Using Ne | twork | | |
| Unit III | Tro | ubleshooting Tools, Resolving Co | onnectivity Issues, Rep | airing | • | |
| | Phy | Isical Cabling, Fixing Common Prot | plems, Troubleshooting | WI-FI- | 9 | |
| | | uware mousieshooting, sonware wheeleshooting Configuring Trouble | shooting securing a | SOHO | | |
| | Net | twork (Wireless). Securing a SOHO No | etwork (Wired). | | | |
| | | | | 1 | | |

| Unit IV | Troubleshooting Operating System Troubleshooting Common OS Problems- Common Symptoms, Common Troubleshooting Steps, Troubleshooting Security Issues - Common Symptoms, Browser Related Symptoms, Working with Windows OS Security Settings-Users and Groups, User Authentication, NTFS vs. Share Permissions, Shared Files and Folders, System Files and Folders, Windows Security Features - Web Browser Security-Browser Download and Installation, Extension and Plug-ins, Credentials Managers, Secure Data Transfer. | | | |
|---|---|-----------|--|--|
| Unit V | Mobile Device Troubleshooting Mobile Device Security, Troubleshooting Mobile OS Issues- Application Problems Performance Issues, OS Fails to Update Extremely Short Battery Life, Connectivity Issues, Auto Rotate Issues, Troubleshooting Mobile Security Issues-Security Concerns, Common Symptoms | | | |
| | Practical Component | | | |
| Exercises | Demonstrating the troubleshooting of motherboards, CPUs, RAM, power problems, Storage Devices Demonstrating the troubleshooting of RAID Arrays, Video, Projector, and Display Issues Demonstrating the troubleshooting of Printer Problems, Common Mobile Device Issues Demonstrating the mitigation of common security threats using appropriate software Demonstrating the troubleshooting of Networking Problems using Network Troubleshooting of Resolving Connectivity Issues, Repairing the troubleshooting of Resolving Connectivity Issues, Repairing Physical Cabling, Fixing Common Problems Demonstrating the troubleshooting of Wi-Fi- Hardware Troubleshooting, Software Troubleshooting Demonstrating troubleshooting Common OS Problems Troubleshooting Security Issues, Browser issues Working with Windows OS Security Settings, Creating Users and Groups, setting up user Authentication, creating NTFS vs. Share file Permissions Configuring Windows Security Features configuring Web Browser Security, Browser Download and Installation, Extension and Plug-ins Demonstrating troubleshooting of Mobile OS Issues, Application Problems, Performance Issues Demonstrating troubleshooting of OS Update failure, Extremely Short Battery Life, Connectivity Issues, Auto Rotate Issues, Mobile Security Issues | 30 | | |
| Print | | E" (core | | |
| Resources | Quentifi Docter, John Bunagiar, COMPTIA A+ COMPLETE study GUIL 1 exam 220-1101 and core 2 exam 220-1102), WILEY-SYBEX, 2022. Meyers, "CompTIA A+ Certification All-in-One Exam Guide", Tentl (Exams 220-1001 & 220-1002), McGraw-Hill Education 2019. | n Edition | | |
| Syllabus design | : Dr. T.Chithralekha, Professor, PUDoCS | | | |
| Dr.S.L.Jayalakshmi, Assistant Professor, PUDoCS | | | | |

| Year | 1 | Course Code: CSIT107 Cred | | | |
|-------------------------------------|---|---|----|-----|--|
| | | Ho | | 60 | |
| Sem. | II | Course Title : Web Designing and Desktop Publishing Tools Categories | | | |
| Course Prerequisites, if any | | Basic knowledge of computers, networks, internet and using computers based tools | | | |
| Internal Assessment Marks: 50 | End | End Semester Marks: 50 Duration of ESA (Practical): 03 hrs. | | | |
| Course Outcomes | | Understand the fundamental concepts related to the Internet a design principles Learn the process of digital illustration for content creation and whosting Demonstrate the use of various web designing and desktop putools to create engaging and interactive design Analyse the usage of document editing tools for various applicati Design and develop a fully functional and aesthetically pleasing v brochures, newsletters, resumes, certificates, etc., emappropriate design tools effectively | | | |
| Unit No. | | Course Content | Но | urs | |
| | | Theory Component | | | |
| | Basi | cs of Web Designing and Internet | | | |
| Unit I | Designing a website/blog, creating different themes for different layouts, designing the look and feel of a website, creating and designing banners, advertisements, basics of networks and internet, working with email and online tools for conversion and compression. | | | | |
| Unit II | Digital Illustration and Hosting Electronic Image Creation and Manipulation, Image Scanning, Colour Model, Graphic Reduction Illustration, Creating Graphic Realism, illustrating children's books, CDs, vector characters or concept art specialize - hosting website & uploading ftp : file transfer protocol - hosting plan, hosting domains on Cpanel. | | | | |
| Unit III | Photoshop/GIMP Introduction, Basic Image Manipulation, Color Painting Tools, Brush Settings, Making Selections, Filling and stroking, Layers, Advanced Layers, Text, Drawing, Using Channels and Masking, Manipulating images, Getting to know the work area, Using Adobe Bridge, Basic Photo Corrections, Retouching and Repairing, Working with selections, Layer Basics, Masks and channels, Correcting and enhancing digital photographs. | | | 6 | |
| Unit IV | PageMaker/Scribus Introduction, PageMaker Interface, Creating a New Document, Managing Document Layer, Creating & Editing Text, Working with Edit Story, Managing Text as an Object, Working with Text and Graphics, Using Graphics, Applying Colors to Graphics, Framing Graphics, Cropping and masking Graphics, Working with Layers, Working with Master pages, Working with Plugins, Using Text Wrap. | | | | |
| Unit V | Core Intro Inter Com | Corel Draw/Inkscape/Canva Introduction to Corel Draw, Features of Corel Draw, Corel Draw Interface, Tool Box, Moving from Adobe Illustrator to Corel Draw, Common Tasks, Drawing and Coloring, Selecting Objects, Creating | | | |

| | Basic Shapes, Reshaping Objects, Organizing objects, Applying color | | | |
|---------------------|--|--|--|--|
| | fills and Outlines, Mastering with Text, Text Tool Artistic and paragraph | | | |
| | text, Formatting Text, Embedding Objects into text, Wrapping Text | | | |
| | around Object, Linking Text to Objects. | | | |
| | Practical Component | | | |
| | 1. Learning about tools like Google web designer, webflow, | | | |
| | wordpress, Adobe Dreamweaver etc | | | |
| | 2. Designing an interactive web page or blog Sending emails | | | |
| | with image and text attachments | | | |
| | 3. Working with E-Publishing, E-Books preparation tools | | | |
| | Learning and applying concepts and techniques for vector- based symbols and illustrations | | | |
| | 5. Designing Business card, hosting website, domain registration | | | |
| | 6. Create your own visiting card and letterhead including your | | | |
| | own style and logo, showing cutting mark and colour | | | |
| Exercises | registration, symbol and take a print by using any colour 30 | | | |
| | printer | | | |
| | 7. Create at least one banner and one poster on "skill | | | |
| | development" theme | | | |
| | 8. Creating regional language magazine showing column | | | |
| | structure and inserting properly edited appropriate picture | | | |
| | within magazine | | | |
| | 9. Designing an attractive and theme oriented regional language | | | |
| | magazine front page | | | |
| | 10. Designing Monograms, Logos, Advertisements, Brochure etc | | | |
| | Decommonded Learning Decourses | | | |
| | ADORE® DREAMWEAVER® Help and tutorials" Dreamweaver Creative | | | |
| | Cloud Adobe publication 2014 | | | |
| | 2 Stephanie Leary "Wordpress for web developer" Apress 2013 | | | |
| | Stephanic Leary, Wordpress for web developer, Apress, 2013. "Adobe Photoshon CC Classroom in a Book" Adobe creative team. Adobe | | | |
| Print | nress 2018 | | | |
| Resources | 4. "Adobe PageMaker 7.0 Classroom in a Book" – Adobe creative team | | | |
| nesources | Adobe press 2001 | | | |
| | 5. Gary David Bouton. "CorelDraw X8: The official guide". McGraw- | | | |
| | Hill. 2017. | | | |
| | 6. 6. Satish Jain, "BPB DTP Course Paperback – 1", BPB Publication, 2014. | | | |
| Syllabus design: D | r. Sukhvinder Singh, Assistant Professor, PUDoCS. | | | |
| Revised by : Dr. T. | Chithralekha, Professor, PUDoCS | | | |

| Year | Course Code:CSIT108 | Credits | 3 | |
|-------------------|--|---|-----|--|
| Sem. | 11 | Hours | 60 | |
| | Course Title: Visual Programming with C# | Category | В | |
| Course | Basic knowledge of computer Programming | | · | |
| Prerequisites, if | | | | |
| any | | | | |
| Internal | End Semester Marks: 50 Duration of ESA (Practical) | : 03 hrs | | |
| Assessment | | | | |
| Marks: 50 | | | | |
| Course | Understand the key components of the .NET Framework | ork related to | C# | |
| Outcomes | development | | | |
| | • Learn the basic syntax and structure of C# programs | | | |
| | Design C# applications by integrating various object-o | riented | | |
| | programming techniques in the .NET framework | | | |
| | • Analyze the significance of graphical user interface (G | UI) compone | nts | |
| | and the Event Handling Model using C# programming | | | |
| | • Learn and apply the fundamental skills to efficiently d | evelop, test, | and | |
| | deploy ASP.Net Core applications | | | |
| Unit No. | Course Content | Hours | | |
| | Theory Component | | | |
| | Introduction to .Net Framework | | | |
| | An Overview - Framework Components - The Common | | | |
| Unit I | Language Runtime (CLR)NET Base Class Library - Common | non 6 S) - | | |
| | Language Specification (CLS) - Common Type System (CTS) - | | | |
| | Metadata and AssembliesNET Namespaces - MSIL - JIT | | | |
| | Compilers. | | | |
| | Overview of C# | | | |
| | Program structure- Literals- Variables- Constants -Data | s- Variables- Constants -Data ts and Expressions- Branching- 6 | | |
| Unit II | Types- Operators-Statements and Expressions- Branching- | | | |
| | Looping and loop control statements- Arrays- Strings | | | |
| | manipulation- Boxing and Unboxing- Pre-processors- | | | |
| | Namespaces. | | | |
| | Object Oriented Programming concepts in C# | | | |
| Unit III | Class- Objects- Encapsulation- Constructors and its types- | | | |
| | Inheritance-Polymorphism-Interface-Abstract class- | 6 | | |
| | Operator overloading- Properties- Indexers- Delegates- | | | |
| | Collections. | | | |
| | Windows Forms | | | |
| Unit IV | Introduction to Windows Forms and various controls-SDI and | nd 6 | | |
| | MDI applications- Menu Creation, Common Dialog Boxes- | | | |
| | Events and event handling. | | | |
| | Getting started with ASP.Net | | | |
| | Choosing a code editor, Creating an ASP.NET Core project, | ect, | | |
| Unit V | Running the ASP.NET Core application, ASP.NET Core | 6 | | |
| | application - Creating the project, Testing ASP.Net Core | | | |
| | Applications - Creating a unit test project, Writing and | | | |
| | running unit tests. | | | |
| | Practical Component | | | |
| | 1. Installation of Visual Studio and creation of Simple | | | |
| | Console Application | | | |
| | 2. Create a simple C# program for the following concepts: | | | |
| | a) To Check whether a given number is an | | | |
| | Armstrong or not | | | |
| | b) To Check whether the alphabet is a vowel or | | | |

| | not using switchcase | | | |
|---|---|--|--|--|
| | c) To Check whether the given string is palindrome | | | |
| | or not using arrays | | | |
| | 3. Create a program to demonstrate boxing and unboxing | | | |
| | operations 30 | | | |
| Exercises | 4. Implement the basic OOP concepts | | | |
| | 5. Implement Interfaces and Operator Overloading | | | |
| | 6. Create a GUI using standard controls, SDI & MDI forms | | | |
| | 7. Design an application with menu options and a Common | | | |
| | Dialog box | | | |
| | 8. Create a simple web application using ASP.Net | | | |
| | 9. Develop any ONE case study listed below: | | | |
| | a) Inventory Control | | | |
| | b) Retail Shop Management | | | |
| | c) Employee Information System | | | |
| | d) Personal Assistant Program | | | |
| | e) Students' Information System | | | |
| | Recommended Learning Resources | | | |
| Print Resources | 1. Herbert Schildt, "C# 4.0: The Complete Reference", First Edition, | | | |
| | McGraw Hill Education, 2017. | | | |
| | 2. Albahari. J, "C# 10 in a Nutshell: The Definitive Reference", 1 st Edition, | | | |
| | O'Reilly, 2022. | | | |
| | 3. Adam Freeman. A, " Pro ASP.NET Core 7", 10 th Edition. Manning | | | |
| | Publication, 2023. | | | |
| Syllabus design: Dr.S Ravi, Professor, , PUDoCS and Dr. S.L.Jayalakshmi, Assistant Professor, | | | | |
| PUDoCS. | | | | |
| Revised by : Dr. T. | Chithralekha, Professor, PUDoCS | | | |

| Year | 1 | Course Code: CSVA101 | | Credits | 2 | |
|-------------------------------------|--|--|--------------|----------|----|--|
| Som | | - | | Hours | 45 | |
| Sem. | 11 | Course Title: Digital Tech | nologies | Category | Α | |
| Course Prerequisites, if any | Basic knowledge of computers, networks and internet | | | | | |
| Internal Assessment Marks: 25 | End Sem | End Semester Marks: 75 Duration of ESA (Theory) : 03 hrs. | | | | |
| Course Outcomes | Get introduced to the digital systems and its building blocks Understand how the Digital Communication happens and to Learn the advantages and disadvantages including Cybersecurity Learn the day to day digital activities and the initiatives on Digital India Acquire knowledge on current Technologies and Trends in Digital Space Explore the applications on the state of the art in Digital Technologies | | | | | |
| Unit No. | | Course Conten | t | Hours | | |
| | | Theory Compo | nent | 1 | | |
| Unit I | Introduc Digital Technolo – Hardwa | Introduction: Digital Systems - Information & Communication Technology - ICT Tools. Computer Architecture – Software – Hardware - Operating System - Algorithms - Flowcharts. | | | | |
| Unit II | Communication Systems:Transmission Media - Computer Networks – Internet - WebBrowsers - Search Engines - Messaging, Email - Social Media- Online Ethics. Cybersecurity: Threats, Significance,Challenges, Precautions, Safety Measures. Cyber CrimeAwareness. | | | | | |
| Unit III | Digital India & e-GovernanceInitiatives - Unified Payment Interface - Aadhar onlineservices - Credit / Debit Cards - e-Wallets - Mobile and7Internet Banking - NEFT / RTGS / IMPS - Online Payments& PoS- Digital Accessibility. | | | | | |
| Unit IV | EmergingTechnologies& Applications:(Basicintroduction only)Overview of Artificial Intelligence, Cloud Computing, Big7Data, Internet of Things, Virtual Reality, 5G, 3D Printing.7 | | | | | |
| Unit V | Case Studies Any one case study on the emerging technologies and report submission by the candidates. | | | | | |
| Practical Component | | | | | | |
| Exercises | 1. Operating System Installation and Configuration. . . . 2. Application Software Installation and configuration . 10 3. Hardware understanding and minor troubleshooting . . . 4. Networking, cabling, configuration . . | | | | | |
| | 1 | Recommended Learnin | ng Resources | | | |
| Print Resources | Pramod Kumar, Anuradha Tomar, R. Sharmila, "Emerging Technologies in Computing - Theory, Practice, and Advances", Chapman and Hall / CRC, 1st Edition, 2021, eBook ISBN: 9781003121466. https://doi.org/10.1201/9781003121466. V. Rajaraman, "Introduction to Information Technology", PHI, 3rd Edition, | | | | | |

| | 3. | E. Balagurusamy, "Fundamentals of Computers", Tata Mc GrawHill, 2 nd |
|------------------|-----------|---|
| | | Edition, 2011, ISBN: 9780071077880. |
| | 4. | Behrouz A. Forouzan, "Data Communications and Networking", McGraw |
| | | Hill, 4 th Edition, 2007, ISBN 978-0-07-296775-3. |
| | 5. | Rajkumar Buvya, James Broberg, and Andrzej Gosciniski, "Cloud |
| | | Computing- Principals and Paradigms", Wiley, 2011, ISBN: 978-0-470- |
| | | 88799-8. |
| | 6. | Stuart Russel and Peter Norvig, "Artificial Intelligence - A Modern |
| | | Approach", Pearson Education, 3rd Edition, 2010, ISBN- 13: 978-0-13 - |
| | | 604259-4. |
| | 7. | Samuel Greengard, "Internet of Things", The MIT Press, 2015, ISBN: |
| | | 9780262328937, https://doi.org/10.7551/mitpress/10277.001.0001. |
| | 8. | C.S.V. Murthy, "E- Commerce – Concept, Models & Strategies", |
| | | Himalaya Publishing House, 2015, ISBN: 8178662760. |
| | 9. | Hurwith, Nugent Halper, Kaufman, "Big Data for Dummies", Wiley & |
| | | Sons, 1 st Edition, 2013, ISBN-13: 978-1118504222. |
| Syllabus Design: | Prof. S.I | K.V. Jayakumar, Professor, PUDoCS |

SEMESTER III

| Year | П | Course Code: CSIT201 Credits | | | 4 | | |
|-----------------------------|---|---|------------------------------|------------|----------|-----|--|
| 6 | | Course Title: Object Oriented Programming | | Hours | | 75 | |
| Sem. | 111 | | | Category | / | С | |
| Course Prerequisites, if | Basic knowledge of Programming | | | | <u> </u> | | |
| any | End C | | Duration of CCA (Theory) | . 02 h.m. | | | |
| Internal | End S | emester Marks: 75 | Duration of ESA (Theory) | : U3 Nrs. | | | |
| Assessment Market 25 | | Duration of ESA (Practical): 03 nrs. | | | | | |
| Course | | ndarstand the principles of | f OOD and the concert of a | | hiasta | | |
| Outcomes | • 0 | nderstand the principles o | roop and the concept of o | ling | objects |) | |
| Outcomes | • A | pply the concept of Object | Initialization and overload | ling | | | |
| | • 0 | nderstand the concept of i | nneritance and reusability | | | | |
| | • 0 | nderstand file operations a | and exception nandling | | | | |
| | • A | ppiy OOP to design and im | plement solutions to real- | world prot | biems | | |
| Unit No. | | Course Theorem Course | | | Ηοι | ırs | |
| | Drime | interry Comp | Jonent | I | | | |
| Linit I | | t Oriented Programming | Daradium Pacie Concente | of OOD | 0 | 1 | |
| | Benef | fits of OOP - Application | of OOP - Simple C++ pr | ogram - | 9 | | |
| | Comp | nis of OOF - Application | or our - simple C++ pr | ograni - | | | |
| | Classe | es and Ohierts | | | | | |
| Unit II | Specif | fving class - Member functi | ions - Nesting of Member f | unctions | 9 | | |
| | - Acce | ess specifier - Static Data | members and functions | - Arravs | 5 | | |
| | withir | n a Class - Arrays of Objects | - Objects as Arguments - R | eturning | | | |
| | Objec | ts - Friend Function | 0 | 0 | | | |
| | Objec | t Initialization and Overlo | ading | | | | |
| Unit III | Types | of Constructors - Dyr | namic Initialization of O | bjects - | 9 | | |
| | Destructors Operator overloading - function Overloading - | | | | | | |
| | Manip | Manipulation of Strings | | | | | |
| | Inher | itance | | | | | |
| Unit IV | Derive | ed Classes - Types of inl | neritance - Virtual Base (| Classes - | 9 | | |
| | Abstr | act Classes - Pointers to D | erived Classes - Virtual bas | se class - | | | |
| | Meth | od Overriding - Pure Virtua | al Functions | | | | |
| | File o | perations and Exception h | andling | | - | | |
| Unit V | Classe | es for File Operations - File | Modes - opening and clos | ing a File | 9 | | |
| | - Basi | cs of Exception Handling - | Try-Catch block - Case St | udies on | | | |
| | кеат г | | nonont | | | | |
| | 1 1 | Vrite a Program to Bood or | d Print Number Input Free | n tho | | | |
| | 1. V | licor | iu Print Number input Froi | ii uie | | | |
| | 2 V | Vrite a simple program usi | ng a class and objects | | | | |
| | 3. V | Vrite a program to demor | nstrate the usage of a cor | nstructor | | | |
| | a | nd destructor in a class | | | | | |
| | 4. V | Vrite a program to overloa | ad + operator to add two | complex | 30 | C | |
| Exercises | n | lumbers | | | | | |
| | 5. V | Vrite a program to dem | nonstrate the usage of | function | | | |
| | 6. Write a program to display employee information usin multiple inheritance | | | | | | |
| | | | | | | | |
| | 7. V | Vrite a program to demons | strate multilevel inheritand | ce 🛛 | | | |
| | 8. Write a program to copy a file from one location to anothe | | | | | | |
| | location | | | | | | |
| | | | | | | | |
| | | | | | | | |

| Recommended Learning Resources | | | | | |
|--------------------------------|--|--|--|--|--|
| Print Resources | E Balagurusamy, "Object oriented Programming with C++", Seventh edition, Tata McGraw Hill, 2020. | | | | |
| Syllabus Design: D | r. T. Vengattaraman, Associate Professor, PUDoCS | | | | |

| Year | II | Course Code: CSIT202 Cred | | Credits | 5 | 4 |
|------------------------------------|--|--|---------------------------------------|---------------|--------|------|
| Sem. | | | | Hours | | 75 |
| | | Course Title: Data Structures Catego | | Categor | 'Y | С |
| Course Prerequisites, if any | • | Basic knowledge of Computing | | | | |
| Internal | End Sen | nester Marks: 75 | Duration of ESA (Theo | ory): 03 hrs. | | |
| Assessment | | | Duration of ESA (Prac | tical): 03 hr | rs. | |
| Marks: 25 | | | | | | |
| Course Outcomes | • | Learn basic terminologies c algorithms | of linear and nonlinear | data struct | ures | and |
| | • | Understand the concept of using arrays | polynomial addition a | nd sparse n | natrı | ces |
| | • | Apply linked lists to solve p sparse matrices | roblems related to stat | :ks, queues | s, and | d |
| | • | Understand the operations | and traversals of bina | ry trees | | |
| | • | Apply graph algorithms to s finding minimum cost span | solve problems like top ning trees | ological so | rting | and |
| Unit No. | | Course Co | ontent | | Но | ours |
| | | Theory Compon | ent | | | |
| | Introdu | ction | | | | |
| Unit I | Basic terminologies – Linear and Nonlinear data structures. Algorithm: Definition – Pseudo code – Analysis – Design Techniques. | | | | 7 | |
| | Arrays, | Stacks and Queues | | | | |
| | Representation – Polynomial Addition – Sparse Matrices – | | | rices – | | |
| Unit II | Multidimensional Arrays. Stacks and Queues: Stack ADT – | | | | | |
| | Operations – Evaluation of Expressions – Queue ADT – Operations | | | |] | 11 |
| | - Applic | ation – Multiple Stacks and | Queues | | | |
| Unit III | Lists Singly Linked Lists – Linked Stacks and Queues – Operations – Circularly Linked Lists – Equivalence Relations – Sparse Matrices – Doubly Linked Lists | | | | | 9 |
| | Trees | | | | | |
| Unit IV | Basic Te | erminologies – Binary trees | - Representation, Op | erations, | | 9 |
| | Traversals, Types – Applications of Trees | | | | | |
| Unit V | Graphs Basic Terminologies – Representation, Operations, Traversals – Applications - Shortest path problem, Topological sorting, | | | | 9 | |
| | 1 | Practical Compo | nent | | | |
| | 1. | Searching Algorithms (with | the number of key | | Э | 30 |
| | | comparisons) - Sequential, | Binary and Fibonacci s | earch | | |
| | | algorithms | | | | |
| | 2. | Evaluation of arithmetic ex | pression | | | |
| | 3. | Stack, Queue, Circular que | ue, priority queue | | | |
| Exercises | 4. | Singly Linked List, Doubly L | inked List, Circular Link | ed List | | |
| | 5. | Tree Traversal techniques | | | | |
| | 6. | Graph Traversal techniques | 5 | | | |
| | 7. | DIJKSTRA'S Algorithm to obta | ain the shortest paths | | | |
| | | | | | | |

| Recommended Learning Resources | | | | | |
|--|----|--|--|--|--|
| | 1. | Ellis Horowitz, Sartaj Sahni, Susan Anderson-Freed, Fundamentals of | | | |
| | | Data Structures in C", India University Press, Second Edition, 2008. | | | |
| Drint Decourses | 2. | Debasis Samanta, "Classic Data Structures", Prentice-Hall of India, | | | |
| Print Resources | | Pvt. Ltd., India, Seventeenth Printing, Second Edition, 2009. | | | |
| | 3. | Dinesh P Mehta & Sartaj Sahni, Handbook of Data Structures and | | | |
| | | Applications, Second Edition, Chapman and Hall, 2020. | | | |
| Syllabus design: Dr. M.Sathya, Assistant Professor, PUDoCS | | | | | |

| Year | II Course Code: CSIT203 | | | | 4 | | |
|---|---|--|---|---|-----------------------|--|--|
| Sem. | | | | | 75 | | |
| | | Course Title: Enterprise IT Infrastructure | | Category | / C | | |
| Course Prerequisi tes, if any | | Basic knowledge of computers, ne | tworks and inte | ernet | | | |
| Internal Assessme nt Marks: 25 | End S | End Semester Marks: 75 Duration of ESA (Theory): 0 Duration of ESA (Practical) | | | | | |
| Course Outcome s | | Understand the IT Infrastructure Fundame Gain knowledge of Data Center, Networkin Equip students with knowledge of consystems, and end-user devices Understand the Infrastructure Lifecycle, Deploying, maintaining, and decommission | ntals ng, and Storage mputing infras eployment opti ning the infrasti | Principles structure, o ons, and Pur ructure | pperating rchasing | | |
| Unit No. | Course Content | | | | | | |
| Theory Component | | | | | | | |
| Unit I | Intro The block Appli Funct Perfo | duction to IT Infrastructure Definition of IT Infrastructure: The Infrastructs, Processes / Information building block, Ap cation Platform building block, Infrastructur tional attributes; Introduction to Non-Formance Concepts–Security Concepts. | cture Model- I plications build re building blo Functional Att | T building ding block, ocks, Non- cributes - | 9 | | |
| Unit II | Data centers, Networking, and Storage Introduction, Data center building blocks, availability, performance, security; Networking building blocks, virtualization, Availability, performance, security; Storage- Introduction, building blocks, availability, performance and Security. | | | | | | |
| Unit III | Computer, Operating Systems and end-user devices Compute - Introduction, building blocks, availability, performance, security; Operating Systems - Introduction, building blocks, availability, performance, security; End User Devices - Introduction, building blocks, Desktop virtualization, availability, performance and security. | | | | | | |
| Unit IV | Infrastructure Lifecycle, Deployment options, and Purchasing Infrastructure Lifecycle; Options – hosting options, Enterprise infrastructure deployment, Software-defined datacenter – SDDC, (Hyper) Converged Infrastructure, Cloud computing and Infrastructure as code; Purchasing Infrastructure and Services. | | | | | | |

| Unit V | Deploying, maintaining, and decommissioning the infrastructure Deploying The Infrastructure- Assembling, Testing, Go live scenarios; Maintaining - Systems management processes, Monitoring, Management using SNMP, Logging and Capacity management; Deploying Applications - DTAP environments, Blue-Green deployment, Continuous Delivery; Decommissioning Infrastructures – Preparation, Execution and Clean up. | | | | |
|-------------|---|-----------|--|--|--|
| | Practical Component | | | | |
| | 1. Install a virtual machine and install two different operating systems | | | | |
| | (windows & Linux) on the virtual machine with a given RAM, storage, | | | | |
| | network, file system and CPU requirements. | | | | |
| | 2. Using an open source SNMP tool, perform the following: | | | | |
| | a. List the devices in a network | | | | |
| | b. Perform SNMP ping of a given set of devices | | | | |
| | c. Using an MIB browser, browse, search and walk throug the | 30 | | | |
| | MIBs and perform basic operations | | | | |
| | d. Periodically query an SNMP device for the OID value and | | | | |
| | plot the results in a graph | | | | |
| | e. Provide the details of a given MIB | | | | |
| | f. Provide a snapshot of a given MIB | | | | |
| F | g. View the SNMP traps | | | | |
| Exercises | 3. Create a very simple website and host it in a free webserver | | | | |
| | 4. Create a free cloud service account and create a computing | | | | |
| | infrastructure for Python and C++ software development | | | | |
| | | | | | |
| | Recommended Learning Resources | | | | |
| Print | 1. Sjaak Laan ," IT Infrastructure Architecture – Infrastructure Buildin | ng Blocks | | | |
| Resources | and Concepts", Third Edition, 2017. | | | | |
| | 2. Surendra Keshari and Narendra Kumar," IT Infrastructure & Manage | | | | |
| | I K International Publishing House Pvt. Ltd, 2020. | | | | |
| Syllabus de | sign: Dr. T.Chithralekha Professor, PUDoCS | | | | |

| Year | II | Course Code: CSIT204 | | Credits | 3 | | | |
|--|---|---|--|--------------|------|--|--|--|
| Som | | | Hours | 60 | | | | |
| sem. | | Course Title: Server Admini | stration | Category | В | | | |
| Course Prerequisites, if any | • | Basic knowledge of Enterprise IT Infrastructure | | | | | | |
| Internal | End Se | End Semester Marks: 50 Duration of ESA (Practical): 03 hrs. | | | | | | |
| Assessment Marks: 50 | | | | | | | | |
| Course | • Lea | arn the management of Syster | m Resources and Web Services | | | | | |
| Outcomes | • Un | Understand the Mail Server Administration and Relational Databases | | | | | | |
| | • Lea | arn the Virtualization and Con | tainerization Technologies | | | | | |
| | • De | velop knowledge in Streaming | g, Communication, and Version Con | trol Systems | | | | |
| | ● Un Mo | derstanding and Implemen onitoring | tation of Collaboration Tools a | nd Performa | ance | | | |
| Unit No | | Course C | ontent | Hours | | | | |
| | • | Theory Con | nponent | | | | | |
| | Manag | ement of System Resources | and Web Services Managing User | | | | | |
| Unit I | Groups permis Apache | s and Accounts – user accoun sions – getting root privilege web server. | t – group account – managing file es – installing and configuring the | 6 | | | | |
| | Mail Se | erver Administration | | | | | | |
| | Working with Mail Servers – IMAP and POP3, email accounts, mail | | | | | | | |
| Unit II filtering, troubleshooting the mail server – Zimbra mail | | | | 6 | | | | |
| | installi | n MySQL, storing and retrieving, | | | | | | |
| | exporting and importing data, user management. | | | | | | | |
| | Virtual | ization and Containerization | Technologies | | | | | |
| | Creatin | ng Virtual machine with KVN | 1 – Managing Virtual Machines – | 6 | | | | |
| Unit III | Openst | ack – Installing, Starting, ar | nd Managing Docker Containers – | | | | | |
| | Docker | Dockerfile – Docker Volumes – Monitoring and Securing Docker | | | | | | |
| | Contail | iers. | | | | | | |
| | Stream | ling and Communication | unloading contents on the fly | | | | | |
| Linit IV | transco | | | | | | | |
| Onicity | transcouling – API access for remote streaming – streaming music with Ampacha – Communications Server with XMPP – Installing Fighberd – | | | | | | | |
| | Creating users and connecting with XMPP Client – Fighberd installation | | | | | | | |
| | Collabo | pration Tools | | | | | | |
| | Enablir | ng group chat – Chat server wi | th Node JS – Git Hosting – Creating | | | | | |
| Unit V | and Ma | anaging Git Contents – GitLab | server –Collaboration Tools – VNC | 6 | | | | |
| | – Hack | | | | | | | |
| | | Practical Co | mponent | | | | | |
| | 1. Cr | reate users and user group | accounts with required access | | | | | |
| | pe | ermissions | | | | | | |
| | 2. In | stalling and Configuring Apacl | he web server Tomcat web server | | | | | |
| | 3. In | stalling and Configuring mail s | servers with IMAP and POP3 | | | | | |
| | 4. In | stalling and Configuring MySC | QL server | | | | | |
| | 5. In | talling and Configuring KVM (Kernel-based Virtual Machine) | | | | | | |
| | 6. In | stalling and Configuring Open | stack and Docker Containers | 30 | | | | |
| | 7. In | stalling and Configuring Ampa | ache | | | | | |
| Exercises | 8. In | stalling and Configuring Ejabb | perd | | | | | |
| | 9. Cr | eating and Managing GIT con | tents | | | | | |

| | 10. Installing and Configuring collaboration tools-VNC- Hackpad- |
|-------------------|--|
| | Mattermost. |
| | Recommended Learning Resources |
| | 1. Uday R. Sawant, Oliver Pelz, Jonathan Hobson, William Leemans, "Linux: Powerful |
| Print Resources | Server Administration", Packt Publishing, 2017. |
| | 2. Vishal Rai, "Expert Linux Administration Guide", BPB Publications, 2022. |
| Syllabus design : | Dr. T.Chithralekha, Professor, PUDoCS |
| | Dr.S.L.Jayalakshmi, Assistant Professor, PUDoCS. |

| Year | П | Course Code: CSIT20 | 5 | Credits | 3 | |
|-------------------------|--|---|---|--------------|-------|--|
| | Hours | | Hours | 60 | | |
| Sem. | III Course Title : 3-D Modeling and Animation Category | | | Category | В | |
| Course Prerequisites | • | Basic knowledge of pro | gramming and using computer based | tools | | |
| , if any | • | Busic knowledge of pro | | | | |
| Internal | End Sen | nester Marks: 50 | Duration of ESA (Practical) : 03 hrs | <u>.</u> | | |
| Assessment | | | | | | |
| Marks: 50 | | | | | | |
| Course | • | Understand the basics | of 3D modeling and animation conce | pts. | | |
| Outcomes | • | Learn the various stage | es of the production pipeline. | | | |
| | • | Acquire skills to handle | digital images, videos, and process t | hem | | |
| | • | Become proficient in th | ne usage of 3D modeling and adding v | isual effect | S, | |
| | | lighting, and rendering | | | | |
| | • | Develop a model for th | e given specification. | | | |
| | • | Develop an animated g | ame, story, virtual tour of a building, | etc | | |
| Unit No. | | | Course Content | | Hours | |
| | 1 | Theo | ry Component | T | | |
| | Introdu | ction | | (20 | 6 | |
| Unit I | Definin | g 3D Animation, Explor | ing the 3D Animation Industry- Hist | ory of 3D | | |
| | Animati | on: Early Computers- II | ne Dawn of Computer Animation-Ine | Building | | |
| | Animati | on Achieves Commercia | e Foundations of Modern Computed Success, The Refining of 2D Animat | tion | | |
| LInit II | Production Pineline | | | | | |
| offic if | Understanding the Production Pineline's Components- Working in 3D | | | | | |
| | Animation PreProduction- Working in 3D Animation Production – Working in | | | | | |
| | 3D Animation Postproduction- Using Production Tools. | | | | | |
| | Understanding Digital Imaging and Video | | | | | |
| Unit III | Understanding Digital Imaging - Understanding Digital Video - Exploring | | | | | |
| | Animati | on, Story, and Pre-visi | ualization: Using Principles of Fine | Art and | | |
| | Traditio | nal Animation- Buildin | ng a Good Story - Using Pre-visi | ualization | | |
| | Techniq | ues. | | | | |
| Unit IV | Understanding Modeling and Texturing | | | | | |
| | Modeling: Polygons, NURBS, Subdivision Surfaces-Texturing: UVs,Texture | | | | | |
| | iviaps, i | exturing workhows- Rig | gging and Animation. | | | |
| | | | | | | |
| 11 | Underst | tanding Visual Effects, I | Lighting, and Rendering | T l- | 6 | |
| Unit V | Creating | g Visual Effects - Lightin rada: Chaosing a comp | ig - Rendering-Hardware and Softw | are loois | | |
| | Graphic | raue. Choosing a compo | are - Osing Wontors/Displays - Won | ding Data | | |
| | Storage | Solutions – Choosing So | oftware | | | |
| | 0101480 | | | | | |
| | | Practi | cal Component | | | |
| | 1. Im | plement the basic rend | lering techniques and effects | | 30 | |
| | 2. De | eveloping storyboards, s | scripts/screenplay, 3D Production lay | out for a | | |
| | sa | mple scene Ex: Friends | meeting at a bus stop | | | |
| | 3. Cr | eating 3D models of c | characters, props, and environment | s for the | | |
| | ab | ove scene | | | | |
| | 4. Ac | Iding visual effects to th | ne above scene | | | |
| Frenzisse | 5. Ac | ding texturing and min | imal animation to the above scene | | | |
| Exercises | 6. Se | etting up lighting and rer | adering scenes to achieve desired visu | a results | | |
| | TO | r early morning moon a | no night time happening of the abov | e scene | | |

| | 7. Animating the above scene when the friends board the bus and the bus | | | | | |
|---|--|--|--|--|--|--|
| | moves | | | | | |
| | 8. Developing an animated game | | | | | |
| | 9. Developing an animated story | | | | | |
| 10. Developing an animated virtual building tool | | | | | | |
| | | | | | | |
| Recommended Learning Resources | | | | | | |
| Print | 1. Andy Beane, "3D Animation Essentials", First Edition, Wiley & Sons, 2012. | | | | | |
| Resources | 2. Magesh Chandramouli, "3D Modeling & Animation: A Primer", CRC Press, 2021. | | | | | |
| | 3. Tony Mullen, "Introducing Character Animation with Blender", 2nd Edition, Wiley | | | | | |
| Publishers, 2011. | | | | | | |
| Syllabus design : Dr. T.Chithralekha, Professor, PUDoCS | | | | | | |
| Dr.S.L.Javalakshmi, Assistant Professor, PUDoCS | | | | | | |

SEMESTER IV

| Year | II | Course Code: CSIT206 | Course Code: CSIT206 Credits | | 4 | |
|--|---|---|-----------------------------------|--------------------|-----------|--|
| Com | | Course Title: Computer System Architecture Hours | | Hours | 75 | |
| sem. | IV | | | Category | / C | |
| Course Prerequisites, if any | • | Basic knowledge of Co | mputer and Digital Logic | | | |
| Internal | End S | emester Marks: 75 | Duration of ESA (Theory | /): 03 hrs. | | |
| Assessment | | Duration of ESA (Practical): 03 hrs. | | | | |
| Marks: 25 | | | | | | |
| Course Outcomes | • L | Inderstand the concept of | digital electronics and log | ic circuits | | |
| | • V | Working with binary and arithmetic operations | | | | |
| | • L | Inderstand the organizatio | on of CPU and working pri | nciples | | |
| | • L | Inderstand the Input-Outp | ut organization in a comp | uter | | |
| | • L | Inderstand the Memory or | rganization in a computer | | | |
| Unit No. | | Course | Content | | Hours | |
| | 1 | Theory Comp | onent | F | | |
| | Digita | al Logic Circuits | | | | |
| Unit I | Digita | I Computers - Logic G | ates - Boolean Algebra | - Map | 9 | |
| | Simpl | ification - Combinational | - Circuits - Flip-Flops - Se | quential | | |
| | Circui | ts - Digital Components | £ | | | |
| l Init II | Data | vpes - Complements - Eive | ter d - Point Penresentation - | Floating | ٥ | |
| Onth | Point | Representation - Regist | er Transfer - Bus and | Memory | 9 | |
| | Trans | fer - Arithmetic - Logic and | Shift Microonerations | wiemory | | |
| | | Organization | | | | |
| Unit III | Regist | ter and Stack - Instruction | Format - Addressing Mod | es - Data | 9 | |
| | Trans | fer and Manipulation - | Program Control - RISC | - Basics | 5 | |
| | of Pi | pelining | | | | |
| | Input | -Output Organization | | | | |
| Unit IV | Perip | heral devices - I/O Interfa | ce - Asynchronous data t | ransfer - | 9 | |
| | Mode | es of transfer - Priori | ty Interrupt - DMA | - Serial | | |
| | Comn | nunication | | | | |
| | Mem | ory Organization | | | | |
| Unit V | Memory Hierarchy - Main Memory - Auxiliary Memory - | | | 9 | | |
| | Assoc | iative Memory - Cache Me | emory - Virtual Memory - | Memory | | |
| | Mana | gement Hardware | | | | |
| | | Practical Comp | oonent | | | |
| List of Exercises | 1. S | implify Boolean expression | ns using Karnaugh maps. | | | |
| | 2. L | esign a combinational circ | Cuit | | | |
| | 3. 1 | mplementing Logical Left a | ind Right Shifts | alaulata | 20 | |
| | 4. 0 | omplements | a types and now to | laiculate | 50 | |
| | 5 F | ivaluate nerformance impr | ovement through instruct | ion level | | |
| | 5. Evaluate performance improvement through instruction level | | | | | |
| | 6 Analyze the effect of cache performance on system | | | | | |
| | performance | | | | | |
| | 7. Understand the impact of memory hierarchy on access time | | | | | |
| | • | Recommended Learn | ing Resources | L | | |
| Print Resources | 1 | . Morris Mano, "Comput | er System Architecture", | Pearson Ec | Jucation, | |
| | | 2017. | | | | |
| Syllabus Design: Dr. Sukhvinder Singh, Assistant Professor, PUDoCS | | | | | | |
| Year | II | Course Code: CSIT207 | | Credits | | 4 | |
|------------------------------------|--|--|---|---------------------------------|--------|---------------|--|
| Som | IV/ | Course Title: Design and | Analysis of Algorithms | Hours | | 75 | |
| Jeiii. | IV | | | Categor | 'Y | С | |
| Course Prerequisites, if any | • | Basic Knowledge of Dat | a Structures and Program | nming. | | | |
| Internal | End S | emester Marks: 75 | Duration of ESA (Theory | y): 03 hrs. | | | |
| Assessment | | | Duration of ESA (Praction | cal): 03 hr | s. | | |
| Marks: 25 | | | | | | | |
| Course Outcomes | • A a • U | Analyse the efficiency of algorithms and compare their perform appropriate metrics Understand the general approach of Brute Force and Divide ar | | | | ising quer | |
| | а | lgorithms | | | | | |
| | • U | Inderstand the principles o | of the Greedy Method in | algorithm | desigr | ۱ | |
| | • U | Inderstand the principles o | of Dynamic Programming | | | | |
| | • U st | Understand the principles of Backtracking and branch and bound strategies in algorithm design | | | | | |
| Unit No. | | Course | Content | | Ног | Jrs | |
| | | Theory Comp | onent | | | | |
| | Intro | duction | | | | | |
| Unit I | Notation of Algorithm - Analysis of Algorithm Efficiency - Asymptotic Notations and Basic Efficiency classes - Mathematical Analysis of Non-Recursive and recursive Algorithms | | | | 9 | | |
| Unit II | Divide and Conquer Brute Force and Divide and conquer - Binary Search – Finding the maximum and minimum – merge sort - quick sort- | | | 9 | I | | |
| Unit III | General method General method - Knapsack problem - Job Sequencing - Spanning Trees - Prims's Algorithm and Kruskal's Algorithm | | | 9 | I | | |
| Unit IV | Dyna Gene - 0/1 | mic Programming ral method - Principle of Knapsack - Travelling Sale | Optimality - Multistage sman Problem- | Graphs | 9 | 1 | |
| Unit V | Backt Backt Subse FIFO | tracking & Branch Bound tracking-General Method ets - Hamiltonian Cycles- Solution – LC Branch and B | – 8 Queen Problem - Branch and Bound: Intro Jound – 0/1 Knapsack | Sum of oduction | 9 | | |
| | | Practical Com | ponent | I | | | |
| | 1. V ti | Vrite recursive and iterati me complexities using Big | ve algorithms and analy -O notation | ze their | | | |
| Exercises | 2. In (e 3. In di 4. In | nplement and compare th e.g., bubble sort, quicksort nplement merge sort and ifferent input sizes nplement a greedy algorith nalyze its efficiency | e efficiency of sorting alg) on different input sizes analyze its time complex nm for the knapsack prob | orithms kity with lem and | 20 | n | |
| | 5. In sp 6. In | nplement Prim's algorithr panning tree nplement Kruskal's algori pmpare the results | n for finding the minimit | um cost ose and | 50 | , | |

| | Solve the 0/1 knapsack problem using dynamic programming and analyze the time complexity Implement a backtracking solution for the subset sum problem and analyze its efficiency | | | |
|--|---|--|--|--|
| Recommended Learning Resources | | | | |
| Print Resources | Horowitz, E. and Sahani, S, "Fundamentals of Computer Algorithms", Universities press, Second Edition, 2008. S.Sridar, , "Design and Analysis of Algorithms", Oxford University Press, 2014. | | | |
| Syllabus Design: Dr. T. Vengattaraman, Associate Professor, PUDoCS | | | | |

| Year | II | Course Code: CSIT208 Credits | | Credits | 4 |
|-------------------------------------|--|---|--|-----------|--------|
| | | Course Title: Database Ma | inagement | Hours | 75 |
| Sem. | IV | Systems | | Category | С |
| Course Prerequisite s, if any | • Knowle | dge of data structures, prog | ramming and file-ha | andling | |
| Internal Assessment Marks: 25 | End Semester N | End Semester Marks: 75 Duration of ESA (Theory): 03 h Duration of ESA (Practical): 03 | | | |
| Course Outcomes | Understand the fundamentals of relational Model Design real time applications using database query language (SQL) Familiarize with the different kinds of PL/SQL objects Understand the various database applications using the Relational ER model and EER model Construct and normalize conceptual data models | | | | model, |
| Unit No. | | Course Conter | nt | | Hours |
| | Introduction to | Relational model | t | | |
| Unit I | Structure of re diagram, Relati | lational database, Database onal Query language, Relatio | schema, Keys, Scher onal Algebra. | na | 9 |
| Unit II | Introduction to SQL SQL data definition, basic structure of SQL Queries, set operations, null values, aggregate functions, nested subqueries | | | 9 | |
| Unit III | Intermediate and advanced SQL Join expressions, views, transaction, integrity constraints, functions and procedures, triggers. | | | 9 | |
| Unit IV | Database design using ER model The Entity-Relationship model, complex attributes, mapping cardinalities, primary key, removing redundant attributes in entity sets, reducing ER diagrams to relational schemas, extended ER features. | | | 9 | |
| Unit V | Relational database design Decomposition using functional dependencies, normal forms, functional dependency theory, algorithms for decomposition using functional dependencies, decomposition using multivalued dependencies. | | | 9 | |
| | | Practical Compone | nt | | |
| Exercises | Implem Implem Implem Implem Implem Implem Implem Implem Implem Creatio Practice Create Create | nent the DDL commands usin nent the DML commands ment the DDL constraints, DC ment various built functions a ment the various join operationent the various nested subourners of and manipulation of View the basics of PL/SQL [contri- the functions and procedure the Triggers using PL/SQL | ng SQL CL, and TCL command and aggregate function ons queries s rol structures] es using PL/SQL | ls ons | 30 |

| | Recommended Learning Resources | | | |
|---|--|--|--|--|
| Print | 1. Abraham Silberschatz, Henry F. Korth and S.Sundarshan, "Database System | | | |
| Resources | Concepts ", Seventh Edition, McGraw Hill International Edition, 2021. | | | |
| | 2. Brumm.B, "Beginning Oracle SQL for Oracle Database 18c: From Novice to | | | |
| | Professional", First Edition, Apress, 2019. | | | |
| | 3. Kevin Loney, Bob Bryla , "Oracle Database 12c The Complete Reference", | | | |
| | First Edition, McGraw Hill, 2013. | | | |
| Syllabus design : Dr. T.Chithralekha, Professor, PUDoCS | | | | |
| | Dr.S.L.Jayalakshmi, Assistant Professor, PUDoCS | | | |

| Year | 11 | Course Code: CSIT209 | 9 | Credits | 4 |
|-------------------------------------|--|---|--|----------------------|----|
| Sem. | IV | | | Hours | 75 |
| | | Course Title: IT Infra | structure Management | Category | А |
| Course Prerequisit es, if any | • | Knowledge of IT infra | astructure | | |
| Internal Assessment Marks: 25 | End Se | mester Marks: 75 | Duration of ESA (Theory) :03 hrs | | |
| Course Outcomes | • • • • | Understand the funda Familiarize with the c Acquire skills in mana Gain knowledge of th Develop the ability to budgets for informati | amentals of IT infrastructure concepts current computing environment aging Information Systems ne ITIL library for IT infrastructure Mar o compute information system costs a ion systems | agement nd create | |
| Unit No. | | Cour | rse Content | Hours | |
| | - | Theo | ory Component | | |
| Unit I | IT Infra Definit System server growth issues, of com | astructure: Overview ions, Infrastructure m is since 1960s (Mainfr computing-to-New ag of internet, current complexity of today's iplexity issues, Value of | anagement activities, Evolutions of rames-to-Midrange-to-PCs-to-Client- ge systems) and their Management, business demands and IT systems computing environment, Total cost f Systems management for business. | 9 | |
| Unit II | IT Infra Factor infrast Systen applica manag system (ITIL). | astructure Managements to consider in de ructure, Determining con Components to ations, Tools and their gement, Introduction to as, Models, Informatio | nt esigning IT organizations and IT ustomer's Requirements, Identifying manage, Exist Processes, Data, integration, Patterns for IT systems o the design process for information n Technology Infrastructure Library | 9 | |
| Unit III | Currer Compl vendo owner | t computing environm exity of current compu rs, multiple users, e ship. | nent Iting, multiple technologies, multiple e- Waste disposal, Total cost of | 9 | |
| Unit IV | IT syst Comm organi manag Manag | em Management on tasks in IT syste zation Management, ement systems conte- gement. | em management, approaches for Models in IT system design, IT xt diagram, patterns for IT system | 9 | |
| Unit V | Establ Inform inform financi | ishing business value of ation system costs a ation system, Real Op al models. | of information system nd benefits, Capital budgeting for ptions pricing models, Limitation of | 9 | |
| | | Practical Co | omponent | | |
| Exercises | 1.Perf 2. Per and p 3. Pe Infras | forming capital budget form a study of recent repare report on the sa rform a study of wh tructure and prepare a | for Information Systems Gartner's report on IT infrastructure ame ite papers on recent trends in IT report on the same | | |

| | 4. Perform a study of IT Infrastructure Management consulting | |
|----------------|---|-----------------|
| | companies in India and Abroad and prepare a report on the same | |
| | 5. Perform a study of ITIL and prepare a report on the same | 30 |
| | 6. Perform a study of Five ITIL tools and prepare a report on the | |
| | same | |
| | 7. Perform a study of e-Waste disposal process/policy for Five IT | |
| | industries and prepare a report on the same | |
| | 8. Perform a study of IT infrastructure Management tools and | |
| | prepare a report on the same | |
| | 9. Perform a study of IT infrastructure Management Models and | |
| | and prepare a report on the same | |
| | 10. Perform a study of whitepapers and case studies on Real | |
| | Option Valuation and prepare a report on the same | |
| | Recommended Learning Resources | |
| Print | 1. Gupta, "IT Infrastructure & Its Management", Ta | ata McGraw-Hill |
| Resources | Education, 2010. | |
| | 2. Choubey, Manoj Kumar, "IT Infrastructure and Mana | gement: For the |
| | GBTU and MMTU", Pearson Education India, 2011. | |
| Syllabus desig | gn : Dr. T.Chithralekha, Professor, PUDoCS | |
| | Dr.S.L.Jayalakshmi, Assistant Professor, PUDoCS | |
| | | |

SEMESTER V

| Year | 111 | Course Code: CSIT301 | | Credits Hours | 4 | | |
|-------------------------------------|---|--|---|---|------------|--|--|
| Sem. | V | Course Title: Operating Syst | ems | Category | , с | | |
| Course Prerequisites, if any | • 1 | Knowledge of computers & co | nowledge of computers & computer organization | | | | |
| Internal Assessment Marks: 25 | End Sem | ester Marks: 75 | Duration of ESA (Theor Duration of ESA (Pract | ry): 03 hrs ical): 03 hrs | | | |
| Course Outcomes | • | To understand the basic conce To learn the various mechanism synchronization and deadlocks To understand how the memo To analyze various File System Evaluate system structures in v and Windows and identifying s | pts of Operating Systen ms of CPU scheduling, p ry is utilized methods and Disk sche various operating syster imilarities and differen | n and Process process duling algoritl ms, such as Lir ces | hms 1ux | | |
| Unit No. | | Course Content | | Hours | | | |
| Unit I | Overview Introduc systems Process processe | Theory Component w and Process management tion: Operating System Str services - System calls. Pro Concept – process sche ss-Inter process communicatio | nt uctures - Operating rocess Management: duling-operation on ns- Threads. | 9 | | | |
| Unit II | Scheduli CPU Sch Process Semapho Monitors Handling Deadlocl | ng algorithms and Process Syn eduling: Basic Concepts – So Synchronization: Critical ores - Classical problems s. Deadlock: Deadlock Char -Deadlock Prevention-Dea C Detection-Deadlock Recovery | nchronization cheduling Algorithms. Section problem – of synchronization- acterization-Deadlock adlock Avoidance- y. | 9 | | | |
| Unit III | Memory Main M Structure Demand | Management Iemory: Contiguous Memor e of the Page Table –Swapp Paging-Page Replacement-The | ry Allocation-Paging- ing. Virtual Memory: rashing. | 9 | | | |
| Unit IV | Storage Mass Storage concepts Protectio Structure | Management orage structure: Overview- HD management- RAID Structur 5 – Access methods – Direc on –File system Impleme e- File-System Operations- Allo | DD (Disk) Scheduling – e. File Systems: File tory Structure – File ntation- File-System ocation methods. | 9 | | | |
| Unit V | Case Stu The Linu process Linux Fi compone | dies ux system: Design principles management- Scheduling- M le System. Windows Operat ents- Windows File System. | s – kernel modules- emory Management- ing system: Systems | 9 | | | |

| | Practical Component | |
|-------------------|--|-------------------|
| | 1. Practice the file handling utilities, Process utilities, Disk | 30 |
| | utilities, and Networking commands (ipconfig, ping, | |
| | arp, route, netstat) | |
| | 2. Write a program to implement various system call | |
| | operations | |
| | 3. Write a program to demonstrate various File | |
| | management operations | |
| | 4. Write a program to simulate CPU scheduling algorithms: | |
| | FCFS, SJF, Round Robin, and priority | |
| | 5. Write a program to simulate Intra & Inter – Process | |
| Exercises | Communication (IPC) techniques: Pipes, Messages | |
| | Queues, and Shared Memory | |
| | 6. Write a program to simulate solutions to Classical | |
| | Process Synchronization Problems: Dining Philosophers, | |
| | Producer-Consumer, Readers – Writers | |
| | 7. Write a program to simulate the Bankers Algorithm for | |
| | Deadlock Avoidance | |
| | 8. Write a program to simulate Page Replacement | |
| | Algorithms: FIFO, Optimal, LRU | |
| | 9. Write a program to simulate the implementation of | |
| | HDD Scheduling Algorithms: FCFS, SCAN, C-SCAN | |
| | 10. Case study on Linux and windows Operating systems | |
| | Recommended Learning Resources | |
| | 1 Abraham Silberschatz Peter B Galvin G Gagne "Or | perating Systems |
| | Concents", 10th Edition, Addison Wesley, 2018. | Seruting Systems |
| Print Resources | 2. William Stallings, "Operating Systems: Internals and Design | Principles", 10th |
| | Edition. Prentice Hall. 2021. | |
| Syllabus design : | : Dr. T.Chithralekha, Professor, PUDoCS | |
| , j | Dr.S.L.Jayalakshmi, Assistant Professor, PUDoCS | |
| | | |

| Year | III | Course Code: CSIT302 | | Credits | 4 |
|----------------------|---|---|-----------------------|----------------|------|
| | | | | Hours | 75 |
| Sem. | V | Course Title: Mathematical Foundations of | | Category | Α |
| Course | | | | | |
| Prerequisites, if | | Knowledge of functions, algebra, | and pre-calculus | | |
| any | | | | | |
| Internal | End | Semester Marks: 75 Durati | on of ESA: 03 hrs. | | |
| Marks: 25 | | | | | |
| Course Outcomes | | Understand logical statement str | uctures | | |
| | | Apply operations in problem-solv | ving | | |
| | | Analyze integer representations | and congruences | | |
| | | Understand counting principles | | | |
| | | Evaluate combinatorial solutions | | | |
| Unit No. | | Course Content | | Hours | |
| | 1 | Theory Component | | | |
| | Logi | and Proofs | | 15 | |
| Unit I | Prop | ositional Logic – Predicates and Qu | iantifiers – Rules of | | |
| | Basi | Structures | ЗУ | 15 | |
| Unit II | Sets – Functions – Sequences and Summations– Matrices | | 15 | | |
| | Rela | tions – properties – representation | | | |
| | Num | ber Theory | | 15 | |
| Unit III | Divis | ibility and Modular Arithm | etic – Integer | | |
| | Repr | esentations and Algorithms – Pri | imes and Greatest | | |
| | Indu | ction and Recursion | | 15 | |
| | Mat | Mathematical Induction - Strong Induction and Well Ordering | | | |
| Unit IV | - Red | ursive Definitions and Structural Ind | uction | | |
| | | | | | |
| | Cour | nting | | 15 | |
| Unit V | Basic | hinations Rinomial Coofficients | Permutations and | | |
| | Com | binations – binomial coefficients | | | |
| | 1 | Practical Component | | | |
| | | - | | - | |
| | T | Recommended Learning Reso | urces | | |
| | - | L. Kenneth H. Rosen, "Discrete N | Mathematics and its | Applicatio | ns", |
| Print Pesources | | Seventh Edition, McGraw Hill, Se | "Discrete Mathema | tical Structu | iroc |
| Fint Resources | 4 | with Applications to Computer S | cience". Tata McGrav | v Hill., 2020. | JIES |
| | | | | ,, 2020 | |
| Syllabus design: Dr. | M.Sa | thya, Assistant Professor, PUDoCS | | | |

| Year | | Course Code: CSIT303 | | Credits | 4 |
|------------------------------------|---|--|--|------------------------------|----|
| Som | V | | | Hours | 75 |
| Sem. | v | Course Title: Computer Ne | tworks | Category | С |
| Course Prerequisites, if any | Fundam | entals of computers | | | |
| Internal Assessment | End Sen | nester Marks: 75 | Duration of ESA (Theor Duration of ESA (Practi | y): 03 hrs. cal): 03 hrs. | |
| Marks: 25 | | | | | |
| | • | Learn the basics of Network topology Learn about the various physical network media Understand the functionalities of all the network layers Familiarize the protocols of different layers Implement the various network protocols | | | |
| Unit No. | | Course Conten | it | Hours | |
| | - | Theory Componen | t | | |
| Unit I | Introduc Introduc Referen Switchir | ction ction to Networks, Topology, ce Models, Transmission ng | Network Architecture, Media-Multiplexing, | 9 | |
| Unit II | Data lin Design I Data, Lii | k layer Issues, Error Detection and C nk Protocols, Sliding window | Correction , Elementary Protocols | 9 | |
| Unit III | Networ Design I Vs IPV6 routing | k Layer ssues, Routing , Logical Addre 5, Address Mapping, deliv | essing, IP Working- IPV4 very, Forwarding and | 9 | |
| Unit IV | Transpo The Trai Flow Co Vs UDP | ort Layer nsport Service, Service provid ntrol & Buffering, TCP Conges | ed to the Upper Layers, tion Control, UDP , TCP | 9 | |
| Unit V | Applicat Domain Records Message | Application layer Domain Naming System, DNS Namespace, Resource Records, Name Servers, Electronic mail, Messages Formats, Message Transfer | | 9 | |
| | | Practical Compone | nt | | |
| Exercises | 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. | Implementation of Basic Cha Implementation of Multiple I Implementation of File Trans Implementation of Simple M Implementation of Client Ser Given IP address and subnet (i)Subnet addresses (ii) Numl subnet (iii IP addresses of ho Implementation of Error Det Correction Techniques Implementation of socket pr Procedure Call Implementation of any 1 rou Implementation of congestic | t User Chat mission ailing Application over Application mask, Computation of ber of hosts in each sts in each subnet ection / Error rogram Remote ting protocol on control protocol | 30 | |

| Recommended Learning Resources | | | |
|--------------------------------|--|--|--|
| | 1. Andrew S. Tanenbaum, David J. Wetherall, "Computer Networks", | | |
| | Fifth Edition, Prentice Hall publisher, 2022. | | |
| | 2. Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems | | |
| Print Resources | Approach", Fifth Edition, Morgan Kaufmann Publishers Inc., 2015. | | |
| | 3. James F. Kurose, Keith W. Ross," Computer Networking - A Top-Down | | |
| | Approach Featuring the Internet", Seventh Edition, Pearson | | |
| | Education, 2022. | | |
| Syllabus Design: Dr | . G. Krishnapriya, Assistant Professor, PUDoCS | | |

| Year | 111 | Course Code: CSIT304 | | Credits | 4 |
|-------------------------------------|--|--|---|----------------------------------|----|
| Som | V | Course Title: Remote Infrast | tructure Management | Hours | 75 |
| Sem. | v | | | Category | С |
| Course Prerequisites | • | Knowledge of Enterprise Infra Management | structure and Enterprise | Infrastructur | e |
| Internal Assessment Marks: 25 | End Ser | nester Marks: 75 | Duration of ESA (Theor Duration of ESA (Praction | /): 03 hrs al): 03 hrs | |
| Course Outcomes | Understand the concept of remote infrastructure matching Learn and use the various network monitoring tools | | | | 5 |
| | | Learn and use various application monitoring tools Learn and use various remote desktop and remote troubleshooti tools | | | |
| Unit No. | | Course Conte | nt | Hour | s |
| | | Theory Compo | nent | | |
| Unit I | Introdu Definit Benefit: Real-tin Monito (SNMP, Applica manage Chef, A | iction to Remote Infrastructur ion and scope of remote infi s and challenges of remote infi ne vs. traditional infrastructu ring Tools and Technologies- I WMI), System monitoring t tion performance monitor ement tools, Configuration ma nsible). | re Management rastructure management rastructure management re management, Remote Network monitoring tools cools (perfmon, Ganglia) ing (APM) tools, Log anagement tools (Puppet | 9 | |
| Unit II | Remote Remote scriptin (Micros | e Management Techniques e desktop protocols (RDP, S g for automation, Remo oft System Center, VMWare v | SSH), Secure Shell (SSH te administration tools Center). | 9 | |
| Unit III | Real-Tin Introdu real-tim mainten data. | me Data and Analytics for Infr ction to real-time data strean ne data for anomaly de nance, Visualization tools for | astructure Management ning and analytics, Use o tection and predictive real-time infrastructure | f 9 | |
| Unit IV | Trouble Identify trouble remote | eshooting Remote Infrastructuring common infrastructurshooting methodologies, To troubleshooting. | i re Issues re problems, Remote ols and techniques fo | 9 | |
| Unit V | Security Manage Implem for secu | y Considerations for ement- Securing remote enting access controls and pe- ure remote management. | Remote Infrastructure access connections ermissions, Best practices | 9 5 | |

| | Practical Component |
|-----------------|--|
| | 1. Using SNMP collect the data from various network |
| | components |
| | 2. Perform a study of WMI and prepare a report on the |
| | same. Also provide a comparison of SNMP and WMI |
| | 3. Perform a study on system monitoring tool Perfmon |
| | and monitor the system performance using the same |
| | 4. Perform a study on system monitoring tool Ganglia and |
| | monitor the system performance using the same |
| | 5. Perform a study on the various application monitoring |
| Exercises | tools and use any one tool to monitor the performance 30 |
| | of an application in your system |
| | 6. Perform a study on Free RDP tools and perform remote |
| | desktop operation |
| | 7. Perform a study on SSH tools and install and use putty |
| | 8. Perform a study on remote troubleshooting tools and |
| | use any disk tools and perform remote system |
| | troubleshooting |
| | 9. Perform a study of Nagios tools for infrastructure |
| | monitoring and install and configure the same for |
| | Infrastructure monitoring of your institution network |
| | 10. Perform a study of Zabbix tools for infrastructure |
| | |
| Duringt | Recommended Learning Resources |
| Print | 1. Russell J, Conn R, Remote Infrastructure Management , 2013. |
| Resources | 2. Unline courses on Remote Infrastructure Management: |
| | https://www.coursera.org/learn/remote-team-management |
| | 3. Vendor documentation on remote management tools: |
| | https://learn.microsoft.com/en-us/system-center/ |
| Syllabus design | n : Dr. T.Chithralekha, Professor, PUDoCS |
| | Dr.S.L.Jayalakshmi, Assistant Professor, PUDoCS. |

SEMESTER VI

| | | Course Code: CSIT306 | Credits | 4 | |
|-------------------------------------|--|---|----------|------------------------|--|
| Year | | Course Title: Management Strategies and Concepts | Hours | 75 | |
| Sem. | VI | | Category | А | |
| Course Prerequisites, if any | • | Basic knowledge of an organization and its functionin | ng | | |
| Internal Assessment Marks: 25 | End S | Semester Marks: 75 Duration of ESA (Theory): (|)3 hrs. | | |
| Course Outcomes | • | Understand the fundamentals of Management Theories Learn the management & communication Process Concepts Analyse the performance of decentralized and centralized organizational structures Analyse the different leadership styles and their effects on team performance and organizational culture Evaluate the effectiveness of the strategies in enhancing productivity | | | |
| Unit No. | | Course Content | Hours | | |
| | | Theory Component | | | |
| Unit I | Management TheoriesScience Theory and Practice - Management and Society:Social Responsibility and Ethics. The nature and purpose ofplanning - objectives - Strategies Policies and planning | | | | |
| Unit II | Decision Making Process of decision making- organizing- Nature and purpose of organizing – Basics of departmentalization - Line/Staff Authority and Decentralization - Effective Organizing and organizational structure & culture | | | | |
| Unit III | Human Resource Management & Selection Staffing-Manpower planning - Recruitment & Selection- 15 Performance appraisal and career strategy - Organizational development. 15 | | | | |
| Unit IV | Mana Moti | aging the Human factor vation - Leadership – Communication | 15 | | |
| Unit V | The System & Process of Controlling Control Techniques and Information Technology - Productivity and Operations Management - Overall and Preventive Control - Towards a Unified - Global Management Theory. | | | | |
| | | Recommended Learning Resources | • | | |
| Print Resources | 1. Herald Knootz and Heinz Weihrich, "Essentials of Management", Eleventh edition, McGraw-Hill Publishing Company, 2020. 2. Fred R. David and Forest R. David, "Strategic Management: Concepts and Cases", Prentice Hall India Learning Private Limited, Sixteenth Edition, 2020. | | | ent", cepts enth | |
| Syllabus design: I | Dr. S.L. | Jayalakshmi, Assistant Professor, PUDoCS | | | |

| Year | 111 | Course Code: CSIT307 | | | 4 |
|-------------------------------------|--|---|---|----------------|---|
| 6 | | Course Title: Software Engineering Theory a | Hours | 75 | |
| Sem. | VI | | Category | С | |
| Course Prerequisites, if any | • | Basic knowledge of programming and informa | ation systems | | |
| Internal Assessment Marks: 25 | End Serr | ester Marks: 75 Duration of E Duration of E | ESA (Theory): 03 ESA (Practical): 03 | hrs. 3 hrs. | |
| Course Outcomes | • • • • • | Understand the fundamental concepts of design thinking Analyze and document the software requirements Apply appropriate software engineering design concepts to develop software. Apply software testing strategies Understand and consider the significance of security in software | | | |
| Unit No. | | Course Content | | Hours | |
| | | Theory Component | | | |
| Unit I | Introdue Design p design p of a de existing Needs - of other | ction to Design Thinking process - Traditional design - Design thinking - rojects - Study on designs around us - Composi sign - Innovative design - Breaking of patte design problems - Principles of creativity Empa Insight-leaving from the lives of others/standin s - Observation. | Existing sample itions/structure erns - Reframe athy - Customer ng on the shoes | 9 | |
| Unit II | Software Engineering and Software Requirements Defining software engineering, Software life cycle models, Selection of a life cycle model - Requirements engineering, Types of requirements, Feasibility studies, Requirements elicitation, Requirement analysis, Requirement documentation, Requirement validation | | | 9 | |
| Unit III | Softwar Size esti Softward design, I | e Project Planning mation, Cost estimation, Models, Constructi e risk management, Software design, Modula Function oriented design, Object oriented des | ve cost model, rity, Strategy of ign. | 9 | |
| Unit IV | Testing Strategies S A strategic approach to software testing, Test strategies for conventional software, Black-Box and White-Box testing, Validation testing, System testing, The art of Debugging. S | | | 9 | |
| Unit V | Secure Software Engineering 9 Introduction - The problem – Software assurance and software security – Threats to software security – Software insecurity 9 Benefits of detecting software security defects early – Managing secure software development – Defining Properties – Influencing the security properties of software – To assert and specify desired security properties. 9 | | | | |
| | 1 Con | centualize a novel ann that will help to save: | 1 | 20 | |
| Exercises | a. b. c. | Energy Water Food | | 30 | |

| | 2. Apply the phases of Software Development Life Cycle for the following applications and develop the same : | | | | |
|---|---|--|--|--|--|
| | a. Library Management System | | | | |
| | b. Hospital Management System | | | | |
| | 3. Design the above two systems with security features and implement the same. | | | | |
| | Recommended Learning Resources | | | | |
| Tim Brown, "Change by Design: How Design Thinking Transfo Organizations and Inspires Innovation", 1^a edition, HarperCollins Publish Ltd, 2019. | | | | | |
| Print Resources | Roger S. Pressman, Bruce Maxim, "Software Engineering, A Practitioner's Approach", 9th edition, McGraw Hill International Edition, 2023. | | | | |
| | Julia H. Allen, "Software Security Engineering : A Guide for Project Managers", 1^a edition, 2008. | | | | |
| Syllabus Design: | Dr. T. Chithralekha, Professor, PUDoCS | | | | |
| | Dr. G. Krishnapriya, Assistant Professor, PUDoCS | | | | |

| Year | | III Course Code: CSIT308 Credits Course Title : Distributed Systems Credits | | Credits | 4 |
|-------------------------------------|---|--|---|---------------------------------|-------|
| Sem. | VI | | | Hours | 75 |
| | | | | Category | С |
| Course Prerequisites, if any | Basic | knowledge in Operating Syst | ems and Computer Ne | tworks | |
| Internal Assessment Marks: 25 | End Se | mester Marks: 75 Du Du | uration of ESA (Theory uration of ESA (Practica |): 03 hrs. als): 03 hrs. | |
| Course Outcomes | | Learn basic concepts of Distributed Systems Understand state-of-the-art distributed system Design and develop Client/Server Applications Setup fault tolerance and replication servers Design and implement CORBA and DCOM | | | |
| Unit No. | | Course Co | ontent | | Hours |
| | Theory Component | | | | |
| Unit I | Introd Definit Client/ Remot | uction ion – Goals – Hardware Server Model Communicati e Object Invocation – Messa | e and Software Cor ion – Layered Protoco age Oriented Communi | ncepts – bls RPC – cation | 9 |
| Unit II | Client Server Client Server and Naming Entity- Threads - Client Server – Code Migration – S/W Agents – Naming Entity – Location Mobile Entity. | | | 9 | |
| Unit III | Synchronization Distributed Transactions- Synchronization – Clock Synchronization – Logical Clocks – Global States – Election Algorithms – Mutual Exclusion – Distributed Transaction - Consistency and Replication– Data Centric Consistency –Fault Tolerance – Distributed Commit – Recovery | | | 9 | |
| Unit IV | Distributed Objects Distributed Object Database System: CORBA – DCOM – GLOBE. | | | 9 | |
| Unit V | Distributed File System Introduction- Distributed File System – Distributed Document Base System – WWW – Distributed Coordination Based System – JINI. | | | 9 | |

| | Practical Component | | | |
|--|--|----|--|--|
| Exercises | Perform arithmetic operation using RMI Calculate simple and compound interest using RMI Implementation of ATM using RMI Implementation of Telephone Directory using RMI Implementation of Quiz Server using Servlets Implementation of Online Shopping System using servlets Implementation of Matrimonial System using servlets Implementation of servlet based Airline Reservation System Create a Word Document with text using DCOM and Visual Basic | 30 | | |
| | Recommended Learning Resources | | | |
| Print Resources 1. Andrew S. Tanenbaum, Maarten van Steer, Distributed Systems Principle and Paradigms, Third edition, Prentice Hall India, 2017. 2.George Couloursis, Jean Dollomore and Tim Kinderberg, Distribute Systems - Concepts and Design, Addison-Wesley, Fifth edition, 2011. | | | | |
| Syllabus Design: Dr.T.Sivakumar, Assistant Professor, PUDoCS | | | | |

| Year | III | Course Code:CSIT309 Credits | | | 4 |
|--|---|--|-----------------------------|-----------|----|
| Sem. | | | | Hours | 75 |
| | VI | Course Title: Operations Re | search | Category | Α |
| Course Prerequisites, if any | Basic Mathematical and Problem Solving Skills | | | | |
| Internal | End Sem | ester Marks: 75 | Duration of ESA (Theory) | : 03 hrs. | |
| Assessment | | | | | |
| Marks: 25 | | | | | |
| Course | Under | rstand and comprehend the b | asics of Linear Programing | g Problem | |
| Outcomes | (LPP) | | | | |
| | • Learn | LPP solving methods and expl | ore duality in LPP | | |
| | • Solve a | assignment problem and their | variants | | |
| | • Find th | ne feasible and optimal soluti | ons for transportation pro | blems | |
| | Perfor | m critical path analysis and re | viewing of a project | | |
| Unit No. | | Course Conter | nt | Hours | |
| | | Theory Compone | ent | | |
| | Introduc | tion | | | |
| Unit I | Operatio – Appli | 15 | | | |
| | compon | ents of LPP – Steps in solving I | LPP. | | |
| | LPP | | | | |
| | Mathem | atical formulation – Graph | ical method – Simplex | | |
| Unit II | method – Artificial variables – Big-M method - Two-phase 15 | | | | |
| office in | method | Degeneracy and unbound s | olutions – Duality in LPP | | |
| – Formulation – Relationship between primal and dual | | | | | |
| | problems. | | | | |
| 11 | Assignment Model | | | | |
| Unit III | | 15 | | | |
| | Transno | rtation Broblem | | | |
| Lipit IV | Mathematical formulation – Finding basic feasible solutions – 15 | | | | |
| Oniciv | NWCR. I CM and VAM – Optimal solution – MODI method | | | | |
| | Network | c Scheduling | | | |
| | Introduc | tion – Basic components – Lo | gical sequencing – Rules | | |
| | of netwo | ork construction – Concurrent | Activities – Critical Path | 15 | |
| Unit V | Analysis | -Activity Time and Floats – | Project Evaluation and | | |
| | Review 1 | Fechnique (PERT) – Three Time | e Estimates – Critical Path | | |
| | Analysis | of PERT network – Proba | bility of completion of | | |
| | Project. | | | | |
| | Practical Component | | | | |
| | | - | | | |
| | | Recommended Learning | Resources | | |
| | 1. | Kanti Swarup, P.K. Gupta, Mai | n Mohan, "Operations Res | search", | |
| Print Resources | | 20th Edition, Sultan Chand & S | Sons, 2023. | | |
| | 2. Taha H.A., "Operations Research: An Introduction", 10th Edition, | | | | |
| | | Pearson Education, 2019. | | | |
| Syllabus Design: | Dr. G. Kris | shnapriya, Assistant Professo | r, PUDoCS | | |
| Revised by : Dr. I | VI. Nandhi | ni, Professor, PUDoCS | | | |

| | III | Course Code: CSIT310 | | Credits | 4 |
|----------------|---|--|---------------------------------------|----------|----|
| Year | | | | Hours | 75 |
| Sem. | VI | Course Title: Cry | ptography and | Category | C |
| | | Cybersecurity | | | |
| Course | • | Knowledge of cor | nputer networks and program | nming | |
| Prerequisites, | | - | | - | |
| if any | | | | | |
| Internal | End Semester Marks: | | Duration of ESA (Theory) : | 03 hrs. | |
| Assessment | 75 | | Duration of ESA (Practical) : 03 hrs. | | |
| Marks: 25 | | | | | |
| Course | Understand the basics of Information security and threats | | | | |
| Outcomes | Learn the various security cryptosystems | | | | |
| | Comprehend the various types of data integrity and authentication schemes | | | | |
| | Analyse the various network security protocols | | | | |
| | • Un | Understand Network and Operating System Security | | | |

| Unit No. | Course Content | Hours | | |
|-----------|---|-------|--|--|
| | Theory Component | | | |
| | Introduction to Cryptography and attacks | | | |
| Unit I | Discussing Security Issues - Attacks and its types – Threats, vulnerabilities and Risk - risk management – Incident response and Defense in depth. | 9 | | |
| Unit II | Cryptography The History of Cryptography - Modern Cryptographic Tools - Protecting Data at Rest, in Motion, and in Use – Symmetric Key algorithms and AES: Algorithmic types and modes - DES - IDEA – Asymmetric Key Algorithms: Overview - RSA – Digital Signatures | 9 | | |
| | Authorization and Access Controls | | | |
| Unit III | Definition - Implementing Access Controls - Access Control Models - Auditing and Accountability : Accountability Security Benefits of Accountability – Auditing | 9 | | |
| | Cryptographic Protocols | | | |
| Unit IV | basics – Kerberos – Firewalls – IP security – VPN – Intrusion | 9 | | |
| Unit V | Network and Operating System SecurityHuman element Security – Physical threat Identification and control,Protecting- people, data and equipment – Designing secure network usingfirewall and IDS – Protecting Network traffic using network security tools -Mobile, Embedded, IoT Security. | | | |
| | Practical Component | | | |
| | Perform encryption, decryption using Caesar cipher substitution techniques Perform encryption, decryption using Hill cipher substitution techniques Perform encryption and decryption using following transposition techniques Rail fence row & Column Transformation Apply the DES algorithm for practical applications. | | | |
| Exercises | Apply the AES algorithm for practical applications. Implement the RSA Algorithm Implement the Diffie-Hellman Key Exchange algorithm for a given problem Calculate the message digest of a text using the SHA-1 algorithm Implement the SIGNATURE SCHEME – Digital Signature Standard Installing and Configuring Opensource Firewalls and IDS | 30 | | |

| | Recommended Learning Resources | | | | |
|---|---|--|--|--|--|
| Print | 1. Jason Andress, "Foundations of Information Security - A Straightforward | | | | |
| Resources | Introduction", William Pollock Publisher, 2019. | | | | |
| | 2. Atul Kahate, "Cryptography and Network Security", McGraw Hill Education, 2019. | | | | |
| Syllabus design : Dr. T.Chithralekha, Professor, PUDoCS | | | | | |
| Dr.S.L.Jayalakshmi, Assistant Professor, PUDoCS | | | | | |
| | | | | | |

| | 1 | | | г | | | |
|---------------|---|--|---|------------------|----------------|--|--|
| Year | ш | Course Code: CSIT311 Creat Course Title: Artificial Intelligence and Machine Hou | | Credits | 4 | | |
| | | | | Hours | 75 | | |
| Sem. | VI | Learning | | Category | С | | |
| Course | • | Knowledge of Algorithms and Python programming | | | | | |
| Prerequisites | | | | | | | |
| , if any | - | | | | | | |
| Internal | End Se | emester Marks: 75 | Duration of ESA (Ineory) : 03 hrs | | | | |
| Marks: 25 | | | Duration of ESA (Practical) . 05 ms | | | | |
| Course | • Ur | nderstand the basic | concepts, principles, and techniques | of artificial in | telligence and | | |
| Outcomes | m | achine learning | | | | | |
| | • De | evelop critical thinki | ng and problem-solving skills in the co | ontext of AI ar | nd ML | | |
| | • Ap | oply AI and ML techr | hiques to solve real-world problems ir | າ various dom | ains | | |
| | • Ga | ain hands-on experie | nce implementing and experimenting | g with AI and | ML algorithms | | |
| | an | id models | | - | C | | |
| | • Le | arn the unsupervise | d algorithms | | | | |
| | | | | | | | |
| Unit No. | | | Course Content | | Hours | | |
| | | | Theory Component | | | | |
| | | | | | | | |
| Unit I | Overvi | Overview of Artificial Intelligence 9 | | | | | |
| | History | History- goals-applications. Intelligent agents: Perception –reasoning -action. | | | | | |
| | Proble | Problem-solving techniques: Search algorithms -heuristic search- game playing. | | | | | |
| Unit II | Knowledge Representation and Reasoning 9 | | | | | | |
| | Logica | Logical agents- Propositional logic- first-order logic. Knowledge representation: | | | | | |
| | chaining- Statistical reasoning | | | | | | |
| Unit III | Pvtho | n libraries | | | | | |
| | Introd | uction-NumPy, Pano | las, Scikit learn - Machine learning wi | th Python – | | | |
| | Cleaning up, Wrangling, Analysis, Visualization - Matplotlib package – Plotting | | | | | | |
| | Graphs. | | | | | | |
| Unit IV | Machi | ne Learning Fundan | nentals | | 9 | | |
| | Introd | uction to machine i | earning: Types of learning- supervise | a -unsupervis | sed | | |
| | KNN-S | VM Ensemble me | thods (random forest gradient h | oosting) Mo | del | | |
| | selecti | on and evaluation- | mplementing Machine Learning algo | rithms in Pyth | on | | |
| Unit V | Unsup | ervised Learning | | · | 9 | | |
| | Cluste | ring algorithms: | K-means, hierarchical clustering. | Dimensiona | lity | | |
| | reduct | ion: Principal compo | onent analysis (PCA). Model selection | and evaluation | on. | | |
| | | | Practical Component | | | | |
| | 1. | Implement the Wa | ater-Jug problem using BFS and DFS a | pproaches. | | | |
| | 2. | Implement the A* | and AO* algorithms for the Travellin | g Salesman | | | |
| | 2 | Problem. | | | | | |
| | 5. | implement the Alp | ona-Beta Pruning algorithm to play th | e IIC-1aC-10e | | | |
| | 4. | Implement unifica | tion and resolution for real-world pro | blems. | | | |
| | 5. | Implement linear | regression using Python. | | | | |
| Exercisers | 6. | Build and evaluate | classification models using KNN and | SVM. | 30 | | |
| | 7. Implement Ensemble Learning with Random Forests. | | | | | | |

| | 8. Implement clustering algorithms in Python. 9. Implement Dimensionality Reduction with PCA. 10. Apply AI/ML techniques to solve a real-world problem. |
|-----------------|---|
| | Recommended Learning Resources |
| Print | 1. Stuart Russell and Peter Norvig, "Introduction to Artificial Intelligence", 4th Edition, |
| Resources | Pearson, 2021. |
| | 2. Christopher M. Bishop, "Pattern Recognition and Machine Learning", Springer, 2016. |
| | 3. Aurelien Geron, "Hands-On Machine Learning with Scikit-Learn, Keras & |
| | TensorFlow", Third Edition, Shroff/O'Reilly, 2022. |
| Syllabus design | n : Dr. T.Chithralekha, Professor, PUDoCS |
| | Dr.S.L.Javalakshmi, Assistant Professor, PUDoCS |

SEMESTER VII

| Year | IV | Course Code : CSIT401 | | Credits | 4 |
|--------------------------------------|---|---|--|---|----------|
| Sem. | VII | Course Title : Web Engineering Hours | | Hours | 75 |
| | | | | Category | С |
| Course Prerequisites, if any | • | Knowledge of progra | mming | | ! |
| Internal Assessment Marks : 25 | End Semester Marks : 75 Duration of ESA (Theory) : 03 hrs. Duration of ESA (Practical) : 03 hrs. | | | | |
| Course Outcomes | Understand the process of web publishing Acquire skills developing web pages using HTML Acquire skills to style the web pages using CSS Acquire skills to build server side web components Explore the mobile web development process | | | | |
| Unit No. | | Cours | e Component | | Hours |
| | | Theory Co | mponent | | |
| Unit I | Introd Introd Unifo | duction to World Wide N duction to web publish rm Resource Locators - I | Web ing - Web browsers Using browser based | s - Web servers - I developer tools. | 9 |
| Unit II | Introduction to HTML and CSS Structuring a web page with HTML - Basic elements - Lists - Links - Tables - Images - Forms. Using CSS to style a site - CSS for positioning - Integrating Multimedia elements. | | | 9 | |
| Unit III | Introduction to JavaScript The structure - Operators - Variables - Control structures - Functions - Arrays - Objects - Validation. | | | 9 | |
| Unit IV | Introd Settin librar email | duction to PHP Ig up the server - PHP y functions - using inclu - cookies and sessions-F | language basics - b des - database conn File uploads. | uilt-in functions - nectivity - sending | 9 |
| Unit V | Mobi Mobil layou mobil | le Web le browsing needs - tex t - links - images and mu e features - Best practic | kt on mobile web - Iltimedia - CSS for mo es. | design and page obile - making use | 9 |
| | | Practical Co | omponent | | |
| Exercises | 1. 2. 3. 4. 5. 6. 7. 8. 9. | Build your resume us Enrich your resume w Implement an HTML I Build a web application JavaScript Add a server side com Build a server side da Build a web application | ing simple static htm vith CSS Form with javascript on to demonstrate ev nponent to the task # ta storage web appli on to demonstrate se on to demonstrate co eb application | l validation vent handling in #3 cation ession handling pokies handling | 30 |

| | 10. Implement file uploads in a web application | | | |
|--|--|---------------------|--|--|
| Recommended Learning Resource | | | | |
| Print Resources | Laura Lemay, Rafe Coburn, Jennifer Kyrnin, "Sams Teach HTML, CSS & Javascript Web Publishing", Pearson Education | n yourself 2016. | | |
| Syllabus design: Dr.K.S.Kuppusamy, Associate Professor, PUDoCS | | | | |

| Vear | IV | Course Code: CSIT402 | | Credits | 4 |
|-------------------------------------|---|--|---|---|-------|
| | 10 | | | Hours | 75 |
| Sem. | VII | Course Title: System Mode | eling and Simulation | Category | C |
| Course Prerequisites, if any | • | Knowledge of computers, m | athematics and programr | ning | |
| Internal Assessment Marke: 25 | End Sen | nester Marks: 75 | Duration of ESA (Theory Duration of ESA (Practic |): 03 hrs. al): 03 hrs. | |
| Course | | Lindorstand the fundaments | le of modoling and simula | tion | |
| Outcomes | • | Understand the fundamenta | als of modeling and simula | | |
| Outcomes | • | Learn about statistical mode | eis and input modeling | | |
| | • | Dorform the simulation of d | | ation | |
| | • | Verify the simulation model | | | |
| Linit No | • | | S Contont | | Hours |
| Unit NO. | | Course C | ontent | | HOUIS |
| | Introdu | ction | | | |
| Unit I | Simulat of appli system- of Mode - Gener | ion tool - Advantages and di ication- Systems and system - Discrete and continuous sy els - DESS Simulation examp al Principles. | sadvantages of Simulatio environment - Compone stems - Model of a system le - Simulation of queuing | n - Areas ents of a m- Types systems | 9 |
| Unit II | Statistical Models in Simulation Review of terminology and concepts - Useful statistical models - Discrete distributions - Continuous distributions - Poisson process - Empirical distributions - General Principles - Characteristics of queuing systems - Queuing notation - Long-run measures of performance of queuing systems - Steady-state behavior of M/G/1 queue - Networks of queues. | | | | 9 |
| Unit III | Random-Number Generation Properties of random numbers - Generation of pseudo-random numbers - Techniques for generating random numbers - Tests for Random Numbers - Inverse transform technique Acceptance -Rejection technique. | | | | 9 |
| Unit IV | Input N Data Co estimat process Series i analysis and the | Iodeling ollection - Identifying the di ion - Goodness of Fit Tests - Selecting input models wit input models -Types of sin - Stochastic nature of outpu ir estimation. | stribution with data - Pa - Fitting a non-stationary thout data – Multivariate nulations with respect to it data - Measures of perf | arameter / Poisson & Time - o output ormance | 9 |
| Unit V | Simulat Measur termina Verifica verificat Calibrat | tion Models res of performance and thei ating simulations - Output an tion, Calibration And Validati tion and validation - Ver tion and validation of models | r estimation - Output an alysis for steady state sim on - Optimization, Model ification of simulation r , Optimization via Simulat | alysis for ulations- building, nodels - :ion. | 9 |

| | Practical Component | | | | |
|------------------|---|----|--|--|--|
| | 1. Simulation of Random Numbers generation | | | | |
| | Implement Chi-square goodness-of-fit test | | | | |
| | 3. Implement One-sample Kolmogorov-Smirnov test | | | | |
| | 4. Implement Test for Standard Normal Distribution | 30 | | | |
| Evensione | 5. Implement Monte-Carlo Simulation | | | | |
| Exercises | 6. Simulation of Single Server Queuing System | | | | |
| | 7. Simulation of Two-Server Queuing System | | | | |
| | 8. Simulate and control a conveyor belt system | | | | |
| | 9. Implement Two-sample Kolmogorov-Smirnov test | | | | |
| | | | | | |
| | Recommended Learning Resources | | | | |
| | 1. Jerry Banks, John S. Carson II, Barry L. Nelson, David M. Nicol, "Discrete-Event | | | | |
| Print Resources | System Simulation", 5th Edition, Pearson Education, 2013. | | | | |
| | 2. Lawrence M. Leemis, Stephen K. Park "Discrete – Event Simulation: A First | | | | |
| | Course", Pearson Education, 2013. | | | | |
| Syllabus Design: | Dr. G. Krishnapriya, Assistant Professor, PUDoCS | | | | |

| Year | IV | Course Code: CSIT40 Course Title: Wireless | 3 Communication Networks | Credits | 4 |
|-------------------------------------|--|--|--|---|------|
| Sem. | VII | | | Hours | 75 |
| | | | | Category | С |
| Course Prerequisites, if any | | Knowledge of cc | omputer networks | | - |
| Internal Assessment Marks: 25 | End Sem | ester Marks: 75 | Duration of ESA (Theory): 03 hrs. Duration of ESA (Practicals): 03 hr | S. | |
| Course Outcomes | Understand basics of Wireless Communication Networks Understand the Satellite Communications concepts and compare various generations of wireless communications Explore the IEEE 802.11 WLAN standard Explore WAP and its application Understand Wireless LAN technologies | | | the | |
| Unit No. | | Cou | rse Content | н | ours |
| | | Theory Co | mponent | | |
| Unit I | Introduc Wireless Antenna Encoding Signals, A | tion Communication Tecl s, Propagation Modes, F g Techniques- Signal E Analog Data-Analog Sign | hnology- Antennas and Propag Fading in the Mobile Environment. Encoding Criteria, Digital Data- A als, Analog Data-Digital Signals. | gation- Signal Analog | 9 |
| Unit II | Satellite Communications Wireless Networking - Satellite Communications- Satellite Parameters and Configurations, Capacity Allocation-Frequency Division, Capacity Allocation-Time Division Cellular Wireless Networks- Principles of Cellular Networks, First-Generation Analog, Second-Generation - TDMA, CDMA, 3G Systems. | | | ers and apacity cellular CDMA, | 9 |
| Unit III | Wireless Evolution Descripti Physical Applicati | Wireless Lan Standards Evolution of IEEE 802.11- Introduction to IEEE 802.11 -General Description- Medium Access Control (MAC) for the IEEE 802.11 -WLANs Physical Layer for IEEE 802.11 -WLANs; Radio Systems -IR Systems Applications. | | | 9 |
| Unit IV | Mobile IP Introduction, operation of Mobile IP, Mobile IP terminologies, Wireless Access Protocols: Introduction, Architecture overview, Wireless application environment. | | | ireless ireless | 9 |

| Unit V | Wireless LAN Technology Wireless LAN- application, requirements, Technology: Infrared, spread spectrum, Narrowband microwave (radio), Introduction Bluetooth Technologies (Only Overview). | | | | |
|--|--|----|--|--|--|
| | Practical Component | | | | |
| Exercises | Study about different Wireless devices like Wi-Fi Dongler, Wireless Access Point, Antenna, Wi-Fi Router Simulate BlueTooth Communication after pairing Simulate a scenario for MANET in NS2 Study and analyse the performance of AODV routing protocol using NS2 Study and analyse the performance of DSR routing protocol using NS Study and analyse the performance of ZRP routing protocol using NS2 | 30 | | | |
| Recommended Learning Resources | | | | | |
| Print Resources | 1. William Stallings, "Wireless Communications and Networks" 2nd edition, Pearson Prentice Hall, 2008. | ł | | | |
| Syllabus Design: Dr.T.Sivakumar, Assistant Professor, PUDoCS | | | | | |

| Year | IV | | Course Code: CSIT404 | | Credits | | 4 |
|--|---|---|---|---|--|----------------------------|----|
| | | | Course Title: Cloud Computing Hours | | Hours | | 75 |
| Sem. | VII | | | | Category | , | С |
| Course Prerequisite any | es if | • | Knowledge of Distributed Sy | stems and Database | S | | |
| , Internal Assessment Marks: 25 | End Semester Marks: 75 Duration of ESA (Theory): 03 ent Duration of ESA (Practical): 0 | | | neory): 03 ractical): 0 | hrs. 3 hrs. | | |
| Course Outcomes | | • | Understand cloud computing's evolution and characteristic Comprehend the architecture of cloud computing and different between Infrastructure as a Service (IaaS) and Software as (SaaS) Recognize PaaS features and examples Compare scaling hardware using SLAs and billing principles Evaluate cloud security measures | | | s rentiate a Service | |
| Unit No. | | | Course Com | ient | | Hou | rs |
| Unit | I | Intro Overv Grid C Comp Clouc Clouc comp | duction view of Computing Paradigm - F Computing, Cluster Computing, E Duting, Cloud Computing - Evo d Computing (NIST Model) Chara d Computing, Cloud computing v Duting - Role of Open Standards. | Recent trends in Cor Distributed Computin Iution of cloud con acteristics - Pros and rs. Cluster computing | nputing - ng, Utility nputing - d Cons of g vs. Grid | 9 | |
| Unit I | | Infrastructure as a Service (IaaS) & Software as a Service SaaS Cloud Computing Architecture - Cloud computing stack - Service Models (XaaS) - Deployment Models. Infrastructure as a Service (IaaS) – Introduction - Virtualization, Hypervisors, Machine Image, Virtual Machine (VM) - Examples | | | 9 | | |
| Unit II | I | Platfo Platfo Mana Softw OS - (| orm as a Service (PaaS) orm as a Service (PaaS) - Introd agement –Examples, Microsof vare as a Service - Introduction - V Case Study on SaaS. | luction - Cloud Plati t Azure, SalesFord Web services - Web 2 | form and ce.com - 2.0 - Web | 9 | |
| Unit IV | / | Servie Servie Agree Harde & Clo | ce Management in Cloud Comp ce Management in Cloud C ements (SLAs) - Billing & Acco ware: Traditional vs. Cloud - Eco oud Services. | uting Computing - Servio Comparing Comparing Comparing - Comparing Comparing - Second - Second Comparison - Second - Second Comparison - Second - Second Comparison - Second - Second Comparison - Second | ce Level g Scaling ccalability | 9 | |
| Unit V | | Cloud Cloud - Data Acces | J Security J Security - Infrastructure Securit a privacy and security Issues, Jur ss Management - Access Control | ty - Data security and isdictional issues - Io - Trust, Reputation, | d Storage dentity & Risk. | 9 | |
| | | | Practical Compo | onent | | | |
| | | 1 2 3 | Install Virtualbox/VMware flavours of linux or windows Install a C compiler in the vivirtual box and execute Simp Install Google App Engine. C other simple web application | Workstation with OS on top of windov rtual machine creat le Programs Create 'hello world' s using python/java | different vs7 or 8 ted using app and | | |

| Exercises | 4. | Use GAE launcher to launch the web applications | 30 | | |
|---|----|---|--------------|--|--|
| | 5. | Simulate a cloud scenario using CloudSim and run a | | | |
| | | scheduling algorithm that is not present in CloudSim | | | |
| | 6. | Find a procedure to transfer the files from one virtual | | | |
| | | machine to another virtual machine | | | |
| | 7. | Find a procedure to launch virtual machine using trystack | | | |
| | | (Online Openstack Demo Version) | | | |
| | 8. | Install Hadoop single node cluster and run simple | | | |
| | | applications like word count | | | |
| Recommended Learning Resources | | | | | |
| Print | 1. | Rajkumar Buyya, James Broberg, Andrzej Goscinski, "Clou | d Computing: | | |
| Resources | | Principles and Paradigms", First Edition, Wiley, 2013. | | | |
| | 2. | Ronald L. Krutz, Russell Dean Vines, "Cloud Security: A C | omprehensive | | |
| | | Guide to Secure Cloud Computing", First Edition, Wiley, 202 | 10. | | |
| Syllabus design: Dr. M. Sathya, Assistant Professor, PUDoCS | | | | | |

| Year | IV | | | Credits | 4 |
|-------------------------------------|--|---|--|---|----------|
| Sem. | VII | Course Code: CSI Course Title : Big | Hours | 75 | |
| | | Ca | | | C |
| Course Prerequisites if any | | Knowled | ge of Database Management Syste | ems | |
| Internal Assessment Marks: 25 | End Se 75 | mester Marks: | Duration of ESA (Theory) : 03 Duration of ESA (Practical) : 03 | hrs. hrs. | |
| Course Outcomes | • | Learn about Big Knowledge abou To get deep insig To understand B To describe the r | Data types, features, analysis and It Hadoop and NoSQL ghts into Data lakes Ig Data applications in healthcare role of Big data in Social media an | applications and fraud de d research di | etection |
| Unit No. | | | Course Content | | Hours |
| Unit I | Overvi Types Wareh Integra Applica Compa | and Evolution of E ouse, Advantages ation – Storing, ations of Big Data arison of Data Anal | Big Data - Characteristics - Big Da and Disadvantages of Big Data Maintaining and Analysis of B Analytics - Types of Big Data ytics Stages | ta Vs Data - Big Data Jig Data - Analytics - | 9 |
| Unit II | Hadoo Comp Proces Spark - Storag Databa NoSQL | Hadoop Ecosystem Components of the Hadoop Ecosystem - Data Storage - Data Processing - Data Access - Data Management Component - Apache Spark - NoSQL Databases: Introduction - Types – Key-Value Pair Based Storage - Column-Oriented, Document-Oriented, Graph-Based Databases - BASE Model of NoSQL - Advantages and Disadvantages of NoSQL. | | | 9 |
| Unit III | Data L Introdu Challer Differe Best P | Data Lakes Introduction - Data Lake Architecture - Usage of Data Lakes - Data Lake Challenges - Data Lake Advantages and Disadvantages - Lake House - Difference between Data Warehouses - Data Lakes and Lake Houses - Best Practices Regarding Data Lakes. | | | 9 |
| Unit IV | Big Data Applications Big Data for Healthcare - Introduction - Benefits and Challenges in Implementing Big Data in Healthcare. Big Data Analytics for Fraud Detection: Types of Fraud - Detection and Prevention – Benefits, Applications and Issues in Implementing Big Data Analytics for Fraud Detection. | | | | 9 |

| | Big Data Analytics in social media | |
|-----------------|--|------------|
| | Types of Social Media Platforms - Social Media Statistics - Applications | |
| | of Big Data Analytics in social media - Key Challenges Novel | |
| Unit V | Applications and Research Directions: Education – Agriculture – | 9 |
| | Entertainment - Manufacturing - Renewable Energy - Finance - Sport - | |
| | Politics | |
| | | |
| | Practical Component | |
| | 1. Install, configure and run python, NumPy and Pandas | |
| | 2. Install, configure and run Hadoop and HDFS | |
| | 3. Visualize data using basic plotting techniques in Python | |
| | 4. Implement NoSQL Database Operations: CRUD operations, | |
| | Arrays using MongoDB | |
| | Implement Functions: Count – Sort – Limit – Skip – Aggregate using MongoDB | |
| | 6. Implement word count / frequency programs using | |
| | MapReduce | |
| Exercises | 7. Implement a MapReduce program that processes a dataset | 30 |
| | 8. Implement clustering techniques using SPARK | |
| | 9. Implement an application that stores big data in MongoDB / | |
| | Pig using Hadoop / R | |
| | 10. To explore the applications of big data analytics in social | |
| | media for decision-making and strategic planning | |
| | Recommended Learning Resources | |
| Print | 1. Mohd. Shahid Husain, Mohammad Zunnun Khan and Tamanna | |
| Resources | Siddiqui, "Big Data Concepts, Technologies and Applications", F | irst |
| | edition, CRC Press, , 2024 . | |
| | 2. Jules J. Berman, "Principles and Practice of Big Data: Preparing, | , Sharing, |
| | and Analyzing Complex Information", 2nd edition, Elsevier Scie | nce & |
| | Technology, 2018. | |
| Syllabus design | : Dr. T.Chithralekha, Professor, PUDoCS | |
| | Dr.S.L.Jayalakshmi, Assistant Professor, PUDoCS | |
| | | |
| Year | IV | Course Code: CS | IT406 | Credits | 4 | | |
|-------------------------------------|--|--|---|--|-------|--|--|
| Sem. | VII | | | Hours | 75 | | |
| | | Course little : Bio | | Category | С | | |
| Course Prerequisites, if any | • | • Knowledge of programming, cybersecurity and cryptography | | | | | |
| Internal Assessment Marks: 25 | End Se 75 | mester Marks: | Duration of ESA (Theory) : 03 hrs. Duration of ESA (Practical) : 03 hrs. | | | | |
| Course Outcomes | Un Eva De Exp Un | derstanding the fu aluating and select ploying blockchair ploring the role of derstanding the u | Indamentals and importance of blockc ing the appropriate blockchain platfor in tools and getting started with Chain of blockchain in smart city development se of Blockchain in Fintech | hain technolog m on Azure | 39 | | |
| Unit No. | | | Course Content | | Hours | | |
| | | | Theory Component | | | | |
| Unit I | Introdu Structu Force Substar Hands- Exchan | Introducing Blockchain Structure of Blockchain-Blockchain Applications-Blockchain Life Cycle-Driving Force of Blockchains-Blockchains in Use-Picking a Blockchain-Adding Substance-Determining Needs-Defining Goals-Choosing a Solution-Getting Hands-on Blockchain - Diving into Blockchain Technology - Securing and Exchanging Your Cryptocurrency | | | | | |
| Unit II | Behold Bitcoin a Block | Beholding the Bitcoin BlockchainBitcoin: The New Wild West- Encountering the Ethereum Blockchain- Hacking9a Blockchain - Hacking a Blockchain- Creating Your Own ERC20 Tokens | | | | | |
| Unit III | Getting Workir Azure E Chain o | Getting your Hands on Hyperledger Working with Hyperledger Besu - Applying Microsoft Azure - Building in the Azure Ecosystem- Deploying Blockchain Tools on Azure- Getting Started with Chain on Azure | | | | | |
| Unit IV | Financi Future Estate World- | al Technology Banking Trends-O Innovations-Elimir Forecasting Regior | Global Financial Products-Squeezing O nating Title Insurance-Mortgages in th nal Trends | ut Fraud-Real ne Blockchain | 9 | | |
| Unit V | Tailorir Interne Landsca | ng Coverage et of Things in In: ape-Smart Cities ir | surance-Removing Third Parties-Glob Asia-Financial Capital Competition-Bc | al Regulatory order Security | 9 | | |
| | 1 | | Practical Component | | 1 | | |
| Exercises | 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. | Implement Block Simulating Block Study the various Create a wallet us Analyzing transac blockchain Understanding th Bitcoin Implementing H Software Setting up a Hype Create a simple b Study the vario governments in In | chain with Geth chain Life Cycle with Ganache cryptocurrencies and prepare a repor sing Open Source tools ctions, blocks, and network activity o ne volatility, market trends, and tradir yperledger Besu on Azure Using erledger Fabric network lock chain application ous blockchain systems used by windia and prepare a report on the same | t on the same n the Bitcoin ng patterns of Open Source various state | 30 | | |

| Recommended Learning Resources | | | | |
|---|---|--|--|--|
| Print | 1. Tiana Laurence, Blockchain for dummies , John Wiley & Sons, 2023. | | | |
| Resources | 2. Lorne Lantz, Daniel Cawrey, "Mastering Blockchain", O'Reilly Media, 2020 | | | |
| Syllabus design : Dr. T.Chithralekha, Professor, PUDoCS | | | | |
| Dr.S.L.Jayalakshmi, Assistant Professor, PUDoCS | | | | |

| Year | IV | Course Code: CSIT407 | Credits | 4 | |
|-------------------------------------|--|---|-----------------|------------|--|
| | | | Hours | 75 | |
| Sem. | VII | Course Title : IT Management Standards | Category | A | |
| | | | | | |
| Course | Knowle | edge of Enterprise IT infrastructure and its management | nt | | |
| Prerequisites, if any | | | | | |
| Internal Assessment Marks: 25 | End Se 75 | mester Marks: Duration of ESA (Theory) : 03 hr | S. | | |
| Course | • | Learn the definition, objectives, and concepts of info | rmation syster | ns | |
| Outcomes | • | Gain insights into the theoretical framework of inform based on ISO/IEC 27001 | nation security | / policies | |
| | • | Gain insights into the theoretical framework of inforr based on ITILv4 | nation security | / policies | |
| | • | Understand the importance of IT service managemer management (ITAM) within IT governance | nt (ITSM) and I | T asset | |
| | • | Analyze the research methodology and case studies t | o comprehend | the | |
| | | implementation of security policies based on ISO/IEC | 27002:2005 | | |
| Unit No. | | Course Content | | Hours | |
| | _ | Theory Component | | | |
| | Inform | ation System and IT Governance Evolution | | | |
| | Introdu | uction-Information System Definition and Objective-In | formation Syst | em | |
| | Concept-Concepts of Enterprise Application-Features of Enterprise | | | | |
| | Applications-EIS and Company Strategy-Enterprise Information Systems | | | | |
| Unit I | Flexibility-Agility. | | | | |
| | IT Gov | ernance in Organizations | | | |
| | IT Gov | ernance Standards-cobit- library - Structure of ITIL v4 | - CMMI – COS | 50 - | |
| Unit II | PMBO | OK - ISO/IEC 27001:2005 - ISO/IEC 27002:2005 - ISO | /IEC 27002:20 | 05- | |
| | NIST- 0 | Core Framework- Comparison and Analysis. Exploring | IT Governance | ein 9 | |
| | MENA | Medium and Large Organizations-Case Study. | | | |
| | IT Serv | vice Management and Governance: A Maturity Fran | nework Based | on | |
| | Introdu | iction - The Proposed ITSM/ITAM Framework- IT Servi | ce Manageme | nt - | |
| Unit III | IT Asse | et Management - IT Security Management- Agility N | lanagement- | The 9 | |
| | Propos | sed Agile ITSM/ITAM Framework- Use Case. | | | |
| | Inform | ation Security Policy: A Maturity Framework Based o | n ISO/IEC 2700 | 01 | |
| | Introdu | uction- Theoretical Framework -Framework Overview | Framework C | ore | |
| Unit IV | - Fram | ework Maturity Profile - Use Case- Data Collection | - Data Analy | sis- | |
| | Condu | cting Assessments - Assessing Capability Matu | rity- Develop | oing 9 | |
| | Impro | /ement Action Plans. | | 2 | |
| Linit V | Introdu | ation Security Policy: A Maturity Framework Based o | 11 ISU/IEC 2/00 | | |
| | |)/IEC_27002:2005ISC/IEC_27007-3005-Other_ISC_2 | 7000 Standau | -sh: | |
| | Resear | ch Methodology - Case Study- Security Clauses. | | | |
| | | | | | |

| | Practical Component | | | |
|---|--|---------|--|--|
| | 1. Prepare reports on the following | | | |
| | 1.1 Case studies of COSO | | | |
| | 1.2 Case studies of ITILv4 | | | |
| | 1.3 Case studies of ISO/IEC 27001 | | | |
| | 1.4 Case studies of ISO/IEC 27002 | | | |
| | 1.5 Case studies of ITSM/ITAM Framework | | | |
| | 2. Study of tools for the following frameworks and prepare reports on the same | 30 | | |
| Exercises | 2.1 ISO/IEC 27002 | | | |
| | 2.2 COSO | | | |
| | 2.3 ITILv4 | | | |
| | 2.4 ISO/IEC 27001 | | | |
| | 2.5 TSM/ITAM Framework | | | |
| | Recommended Learning Resources | | | |
| Print | 1. Maleh, Y., Sahid, A., Alazab, M., & Belaissaoui, M, "IT Governance and Info | rmation | | |
| Resources | Security; Guides, Standards, and Frameworks", CRC Press, 2021. | | | |
| | 2. Marcia J. Bates " Understanding Information Retrieval Systems: Mana | gement, | | |
| | Types, and Standardsl", Auerbach Publications, CRC Press, 2011. | | | |
| Syllabus design : Dr. T.Chithralekha, Professor, PUDoCS | | | | |
| | Dr.S.L.Jayalakshmi, Assistant Professor, PUDoCS | | | |

SEMESTER VIII

| Year | IV | Course Code: CSIT408 | | Credits | 4 |
|-----------------------------------|---|---|---|-------------|------|
| | N/111 | Course Title: 5G Communication Technologies | | Hours | 75 |
| Sem. | VIII | | Category | | |
| Course Prerequisites if any | • | Knowledge of computer netwo | orks and wireless communic | ation netwo | orks |
| Internal | End Sei | mester Marks: 75 | Duration of ESA (Theory) | : 03 h | nrs |
| Assessment | | | Duration of ESA (Practical) |) : 03 ł | nrs |
| Marks: 25 | | | | | |
| Course | • | Understand the basics of 5G Co | ommunication | | |
| Outcomes | • | Understand the fundamentals | of 5G Architecture | | |
| | • | Understand the various 5G rad | lio-access technologies | | |
| | • | Understand the various 5G Ena | abling Technologies | | |
| | • | Learn about the 5G use cases | | r | |
| Unit No. | | Course Conte | nt | Hours | |
| | l | Theory Compone | ent | | |
| Unit I | Backgro Introdu Capacit Propag Cohere study a | ound uction to Cellular Technologies: ty; Evolution of 1G, 2G, 3G, 4G st ation mechanisms: Dopplei ence time and bandwidth, all t llone). | Frequency reuse, Handoff, andards and architectures. r spread, Delay spread, ypes of fading (non-detail | 9 | |
| Unit II | SG Arcl Introdu Archite physica and si beamfo User I transm coding measu | hitecture action – 5G Architecture opti acture – 5G RAN Architecture al Layer – 5G Multiple Access Pr gnals – frame structure – forming basics – Random Access Data transmission – Downlin ission – MIMI and beamform – Dual connectivity - Data rements – UE capability | ons – 5G Core Network – Network Slicing – 5G inciple – Physical channels Channel structures and ss – Downlink and Uplink nk and uplink signaling ning operation – Channel rates – Physical Layer | 9 | |
| Unit III | 5G Rad Access Orthog access OFDM dense o | lio Access Technologies design principles for mu onal multiple-access systems, systems, Capacity limits of numerology for small-cell depl deployments, Radio access for V | lti-user communications, Spread spectrum multiple multiple-access methods, oyments, Radio access for /2X communication. | 9 | |
| Unit IV | 5G Ena MIMO Capacit algorith – Haro Beamfo | bling Technologies : Introduction – Single User ty of Massive MIMO – Resource nms – Channel models – mmWa dware Technologies – Archi prming – Physical layer techniqu | and Multi user MIMO – allocation and transceiver ave – Channel Propagation tecture and mobility – ies | 9 | |
| Unit V | 5G Use Machin MTC, Commu broadb and em | e Cases ne type communication: Fundam Ultra-reliable low-latency M unication: Radio resource n band D2D, Multi-hop D2D com nergency services, Multi-operato | nental techniques, Massive ITC. Device to Device nanagement for mobile munications for proximity or D2D communication. | 9 | |

| | Practical Component | |
|------------------|---|------------------------------|
| | 1. Study and simulation of Handoff techniques | |
| | 2. Study and simulation of types of fading | |
| | 3. Computation of channel capacity | |
| | 4. Calculation of bandwidth of different generation | ions |
| Exercises | 5. Problems based on 5G Frame Structure | 30 |
| | 6. 5G Communications Link Analysis with Ray Tra | acing |
| | 7. Model and analyse 5G NR Waveforms generated | tion |
| | 8. Channel modelling in 5G | |
| | 9. MIMO Wireless System Design for 5G | |
| | 10. 5G Beamforming Design | |
| | Recommended Learning Resources | |
| Print | 1. Theodore S. Rappaport, "Wireless comm | unications: principles and |
| Resources | practice", Cambridge University Press, 2024. [| Unit 1] |
| | 2. Osseiran, Afif, Jose F. Monserrat, and Patric | k Marsch, "5G mobile and |
| | wireless communications technology", 1st ed | ition, Cambridge University |
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| Syllabus design: | Dr. T.Chithralekha, Professor, PUDoCS | |
| L | Dr. P. Shanthi Bala, Professor, PUDoCS | |

| Sem Viii Course Title : Hadoop Ecosystem Hours 75 Course Prerequisites if any • Knowledge of Big Data Technologies • Category C Internal Assessment Marks: 25 End Semester Marks: 75 Duration of ESA (Practical) : 03 hrs - Duration of ESA (Practical) : 03 hrs Course Outcomes • Understand Hadoop ecosystem basics - Duration of ESA (Practical) : 03 hrs - Duration of ESA (Practical) | Year | IV | Course Code: CSIT409 Credits 4 | | Course Code: CSIT409 Credits 4 | | 4 |
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| Unit III Line Interface -Hadoop File systems - Java Interface - Data Flow - Parallel copying - Hadoop Archives 9 Unit III Advanced MapReduce Development Configuration and Development Environment - Writing Unit Tests for Map Reduce -Running locally on test data - Running on cluster- Tuning a job - Map Reduce workflow - Map Reduce Types and Formats 9 Unit IV Hadoop Ecosystem for Data Warehousing and Analysis 9 Pig Basics and Running Pig Scripts- Pig Latin - User Defined Functions- Data 9 Unit V Processing operators - Hive - HiveQL - HBase Basics - HBase versus RDBMS-HBase Use cases 9 Example Component 1. Simulate Big Data & Explore Hadoop (Single Node) 2. Analyse HDFS Architecture (Commands & Fault Tolerance) 3. Load Data Techniques (Manual, Flume, Sqoop) 4. Ruid & Ontimize MapReduce (Manual, Flume, Sqoop) 4. Ruid & Ontimize MapReduce (Manual, Flume, Sqoop) | | Design and Concepts of HDFS - Blocks, Namenodes, Datanodes - Command- | | | | - | |
| copying - Hadoop Archives Advanced MapReduce Development Unit IV Advanced MapReduce Development Environment - Writing Unit Tests for Map Reduce -Running locally on test data - Running on cluster-Tuning a job - Map 9 Reduce workflow - Map Reduce Types and Formats 9 Unit IV Hadoop Ecosystem for Data Warehousing and Analysis 9 Pig Basics and Running Pig Scripts- Pig Latin - User Defined Functions- Data 9 Processing operators - Hive - HiveQL - HBase Basics - HBase versus RDBMS- HBase Use cases 9 Example Component 1. Simulate Big Data & Explore Hadoop (Single Node) 9 Image: Analyse HDFS Architecture (Commands & Fault Tolerance) 3. Load Data Techniques (Manual, Flume, Sqoop) 1. Ruild & Optimize ManPadures leb (or ar Woord Count) | Unit III | Line Interface – Hadoop File systems - Java Interface - Data Flow - Parallel | | | | | |
| Advanced MapReduce Development Configuration and Development Environment - Writing Unit Tests for Map Reduce –Running locally on test data - Running on cluster- Tuning a job - Map Reduce workflow - Map Reduce Types and Formats9Unit IVHadoop Ecosystem for Data Warehousing and Analysis Pig Basics and Running Pig Scripts- Pig Latin - User Defined Functions- Data Processing operators - Hive - HiveQL - HBase Basics - HBase versus RDBMS- HBase Use cases9Practical Component1. Simulate Big Data & Explore Hadoop (Single Node) 2. Analyse HDFS Architecture (Commands & Fault Tolerance) 3. Load Data Techniques (Manual, Flume, Sqoop) 4. Build & Optimize ManPeduse Job (a g. Word Count) | | copying - Ha | adoop Archives | | | | |
| Unit IV Reduce –Running locally on test data - Running on cluster- Tuning a job - Map 9 Reduce workflow - Map Reduce Types and Formats 9 Unit IV Hadoop Ecosystem for Data Warehousing and Analysis 9 Pig Basics and Running Pig Scripts- Pig Latin - User Defined Functions- Data 9 Processing operators - Hive - HiveQL - HBase Basics - HBase versus RDBMS- HBase Use cases 9 Image: Configuration of the test of | | Advanced N | ApReduce Develo | pment | T | | |
| Onic IV Reduce Running locally on test data Running on elaster Funning a job Map 3 Reduce workflow - Map Reduce Types and Formats Reduce workflow - Map Reduce Types and Formats Unit V Hadoop Ecosystem for Data Warehousing and Analysis 9 Unit V Pig Basics and Running Pig Scripts- Pig Latin - User Defined Functions- Data 9 Unit V Processing operators - Hive - HiveQL - HBase Basics - HBase versus RDBMS- HBase Use cases 9 Practical Component 1. Simulate Big Data & Explore Hadoop (Single Node) 2. Analyse HDFS Architecture (Commands & Fault Tolerance) 3. Load Data Techniques (Manual, Flume, Sqoop) 4. Build & Optimize MapPeduge Jab (a.g. Woord Count) 1 | Linit IV | Configuration and Development Environment - Writing Unit Tests for Map Reduce – Running locally on test data - Running on cluster Tuning a job | | | | | |
| Hadoop Ecosystem for Data Warehousing and Analysis Pig Basics and Running Pig Scripts- Pig Latin - User Defined Functions- Data 9 Unit V Processing operators - Hive - HiveQL - HBase Basics - HBase versus RDBMS- HBase Use cases 9 Practical Component 1. Simulate Big Data & Explore Hadoop (Single Node) 2. Analyse HDFS Architecture (Commands & Fault Tolerance) 3. Load Data Techniques (Manual, Flume, Sqoop) 4. Build & Optimize ManPaduse Job (a.g. Ward Count) 1 | Onerv | Reduce workflow - Map Reduce Types and Formats | | | | | |
| Hadoop Ecosystem for Data Warehousing and Analysis 9 Pig Basics and Running Pig Scripts- Pig Latin - User Defined Functions- Data 9 Processing operators - Hive - HiveQL - HBase Basics - HBase versus RDBMS- HBase Use cases 9 Dractical Component 1. Simulate Big Data & Explore Hadoop (Single Node) 2. Analyse HDFS Architecture (Commands & Fault Tolerance) 3. Load Data Techniques (Manual, Flume, Sqoop) 4. Build & Optimize ManPaduse Job (a.g. Word Count) 1. | | | · | ,, | | | |
| Pig Basics and Running Pig Scripts- Pig Latin - User Defined Functions- Data 9 Unit V Processing operators - Hive - HiveQL - HBase Basics - HBase versus RDBMS- HBase Use cases 9 Practical Component 1. Simulate Big Data & Explore Hadoop (Single Node) 2. Analyse HDFS Architecture (Commands & Fault Tolerance) 3. Load Data Techniques (Manual, Flume, Sqoop) A Build & Optimiza ManPadusa Jab (a.g. Ward Count) | | Hadoop Eco | osystem for Data W | arehousing and Analysis | | | |
| Unit V Processing operators - Hive - HiveQL - HBase Basics - HBase Versus RDBMS- HBase Use cases Practical Component 1. Simulate Big Data & Explore Hadoop (Single Node) 2. Analyse HDFS Architecture (Commands & Fault Tolerance) 3. Load Data Techniques (Manual, Flume, Sqoop) 4. Build & Optimize MapPoduce Job (or g. Word Count) | | Pig Basics a | Pig Basics and Running Pig Scripts- Pig Latin - User Defined Functions- Data | | | | |
| Practical Component 1. Simulate Big Data & Explore Hadoop (Single Node) 2. Analyse HDFS Architecture (Commands & Fault Tolerance) 3. Load Data Techniques (Manual, Flume, Sqoop) 4. Build & Optimize MapPeduse Job (or g. Word Count) | Unit V | Processing HBase Lise | operators - Hive - I | HIVEUL - HEASE BASICS - HEASE | versus RDBIVIS | | |
| 1. Simulate Big Data & Explore Hadoop (Single Node) 2. Analyse HDFS Architecture (Commands & Fault Tolerance) 3. Load Data Techniques (Manual, Flume, Sqoop) 4. Build & Optimize MapPeduse Job (a.g.)Mard Count) | | TIDUSC OSC (| Practic | al Component | | | |
| Analyse HDFS Architecture (Commands & Fault Tolerance) Load Data Techniques (Manual, Flume, Sqoop) Build & Optimize MapPeduce Job (e.g.)Mord Count) | | | 1. Simulate Big D | ata & Explore Hadoop (Single N | ode) | | |
| 3. Load Data Techniques (Manual, Flume, Sqoop) | | | 2. Analyse HDFS | Architecture (Commands & Fau | lt Tolerance) | | |
| 1 Ruild & Ontimize ManReduce Job (a.g. Mard Count) | | | 3. Load Data Tech | nniques (Manual, Flume, Sqoop |) | | |
| 4. Build & Optimize MapReduce Job (e.g. Word Count) | | | 4. Build & Optimi | ze MapReduce Job (e.g. Word (| Count) | | |
| Exercises 5. Simulate YARN Resource Management 30 | Exercises | | 5. Simulate YARN | Resource Management | | 30 | |
| 6. Run Sample App on YARN | | | 6. Run Sample Ap | op on YARN | | | |
| 7. Explore HiveQL for Data Analysis | | | /. Explore HiveQI | L tor Data Analysis | | | |
| 8. Explore Pig Latin for Data Processing | | | 8. Explore Pig Lat | In for Data Processing | | | |
| 9. Use Sqoop for Relational Database Import 10. Elume for Data Ingestion into HDES | | | Use sqoop for Flume for Data | neiational Database Import | | | |

| Recommended Learning Resources | | | | |
|---|--|--|--|--|
| Print Resources | 1. Kerry Koitzsch, " Pro Hadoop Data Analytics: Designing and Building Big Data | | | |
| | Systems using the Hadoop Ecosystem", Apress, 2017. | | | |
| | 2. Tom White, "Hadoop: The definitive guide", 3rd Edition, O'Reilly Media, 2012. | | | |
| Syllabus design: Dr. P.Shanthi Bala, Professor, PUDoCS. | | | | |

| Year | IV | Course Code: CSIT410 | | Credits | 4 |
|-------------------------------------|--|--|---|-----------------------|---|
| Som | VIII | | Hours | 75 | |
| Sem. | VIII | Course Title: High Perform | nance Computing | Category | С |
| Course Prerequisites, if any | • * | Knowledge of Computer Arc | hitecture and Cloud Compu | ıting | |
| Internal Assessment Marks: 25 | End Sem | ester Marks: 75 | Duration of ESA (Theory): Duration of ESA (Practical | 03 hrs.): 03 hrs. | |
| Course Outcomes | • (s • (• / + • / s • E t | impact of IPC systems nd Conquer i y hierarchy ir understand | ์n า | | |
| Unit No. | | Course Conte | ent . | Hours | |
| | | Theory Compor | ient | | |
| Unit I | Introduction Introduction: High Performance Computing Discipline – History of Supercomputing – Anatomy of Supercomputer – Impact of Supercomputing on Science – Society and Security. | | | 9 | |
| Unit II | HPC Architecture: Systems and Technologies Key Properties of HPC Architecture – Enabling Technology – Vector and Pipelining – Single-Instruction – Multiple Data Architecture – Multiprocessors – Heterogeneous Computer Structures. | | | 9 | |
| Unit III | Parallel Algorithm Introduction, Fork-Join – Divide and Conquer – Manger- Worker – Halo Exchange – Permutation: Cannon's Exchange – Task Dataflow: Breath First Search. | | | 9 | |
| Unit IV | Symmet Amdahl's Hierarch | ric Multiprocessor Architect s Law Plus – Processor Cor y – PCI Bus – External I/O Int | t ure e Architecture – Memory terfaces. | 9 | |
| Unit V | Case Stu OpenMP | dies API, Essential API, Open AC | с | 9 | |
| | | Practical Compo | onent | | |
| Exercises | Install MPICH library and write a "Hello World" program Write a parallel program to calculate the value of PI/Area of Circle using OpenMP library Write a parallel program to multiply two matrices using MPI library and compare the execution time with it's OpenMP and Serial version Write a program in C to multiply two matrices of size 10000 x 10000 each and find it's execution-time using "time" command. Try to run this program on two or more machines having different configurations and compare execution-times obtained in each run. Comment on which factors affect the performance of the program | | 30 | | |

| | 5. Install MPICH on two and more machines and create | | | | |
|---|--|--|--|--|--|
| | a MPI cluster. Execute MPI programs on this cluster | | | | |
| | and check the performance. | | | | |
| | 6. Implement a program to demonstrate balancing | | | | |
| | workload on MPI platform | | | | |
| Recommended Learning Resources | | | | | |
| | 1. Thomas Sterling, Matthew Anderson, Maciej Brodowicz, "High | | | | |
| Deferences | Performance Computing", Morgan Kaufmann ,2017. | | | | |
| References | 2. Severance, Charles, and Kevin Dowd. "High performance computing", | | | | |
| | OpenStax CNX, 2015. | | | | |
| Syllabus design: Prof. SKV.Jayakumar, Professor, PUDoCS | | | | | |

| Year | IV | Course Code: CSIT | 411 | Credits | 4 | |
|-------------------------------------|--|--|---|---|-----------------|--|
| | | Course Title: Data | Center Management | | 75 | |
| Sem. | VIII | | | Hours | /5 | |
| Course Prerequisites if any | • Kno | Knowledge of Computer Networks and Cloud Computing | | | | |
| Internal Assessment Marks: 25 | End Semest | er Marks: 75 | Duration of ESA (Theory) | : 03 hrs | | |
| Course Outcomes | To u To lo syst To p To a To c | Inderstand how to r earn and keep track em provide effective ma inalyze the data cer levelop and Test Str | nanage a data center envi of the reporting system a nagement in Client server ter processes and operati rategies in Network Disaste | ronment nd adapt to changes environment ons in distributed ne er Recovery | in the twork | |
| Unit No. | | (| Course Content | | Hours | |
| | | Theory | Component | | | |
| Unit I | Data Center Cost-Effectiv Alternative Achieving Q | • Management ve Management Pra - Downsizing Comp uality in Data Cente | actices for the Data Center uter Resources - Fine Tun r Operations - Automating | r - The Outsourcing ing the Help Desk - g the Data Center. | 9 | |
| Unit II | Data Center Developing Problem Tr Backup - Un | Controls a Data Center Repo acking Systems - derstanding Compu | rting System - Update on (Improving Productivity, I Iter Negligence and Liabili | Change Control and File Retention and Ty. | 9 | |
| Unit III | Systems Pla Client/Serve Solutions – Client/Serve | Systems PlanningClient/Server Technology - Managing Hardware – Implementing Client/ServerSolutions – Implementation of Business Process Reengineering - ThreeClient/Server Implementations.9 | | | 9 | |
| Unit IV | Network Te Enterprise Communica Security - Th Availability - | chnology Network Design tions - Securing Dist ne Data Center Mar Auditing LANs. | Technology - Managin ributed Data Networks - D nager's Guide to Ensuring | g Multi Network Distributed Network LAN Reliability and | 9 | |
| Unit V | Contingency Overview of Testing - A E Recovery P Options. | y Planning If Business Continu Business Impact Ana lanning, Disaster F | ity Planning - Strategies f lysis for Disaster Recovery Recovery Planning Tools | or Developing and - Network Disaster and Management | 9 | |
| | | Practica | l Component | | | |
| | 1. Perf repo 2. Perf sam 3. Perf Mar | orm a study of data ort on the same orm a study of netv e orm a study of disa nagement and prepa | o center management tool work security and prepare ster recovery tools for Dat are a report on the same | s and prepare a a report on the a Center | | |

| | 4. Perform a study of Business Continuity Planning tools and prepare a | 30 |
|--------------------|---|----------|
| Exercises | report on the same | |
| | 5. Perform a study of Business Continuity Standards and prepare a | |
| | report on the same | |
| | 6. Perform a study of DR Standards and prepare a report on the same | |
| | 7. Perform a study of data centers of any 5 Banks and prepare a report | |
| | On the Same | |
| | report on the same | |
| | 9. Perform a study of state data centers of 5 Indian states and prepare | |
| | a report on the same | |
| | 10. Perform a study of Meghraj Project and prepare a report on the | |
| | same | |
| | Recommended Learning Resources | |
| Print Resources | 1. Layne C. Bradley , "Handbook of Data Center Management", 2nd Edition | on, CRC |
| | Press, 2018. | |
| | 2. Hwaiyu Geng ,"Data Center Handbook- Plan, Design, Build, and Operat | ion of a |
| | Smart Data Center", Wiley, 2021. | |
| Syllabus design: D | r. T.Chithralekha, Professor, PUDoCS. | |

| Year | IV | Course Code: CS | IT412 | Credits | 4 | | | |
|---|---|--|--------------------------------------|----------------------------|--------------|--|--|--|
| | | | | Hours | 75 | | | |
| Sem. | VIII | Course Title : Dr | one Technologies | one Technologies Category | | | | |
| Course Prerequisites, if any | • | Knowledge of computers and mobile devices | | | | | | |
| Internal | End Ser | End Semester Marks: Duration of ESA (Theory) : 03 hrs. | | | | | | |
| Assessment | 75 | 75 Duration of ESA (Practical) : 03 hrs. | | | | | | |
| Marks: 25 | | | | | | | | |
| Course | • Un | derstand the evolv | ing landscape of drone tecl | hnology and its current | and | | | |
| Outcomes | pot | tential applications | | 0, | | | | |
| | Dev thr | velop proficiency i oughout its full cyc | n utilizing drone data visual cle | ization as a comprehen | sive tool | | | |
| | • Un | derstand the AFC (| drone operations, including | standard features, soft | ware | | | |
| | apr | plications, legal reg | ulations, and permissions | | | | | |
| | Dev | velon comprehens | ive knowledge and skills in | drone operation best p | actices ann | | | |
| | | ge and automate | d techniques | | defices, upp | | | |
| | | nly the knowledge | and skills for proficiently ut | tilizing drones for photo | grammetry | | | |
| | - App | ply the knowledge | and skins for proficiently u | tillizing drones for photo | grannetry | | | |
| Unit No | apt | | Course Conter | nt | Hours | | | |
| | | | Theory Component | n. | nours | | | |
| | Fundam | nentals | | | | | | |
| | Introdu | ction- The Bread | h of Drone Applications- | Basic Drone Use- Curre | nt | | | |
| Unit I | Breadth | of Drone Use- T | ne Future Breadth of Drone | e Use -The Risks of Dror | e 9 | | | |
| | Technology- The Bottom Line on Drones. | | | | | | | |
| | Drone [| Drone Data Visualization as a Full Cycle Tool | | | | | | |
| | Drone [| Data Visualization- | Advantages-Defining Drone | e Data and Visualization | - | | | |
| Unit II | 2D Con | cept Overlay- 3D (| Concept Model Overlay- Re | turn on Investment (RC | I) 9 | | | |
| | - Rate o | of Return (ROR) - | /alue Added Services- Trai | ning Costs- Permission | is | | | |
| | Costs. | | | | | | | |
| | Getting | Started with Four | ndations of AEC Drone Ope | rations: Documentatio | n, | | | |
| Unit III | Permiss | sions, and License | | | | | | |
| | AEC Dro | one Standard Feat | ures -Drone Packages- Ap | plications and Softwar | e- 9 | | | |
| | Desktop | o Software- Comp | outer Hardware- Documer | ntation, Permissions ar | d | | | |
| | License | | | | | | | |
| | Best Pra | actices for Flying D | Prones | | | | | |
| | The Fly | ing Mindset - Dro | ne Flying Apps- Automate | d Flying- Acquiring ar | d | | | |
| Unit IV | Working with Drone Data: Imagery and Videos- Photo and Video Quality- Using | | | | | | | |
| | DJI Standard Apps- Image Geotag- Litchi Flight Planning Software- Working | | | | | | | |
| | with Dr | one Photos- Work | ng with Drone Videos. | | | | | |
| | Photog | rammetry | | A | | | | |
| 11 | Drones | Drones and Photogrammetry- Photogrammetry Accuracy and Precision- | | | | | | |
| Unit V | Ground Control Points- Collecting Data- RTK Drones, Ground Control Pads- | | | | | | | |
| Photogrammetry Software - Marking with 2D Models - Marking with Doint | | | | | e- 9 | | | |
| | Clouds and 2D Mashas. Future of LAV(s | | | | | | | |
| | | | | | | | | |
| | | | Dreatical Commencent | | | | | |
| | 1 C+ | dy on drong and th | practical Component | | | | | |
| | Survey on arone and their types Disassemble and assemble different parts of the drame for testing and | | | | d | | | |
| | z. Disassemble and assemble different parts of the drone for testing and repair | | | | | | | |
| | 3. Unc | erstand Flight Sim | ulator: Perform basic flight | maneuvers | | | | |
| | 4. Cap | Capturing agricultural fields using drones to identify the status of the crops | | | | | | |

| Exercises | 5. | Collecting Atmospheric pressure, air quality, temperature, and humidity to | | | | |
|----------------|--|---|-----------|--|--|--|
| | | identify the purity of the air in the atmosphere 30 | | | | |
| | 6. | Testing of landing gear | | | | |
| | 7. | Testing of the GPS module | | | | |
| | 8. | Testing of Collision avoidance sensor | | | | |
| | 9. | Testing of different motors and flight controllers | | | | |
| | 10 | . Sending and receiving messages from the drone to the ground system | | | | |
| | | Recommended Learning Resources | | | | |
| Print | 1. | Daniel Tal and Jon Altschuld, "Drone Technology in Architecture, Engine | ering and | | | |
| Resources | | Construction: A Strategic Guide to Unmanned Aerial Vehicle Operation and | | | | |
| | | Implementation", First edition, 2021. | | | | |
| | 2. | Aaron Asadi, "Drones The Complete Manual: The Essential Handbook f | or Drone | | | |
| | | Enthusiasts", First edition, Imagine Publishing Ltd, 2016 (ISBN 978 1785 46 | 2 962). | | | |
| Syllabus desig | Syllabus design: Dr. T.Chithralekha, Professor, PUDoCS | | | | | |
| | Dr. | S.L.Jayalakshmi Assistant Professor, PUDoCS | | | | |
| | | | | | | |

| Year | IV | Course Code: CS | IT413 | Credits | 4 | |
|-------------------------------------|--|--|------------------|---|-----------------------------------|--|
| Sem. | VIII | Course Title: Medern Networking | | Hours | 75 | |
| | | Course fille: Mo | dern Networking | Category | с | |
| Course Prerequisites, if any | Knowledge of Computer Networks | | | | | |
| Internal Assessment Marks: 25 | End Se 75 | End Semester Marks:Duration of ESA (Theory): 03 hrs.75Duration of ESA (Practical): 03 hrs. | | | | |
| Course Outcomes | Un ecc Lea sta Lea Lea | Understand the fundamentals of modern networking, including the net ecosystem, network architectures Learn about the concepts and architecture of SDN and NFV Learn about SDN and NFV including their approaches, integration, and standards Learn about Network Virtualization | | | | |
| Unit No. | | | Course Content | | Hours | |
| | | | Theory Component | | | |
| Unit I | Introduction to Modern Networking The Networking Ecosystem- Example Network Architectures- Network Convergence- Unified Communications - Requirements and Technology- Types of Network and Internet Traffic- Emerging Demands- Quality of Service (QoS) and Quality of Experience (QoE)- Routing Characteristics- Congestion Control- Software-Defined Networking (SDN) and Network Function Virtualization (NFV)- Modern Networking Elements. | | | work ypes 9 QoS) itrol- ation | | |
| Unit II | Introduction to Software-Defined Networks (SDN) The SDN Approach- SDN and NFV Integration- Related Standards in SDN and NFV- SDN Control Plane- SDN Application Plane Architecture- Measurement and Monitoring in SDN- Security in SDN Environments- SDN in Data Centre Networking- Mobility and Wireless Aspects in SDN- Information-Centric Networking (ICN) | | | | and ment 9 entre entric | |
| Unit III | Network Functions Virtualization: Concepts and ArchitectureBackground and Motivation- Virtual Machines- NFV Concepts- NFV Benefitsand Requirements- NFV ReferenceArchitecture- NFV Functionality- NFVInfrastructure- Virtualized Network Functions- NFVManagementOrchestration- NFV Use Cases- SDN and NFV | | | nefits NFV 9 and | | |
| Unit IV | Network Virtualization Virtual LANs- OpenFlow VLAN Support- Virtual Private Networks- Network Virtualization- OpenDaylight VirtualTenant Network- Software Defined Infrastructure. Quality of Service- Background- QoS Architectural Framework- Integrated Services Architecture- Differentiated Services- Service Level Agreements- IP Performance Metrics- OpenFlow QoS Support. | | | | work fined 9 vork- Level | |

| Unit V | Cloud Computing Basic Concepts- Cloud Services- Cloud Deployment Models- Cloud Architecture- SDN and NFV- The Internet of Things: Components- The IoT Era Begins- The Scope of the IoT- Components of IoT-Enabled Things- IoT Architecture- IoT Implementation. | | |
|--------------------|--|--------------------------|--|
| | Practical Component | | |
| Exercises | Analyze network and internet traffic using Wireshark Implement unified communications with Asterisk Deploy OpenDaylight or ONOS SDN controller Explore SDN and NFV standards compliance using OpenDaylight and OPNFV Deploy virtual machines using tools like KVM (Kernel-based Virtual Machine) or VirtualBox to simulate NFV environments Implement a reference NFV architecture using OPNFV (Open Platform for NFV) or OpenStack Set up a VPN tunnel using OpenVPN or StrongSwan to establish secure communication over a virtualized network Configure OpenFlow switches to support VLANs using Mininet and Floodlight/OpenDaylight controllers Deploy and explore basic cloud computing concepts using OpenStack or Apache CloudStack Deploy different cloud deployment models (public, private, hybrid) | 30 | |
| | Recommended Learning Resources | | |
| Print Resources | Stallings, W, "Foundations of Modern Networking: SDN, NFV, QoE, IoT, ar Addison-Wesley Professional, 2015. Goransson, Paul, Chuck Black, and Timothy Culver, "Software defined ne comprehensive approach ", Morgan Kaufmann, 2016. | ıd Cloud", etworks: a | |
| syllabus desigr | i: Dr. I.Chithraiekha, Projessor, PUDOCS | | |

| Year | IV | Course Code: CS | IT414 | Credits | 4 | |
|-------------------------------------|---|---|---|-------------------------|-------|--|
| Sem. | VIII Hours | | Hours | 75 | | |
| | | Course Title : Sto | orage Technologies | Category | Α | |
| Course Prerequisites if any | Course Prerequisites, • Knowledge of Computer Networks if any | | | | | |
| Internal Assessment Marks: 25 | End Semester Marks: Duration of ESA (Theory) : 03 hrs. 75 | | | | | |
| Course Outcomes | Learn the significance of storage and its evolution Understand the transition and integration of storage area networks (SANs) and network-attached storage (NAS) Learn software-defined storage using the LEGO metaphor Compare server storage and network storage options for big data applications Evaluate the limitations of RAID and explore alternative data protection methods | | | | | |
| Unit No. | | Со | urse Content | ŀ | lours | |
| | | Th | eory Component | | | |
| Unit I | Storage Why Stora Corporatio Years- | ige Matters- Stora on- Mid-Sized Ope The Distant Future | ge From 30,000 Feet- Storage Today erations- The Small Business- Sto e: 2019 And Beyond | The Large prage In 3 | 9 | |
| Unit II | Network Infrastructure TodaysStorage area networks in transition -network-attached storage-Scaling ToInfinity With Object Storage- Flash and SSD Technologies- RDMA andstorage acceleration- Optimizing The Datacenter With Storage Software-9Virtualization Tools And Virtual Sans-The Operating System Storage Stack | | | | | |
| Unit III | Software Defined Storage The LEGO Storage Concept-Connecting The Pieces: Unified Storage Appliances-Agility and Flexibility In Storage-The Implications of SSD to the Datacenter-The Future Of The Storage Industry-NAS Vs. SAN Vs. Object 9 Storage-Ethernet and the End of the San-Commoditization and the Storage Network | | | | 9 | |
| Unit IV | Big Data Addressing Big-Data Bottlenecks: Network Bandwidth- Speeding In- Memory Computing-Key/Value Storage for Big Data- Server Storage VS. Network Storage for Big Data- File Systems for Big Data- High-Performance Computing- For Big Data Applications- Converging (RDMA) | | | 9 | | |
| Unit V | Data IntegrityRAID and its problems-Replication and Erasure Coding-Disaster Protectionin the Cloud-Data Security: Protecting Data at Rest and in Transit –Protecting cloud data in software SERVICE (SAAS)- Hybrid Clouds and Data9Governance-Encryption And Information Rights Management-On theHorizon: Emerging Storage Technologies | | | | 9 | |
| | | Pra | ctical Component | | | |
| | 1. | Prepare a repo technologies Study Flash and same | ort on the evolution of various SSD storage technologies and con | s storage | | |

| | 3. Install and Configure RDMA on Linux | 30 |
|-----------------|---|-----------|
| | 4. To deploy a scalable and flexible storage infrastructure using | |
| | Ceph | |
| Exercises | 5. To set up a NAS solution using FreeNAS for centralized file | |
| | storage and sharing | |
| | To implement a software-defined storage infrastructure using open-source software | |
| | 7. Study and compare NAS tools and prepare a report on the same | |
| | 8 Study and compare SAN tools and prepare a report on the same | |
| | 9 Study and compare BAID tools and prepare a report on the | |
| | 5. Study and compare that tools and prepare a report on the | |
| | | |
| | 10. Study the various storage technologies used by various MINCs | |
| | and prepare a report on the same | |
| | | |
| | Recommended Learning Resources | |
| Print | 1. O'Reilly. James, " Network storage: Tools and technologies for sto | ring your |
| Resources | company's data" Morgan Kaufmann (Elsevier). | 2017. |
| | https://doi.org/10.1016/b978-0-12-803863-5.01001-3 | |
| | <u>maps.//doi.org/10.1010/05/0 0 12 005005 5.01001 5</u> . | |
| | | |
| Syllabus design | n: Dr. T.Chithralekha , Professor, PUDoCS | |
| | | |

MULTI DISCIPLINARY COURSES

| Year Sem. | 1/11 | Course Code: COMS101 Course Title: Intro Programming | duction to | Python | Credits Hours Category | 3 60 A |
|--|--|--|---|--------------------------------------|------------------------------|--------------|
| Courso | Droblon | n colving skills | | | | |
| Prerequisites, if any | FIODIEI | II-SOIVIIIg Skills | | | | |
| Internal Assessment | End Ser | nester Marks: 75 | Duration of ES | A (Theory |): 03 hrs. | |
| Marks: 25 | | | | | | |
| Course Outcomes | | Understand Python pro | gramming cons | tructs | | |
| | • | Learn about different data structures in Python | | | | |
| | | Explore the use of Pyth | on modules and | packages | i | |
| | | Perform Visualization u | sing Python pac | :kage | | |
| Unit No. | | Cours | e Content | | | Hours |
| | | | | | | |
| Unit I | Introdu | ction | | | | 12 |
| | Python | Basics: Working – Ide | entifiers – Co | mments - | – Types – | |
| | Strings: | ONS — BUIT-IN, IIDFARY TUNC Accessing — Properties — | nons Operations | | | |
| | Control | -flow Instructions: Deci | sion Control – | logical o | perators – | |
| conditional expressions Repetition control instruction – break and | | | | | | |
| | continue – <i>pass</i> Statement | | | | | |
| Unit II | Console printing Lists | e Input/Output: Console | Input – Console | e Output – | Formatted | 12 |
| Definition – Accessing – Operations – Methods – Varieti Comprehension | | | Varieties – | | | |
| | Definiti | on – Accessing – Operat sion – Iterators and Iterab | ions – Varieties Iles - zip() | s – Compr | ehension – | |
| Unit III | Sets Definition operation Definition | on – Accessing – Operati ons – Updating set operat on – Accessing – Operatic | ons – Functions tions Dictionari e ons – Functions - | s – Mathe es – Nested I | ematical set Dictionary | 12 |
| Unit IV | Function Definition function Module Creation | ns on – Communication – Typ ns es and Packages n and importing | oes – Unpacking | g – Lambda | , Recursive | 12 |
| Unit V | Exception handling Syntax errors – handling exceptions – try-except – user-defined exceptions – else, finally blocks – Tips Visualization - Matplotlib package – Plotting Graphs | | | | 12 | |

| Recommended Learning Resources | | | | | | |
|---|---|--|--|--|--|--|
| Print Resources | Aditya Kanetkar, Yashavant Kanetkar, Let us Python, BPB Publisher, 6th Edition, 2023 | | | | | |
| Syllabus Design: Dr. R.Sunitha, Associate Professor, PUDoCS | | | | | | |

| Voor | I/II Credi Course Code: COMS102 Course Title: Foundations of Information Technology | | Credits | 3 | | | |
|-------------------------------------|--|--|---|-------|---------------------------------|--|--|
| Tear | | | | | | | |
| Com | 1/11 | | | Hours | 60 | | |
| sem. | 1/11 | II Categor | | | A | | |
| Course Prerequisite s, if any | Basic | knowledge of Computers | | | | | |
| Internal Assessment Marks: 25 | End Semester Marks: 75 Duration of ESA (Theory): 03 h | | | | ·s. | | |
| Course Outcomes | | Familiarize the fundamentals of Ir Understand the management of h Describe the basics of networking Discuss about data management a Ability to troubleshoot computer | nformation Technology ardware and software and security aspects of systems | data | | | |
| Unit No. | | Course Conter | nt | | Hours | | |
| - | 1 | | | | | | |
| Unit I | Introduction Overview of IT – Computer Basics – Software fundamentals – Networks & Internet – IT ethics and policies | | | 12 | | | |
| Unit II | Hardware and Software Management Computer Assembly and maintenance - Operating Systems – Software installation and maintenance – Virtualization, Cloud Computing | | | 12 | | | |
| Unit III | Networking Essentials Network Fundamentals - Hardware – Protocols and services – Wireless Networking – Security | | | 12 | | | |
| Unit IV | Data Management and Security Data and fundamentals of Database – Data Backup and recovery – Cyber Security – Encryption and Cryptography | | 12 | | | | |
| Unit V | IT Support and Troubleshooting Help desk and IT support – Troubleshooting methodologies – Diagnostic tools and utilities – Future trends in IT | | | 12 | | | |
| Recommended Learning Resources | | | | | | | |
| Print Resources | Floyd Fuller, Brian Larson, Computers: Understanding Technology, E Paradigm, 4th Edition, 2011. Mike Meyers, CompTIA A+ Certification All-in-One Exam Guide, Mcd Hill Education, 11th Edition, 2023. Jeffrey S. Beasley, Piyasat Nilkaew, Networking Essentials, Prentice I Certification, 3rd Edition, 2012. Charles J. Brooks, Christopher Grow, Philip Craig, and Donald Cybersecurity Essentials, Sybex Publisher, 1st Edition, 2018. | | | | EMC Graw- Hall Short , | | |
| Syllabus Desi | gn: Dr. | R.Sunitha, Associate Professor, PUDc | oCS | | | | |