



PERIYAR UNIVERSITY

PERIYAR PALKALAINAGAR

SALEM-636011

B.Sc. COMPUTER SCIENCE *CHOICE BASED CREDITS SYSTEM*

OBE REGULATIONS AND SYLLABUS

(SEMESTER PATTERN)

(For Candidates admitted in the Colleges affiliated to

Periyar

University from 2021 -2022 onwards)

OutcomeBased Education(OBE)REGULATIONSANDSYLLABUS

(Witheffectfromtheacademicyear2021-2022onwards)

1. PREAMBLE

The programme prepares under Graduates in **Computer Science** with strong theoretical inputs and practical knowledge, who can be employed in industries. The programme develops requisite professional skills and problem solving abilities to pursue a successful career in software industry and for pursuing higher studies in Computer Science.

2. GRADUATE ATTRIBUTES

1. Computational Knowledge
2. Problem Analysis & Solving
3. Design & Development of Solutions
4. Modern Tool Usage
5. Communications skills
6. Innovation & Entrepreneurship
7. Societal & Environmental concern

3. PROGRAMME SPECIFIC QUALIFICATION ATTRIBUTES

The programme specific qualification attributes meant to be achieved through subjects in the programme in terms of

1. Knowledge and understanding level (K1 and K2)
2. Application level (K3)
3. Analytical level (K4)
4. Evaluation capability level (K5)
5. Scientific or Synthesis level (K6)

4. FOR ADMISSION

A candidate who has passed in Higher Secondary Examination with Mathematics or Business Mathematics or Computer Science or Statistics (Academic stream or Vocational stream) as one of the subject under Board of Higher Secondary Examination, Tamil Nadu as per the norms set by the Government of Tamil Nadu or an Examination accepted as equivalent thereto by the syndicate, subject to such other conditions as may be prescribed, are permitted to appear and qualify for

the **Bachelor of Science in Computer Science** degree examination of this university, after a programme of study of three academic years.

5. PROGRAMME OBJECTIVES AND OUTCOMES

1. Programme Educational Objectives (PEOs)

PEO1: Graduates are prepared to be employed in IT industries by providing expected domain knowledge.

PEO2: Graduates are provided with practical training, hands-on to meet the industrial needs. **PEO3:** Graduates are motivated in career and entrepreneurial skill development to become global leaders.

PEO4: Graduates are trained to demonstrate creativity, develop innovative ideas and to work in teams to accomplish a common goal.

PEO5: Graduates are trained to address social issues and guided to approach problems with solutions.

2. Programme Specific Outcomes (PSOs)

After completion of the programme, the graduates will be able to

PSO1: Apply domain knowledge and problem solving skills to solve real time problems.

PSO2: Acquire good employability skills which will ensure exceptional career opportunities in IT companies.

PSO3: Get a strong foundation to pursue higher education in the field of Computer Science/Applications.

3. Programme Outcomes (POs)

After completion of the programme, the graduates will be able

PO1: To understand the fundamental concepts of computer system, including hardware and software.

PO2: To Design, and analyze precise specifications of algorithms, procedures, and interaction behavior.

PO3: To apply the appropriate technologies, skills and tools in various fields of Computer Science.

PO4: To analyze impacts of computing on individuals, organization and society.

6. DURATION OF THE PROGRAMME

The programme shall extend over a period of three years comprising six semesters with two semesters in one academic year. There shall not be less than 90 working days for each semester. Examinations shall be conducted at the end of every semester for the respective subjects.

7. COURSE OF STUDY

The programme of study shall comprise instruction in the following subjects according to the syllabus and books prescribed from time to time. The syllabus for various subjects shall be clearly demarcated into five units in each subject. Part -I, Part-II, Part- III, Part -IV and Part-V subjects are prescribed in the scheme of examination. The Extension Activities are a must for each student to take part at least in any one of the activities such as NSS, YRC, SPORTS and RRC for the fulfillment of the degree.

8. EXAMINATIONS

The theory examination shall be three hour duration for each paper at the end of every semester. The candidate failing in any subject(s) will be permitted to appear in the subsequent examination. The practical examinations for core subjects and SBEC should be conducted at the end of the every semester.

Submission of record notebooks for practical examinations

Candidates appearing for practical examinations should submit bonafide Record notebooks prescribed for practical examinations, otherwise the candidates will not be permitted to appear for the practical examinations. However, in genuine cases of the students who could not submit their record notebooks, they may be permitted to appear for the practical examinations, provided the concerned Head of the Department certifies that the candidate has performed the experiments prescribed for the course. For such candidates zero (0) marks will be awarded for record notebooks.

9. Revision of Regulations and Curriculum

The University may revise/amend/ change the Regulations and Scheme of Examinations, as and when found necessary.

10. PASSING MINIMUM

(a) Theory

The candidate shall be declared to have passed the examination if the candidate **secures not less than 40 marks** put together out of 100 marks (CIA+EA). **Minimum 40% should be secured (30 out of 75) in EA** of each theory subject.

(b) Practical/Project viva voce

The candidate shall be declared to have passed the examination if the candidate **secures not less than 40 marks** put together out of 100 marks (CIA + EA). **Minimum 40% should be secured (24 out of 60) in EA** of each Practical subject.

11. MarksDistributionandQuestionPaperPatternforB.Sc.,

11.1 Theory–MarksDistribution

MaximumMarks : 100Marks
 External[EA] : 75Marks
 Internal[CIA] : 25Marks

(a). Theory-QuestionPaperPattern [External] (Total Marks:75)

| Section | Approaches | MarkPattern |
|---------|--|--|
| A | Oneword(Answerallquestions&Threequestions from each unit) | 15X1 = 15 (MultipleChoiceQuestions) |
| B | 100to200words(AnsweranyTwooutoffive questions & One question from eachunit) | 2X5=10(Analyticaltypequestions) |
| C | 500 to 1000 words(Answer ALL questions &One question from each unit with InternalChoice) | 5X10=50(Essaytypequestions) |

(b).Theory-Internal MarksDistribution

(TotalMarks:25)Attendance : 5Marks
 Assignment : 5Marks
 Test : 15Marks

11.2. Practical–MarksDistribution

MaximumMarks : 100
 MarksExternal[EA] : 60Marks
 Internal[CIA] : 40Marks

(a) practical-Externalmarksdistribution (TotalMarks:60)

Foreachpractical questionthemarksshouldbeawardedasfollows(External)

- i) Algorithm/flowchart -20%
- ii) Writingthe program in themain answerbook -30%
- iii) Testand debugthe program -30%
- iv) Printingthe correct output -20%

(Marksmaybeproportionatelyreducedfortheerrors committed ineach ofthe above)

PracticalQuestionPaperPattern

Studentshouldattendtwoquestions(either/orpattern)Not

e:

- (i) PracticalItoPractical VIIandSBECPracticalhavethesamepattern
- (ii) CoreandSBECPracticalExamination mustbeconductedattheendofeverySemester

(b). Practical-InternalMarksDistribution(TotalMarks:40)

- Record :15Marks
- InternalPracticalexaminations : 25Marks

11.3ProjectEvaluation:

| | |
|------------------------------|----------|
| ContinuousInternalAssessment | :40Marks |
| Evaluation(External) | :40Marks |
| Viva-voce(jointly) | :20Marks |

12. COMMENCEMENTOFTHIS REGULATION :

These regulations shall take effect from the academic year 2021-2022, i.e, for students who are tobeadmittedto thefirstyearoftheprogrammeduringtheacademicyear2021-2022and thereafter.

**Scheme of Examinations from the Academic Year 2021-
2022CreditDistributionas pertheUniversity Norms.**

| SEMESTER | I | II | III | IV | V | VI | Total Credits |
|--|-----------|-----------|------------|-----------|-----------|-----------|----------------------|
| PART-I | 3 | 3 | 3 | 3 | - | - | 12 |
| PART- II | 3 | 3 | 3 | 3 | - | - | 12 |
| ALLIED | 4 | 6 | 4 | 6 | - | - | 20 |
| CORETHEORY | 5 | 10 | 9 | 4 | 12 | 5 | 45 |
| COREPRATICAL | 2 | 2 | 2 | 2 | 4 | 8 | 20 |
| ELECTIVE | - | - | - | - | 4 | 8 | 12 |
| SBEC | - | - | - | - | 3 | 3 | 6 |
| NMSDC | - | 2 | 2 | 2 | 2 | 2 | 10 |
| NMEC | - | - | 2 | 2 | - | - | 4 |
| EVS | - | - | - | - | - | - | - |
| VALUEEDUCATION | 2 | - | - | - | - | - | 2 |
| ADD-ONCOURSE | - | - | - | - | - | - | - |
| EXTENSIONACTIVITY | - | - | - | - | - | 1 | 1 |
| PROFESSIONAL ENGLISH- PHYSICALSCIENCE | 4 | 4 | | | | | 8 |
| CumulativeTotalCredits | 23 | 30 | 25 | 22 | 25 | 27 | 152 |

COURSE OF STUDY AND SCHEME OF EXAMINATION

| SEM | PART | SUB CODE | TITLE OF THE SUBJECT | Hrs. | | CRE | MARKS | | |
|--------------------|----------------------|-------------|--|-----------|----------|-----------|------------|------------|-------------|
| | | | | Lect. | Lab | DIT | CIA | EA | TOTAL |
| SEMESTER-I | | | | | | | | | |
| I | I | 21UFTA01 | Tamil I | 6 | - | 3 | 25 | 75 | 100 |
| | II | 21UFEN01 | English I | 6 | - | 3 | 25 | 75 | 100 |
| | III | 21UCS01 | Core I: Problem Solving Through C | 6 | - | 5 | 25 | 75 | 100 |
| | III | 21UCSP01 | Practical I: C Programming | - | 3 | 2 | 40 | 60 | 100 |
| | III | | Allied I | 7 | - | 4 | 25 | 75 | 100 |
| | IV | 21UVE01 | Value Education | 2 | - | 2 | 25 | 75 | 100 |
| | IV | | Professional English-Physical Science I | 4 | - | 4 | 25 | 75 | 100 |
| | | | Total | 31 | 3 | 23 | 190 | 510 | 700 |
| SEMESTER-II | | | | | | | | | |
| II | I | 21UFTA02 | Tamil II | 6 | - | 3 | 25 | 75 | 100 |
| | II | 21UFEN02 | English II | 4 | - | 3 | 25 | 75 | 100 |
| | | | NMSDC- I Effective Learning | 2 | - | 2 | 25 | 75 | 100 |
| | III | 21UCS02 | Core II: Data Structure and Algorithms | 3 | - | 5 | 25 | 75 | 100 |
| | III | 21UCSP02 | Practical II: Data Structure Using C | - | 3 | 2 | 40 | 60 | 100 |
| | III | 21UCS03 | Core III: Computer Organization and Architecture | 4 | - | 5 | 25 | 75 | 100 |
| | III | | Allied II | 5 | - | 4 | 25 | 75 | 100 |
| | III | | Allied-Practical | - | 2 | 2 | 40 | 60 | 100 |
| | IV | 21UES01 | Environmental Studies | 1 | - | - | 25 | 75 | 100 |
| | IV | | Professional English-Physical Science II | 4 | - | 4 | 25 | 75 | 100 |
| | | | Total | 29 | 5 | 30 | 280 | 720 | 1000 |
| | SEMESTER -III | | | | | | | | |
| III | I | 21UFTA03 | Tamil- III | 6 | - | 3 | 25 | 75 | 100 |
| | II | 21UFEN03 | English- III | 6 | - | 3 | 25 | 75 | 100 |
| | III | 21UCS04 | Core IV: Relational Database Management Systems | 3 | - | 5 | 25 | 75 | 100 |
| | III | 21UCSP03 | Practical III: SQL and PL/SQL | - | 2 | 2 | 40 | 60 | 100 |
| | III | 21UCS05 | Core V: Computer Network | 3 | - | 4 | 25 | 75 | 100 |
| | III | | Allied III | 6 | - | 4 | 25 | 75 | 100 |
| | III | | Allied-Practical | - | - | - | - | - | - |
| | IV | | NMSDC-II Programming Essentials for Employability (Fundamentals of Coding and Cloud) | 2 | - | 2 | 25 | 75 | 100 |
| | IV | NMEC-1 | Non-Major Elective Course-I | 2 | - | 2 | 25 | 75 | 100 |
| | | | Total | 28 | 2 | 25 | 215 | 585 | 800 |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| SEM | PART | SUB CODE | TITLE OF THE SUBJECT | Hrs. | | CRE DIT | MARKS | | |
|---------------------|------|--------------------|--|-----------|-----------|------------|------------|------------|------------|
| | | | | Lect. | Lab | | CIA | EA | TOTAL |
| SEMESTER –IV | | | | | | | | | |
| IV | I | 21UFTA04 | Tamil–IV | 6 | - | 3 | 25 | 75 | 100 |
| | II | 21UFEN04 | English–IV | 6 | - | 3 | 25 | 75 | 100 |
| | III | 21UCS06 | CoreVI: Programmigin Java | 4 | - | 4 | 25 | 75 | 100 |
| | III | 21UCSP04 | Practical IV:Javaprogramming | - | 3 | 2 | 40 | 60 | 100 |
| | III | | AlliedIV | 5 | - | 4 | 25 | 75 | 100 |
| | III | | Allied-PracticalLab | - | 2 | 2 | 40 | 60 | 100 |
| | IV | NMSDC | DigitalSkillsforEmployability | 2 | - | 2 | 25 | 75 | 100 |
| | IV | NMEC-2 | Non-MajorElective–II | 2 | - | 2 | 25 | 75 | 100 |
| | IV | Add-on | Add-onCourseInternshipProgramme | - | - | - | - | - | - |
| | | | Total | 25 | 5 | 22 | 230 | 570 | 800 |
| SEMESTER –V | | | | | | | | | |
| V | III | 21UCS07 | CoreVII:OperatingSystems | 4 | - | 4 | 25 | 75 | 100 |
| | III | 21UCS08 | CoreVIII:Web Technology | 4 | - | 4 | 25 | 75 | 100 |
| | III | 21UCSP05 | PracticalV:WebTechnologyLab | - | 3 | 2 | 40 | 60 | 100 |
| | III | 21UCS09 | CoreIX: Linux andShellProgramming | 5 | - | 4 | 25 | 75 | 100 |
| | III | 21UCSP06 | PracticalVI:Shell Programming | - | 4 | 2 | 40 | 60 | 100 |
| | III | 21UCSE01 /02/03 | Elective–I | 5 | - | 4 | 25 | 75 | 100 |
| | IV | | NMSDC –Cloud and IT Essentials for Employability-Cyber Security | 2 | - | 2 | 25 | 75 | 100 |
| | IV | 21UCSSP03 | SBECIII- MobileApplicationDevelopmentLab | - | 3 | 3 | 40 | 60 | 100 |
| | | | Total | 20 | 10 | 25 | 245 | 555 | 800 |
| SEMESTER–VI | | | | | | | | | |
| VI | III | 21UCS10 | CoreX:Programmigin Python | 6 | - | 5 | 25 | 75 | 100 |
| | III | 21UCSP07 | PracticalVII:PythonProgramming | - | 4 | 3 | 40 | 60 | 100 |
| | III | 21UCSPR01 | MiniProject | - | 5 | 5 | 40 | 60 | 100 |
| | III | 21UCSE04 /05/06 | Elective-II | 5 | - | 4 | 25 | 75 | 100 |
| | III | 21UCSE07 /08/09 | Elective-III | 5 | - | 4 | 25 | 75 | 100 |
| | IV | 21UCSS01 | SBEC IV-Quantitative Aptitude | 3 | - | 3 | 25 | 75 | 100 |
| | IV | NMSDC | EmergingTechnologyforEmployability– Cyber Security | 2 | - | 2 | 25 | 75 | 100 |
| | V | 21UEX01 | ExtensionActivities | - | - | 1 | - | - | - |
| | | | Total | 21 | 9 | 27 | 205 | 495 | 700 |

PracticalExaminationshouldbeconductedinthesamesemester

ELECTIVE SUBJECTS

Elective-I

| Sem | Part | SubjectCode | Subject |
|-----|------|-------------|-----------------------------|
| V | III | 21UCSE01 | Data Mining and Warehousing |
| | | 21UCSE02 | Software Project Management |
| | | 21UCSE03 | Software Engineering |

Elective-II

| Sem | Part | SubjectCode | Subject |
|-----|------|-------------|-------------------|
| VI | III | 21UCSE04 | Mobile Computing |
| | | 21UCSE05 | Wireless Network |
| | | 21UCSE06 | Computer Graphics |

Elective-III

| Sem | Part | SubjectCode | Subject |
|-----|------|-------------|--------------------|
| VI | III | 21UCSE07 | Software Testing |
| | | 21UCSE08 | Network Security |
| | | 21UCSE09 | Internet of Things |

NonMajorElectiveCourse–(NMEC)

ExtraDisciplinarySubjectsofferedbytheDepartmentofComputerScience

The department can offer any one of these subjects to the other major subject students in each semester.

| PART | SEM | SUB CODE | TITLE OF THE SUBJECT | Lect. Hours | Credit | MARKS | | |
|------|-----|----------|--|-------------|--------|-------|----|-------|
| | | | | | | CIA | EA | TOTAL |
| IV | III | 21UCSN01 | NMEC I: Basics of Computers | 2 | 2 | 25 | 75 | 100 |
| | | 21UCSN02 | NMEC I: Computer Applications for Automation | 2 | 2 | 25 | 75 | 100 |
| | IV | 21UCSN03 | NMEC II: Basics of Internet | 2 | 2 | 25 | 75 | 100 |
| | | 21UCSN04 | NMEC II: Image Editing Tool | 2 | 2 | 25 | 75 | 100 |

SBEC–SkillBasedElectiveCourses

| SEM | PART | SUB CODE | TITLE OF THE SUBJECT | Hrs. | | CRE DIT | MARKS | | |
|-----|------|-----------|--|-------|-----|---------|-------|----|-------|
| | | | | Lect. | Lab | | CIA | EA | TOTAL |
| III | IV | 21UCSSP01 | SBEC- I: Office Automation Lab | - | 2 | 3 | 40 | 60 | 100 |
| IV | IV | | | | | | | | |
| V | IV | 21UCSSP03 | SBEC-III: Mobile Application Development | - | 3 | 3 | 40 | 60 | 100 |
| VI | IV | 21UCSS01 | SBEC-IV: Quantitative Aptitude | 3 | - | 3 | 25 | 75 | 100 |

AlliedSubjectsforanyDegreeofferedbytheDepartmentof ComputerScience

SYLLABUS-CBCSPATTERN

EFFECTIVEFROM THEACADEMICYEAR2021-2022

All subjects should be handled and valued by Department of Computer Science only. ForUniversity practical examinationsbothInternaland External examiners should be appointedfromDepartment of ComputerScience.

FIRSTOPTION(AlliedComputerScience)

FirstYear/SecondYear(SelectanyoneoftheSubjectwithPractical)

| PART | SEMESTER | TITLEOFTHE SUBJECT | Hrs. | | CRE DIT | MARKS | | |
|------|-------------------|--|-------|-----|------------|-------|----|-------|
| | | | Lect. | Lab | | CIA | EA | TOTAL |
| III | I/III 21UCSA01 | AlliedPaper–I FundamentalofComputers | 7 | - | 4 | 25 | 75 | 100 |
| | II/IV 21UCSA02 | AlliedPaper–II ComputerApplicationsinOffice | 5 | - | 4 | 25 | 75 | 100 |
| | 21UCSAP01 | AlliedPractical OfficeAutomation | - | 2 | 2 | 40 | 60 | 100 |

SECONDOPTION(Allied ComputerScience)

FirstYear/SecondYear(SelectanyoneoftheSubjectwithPractical)

| PART | SEMESTER | TITLEOFTHE SUBJECT | Hrs. | | CRE DIT | MARKS | | |
|------|-------------------|--|-------|-----|------------|-------|----|-------|
| | | | Lect. | Lab | | CIA | EA | TOTAL |
| III | I/III 21UCSA03 | AlliedPaper–I DatabaseSystems | 7 | - | 4 | 25 | 75 | 100 |
| | II/IV 21UCSA04 | AlliedPaper–II E-CommerceTechniques | 5 | - | 4 | 25 | 75 | 100 |
| | 21UCSAP02 | AlliedPractical HTMLProgramming | - | 2 | 2 | 40 | 60 | 100 |

AlliedSubjectsforComputerScience/InformationScience /BCA

SYLLABUS-CBCSPATTERN

EFFECTIVEFROM THEACADEMICYEAR2021-2022

FIRSTOPTION

FirstYear/SecondYear(SelectanyoneoftheSubjectwithPractical)

| PART | SEMESTER | TITLEOFTHE SUBJECT | Hrs. | | CRE DIT | MARKS | | |
|------|----------|--|-------|-----|------------|-------|----|-------|
| | | | Lect. | Lab | | CIA | EA | TOTAL |
| III | I/III | AlliedPaper–I StatisticalMethodsandtheirApplicationsI | 7 | - | 4 | 25 | 75 | 100 |
| | II/IV | AlliedPaper–II StatisticalMethodsandtheirApplicationsII | 5 | - | 4 | 25 | 75 | 100 |
| | | AlliedPractical StatisticalPractical | - | 2 | 2 | 40 | 60 | 100 |

SECONDOPTION

FirstYear/SecondYear(SelectanyoneoftheSubjectwithPractical)

| PART | SEMESTER | TITLEOFTHE SUBJECT | Hrs. | | CRE DIT | MARKS | | |
|------|----------|--|-------|-----|------------|-------|----|-------|
| | | | Lect. | Lab | | CIA | EA | TOTAL |
| III | I/III | AlliedPaper–I PrinciplesofAccounting | 7 | - | 4 | 25 | 75 | 100 |
| | II/IV | AlliedPaper II CostandManagement Accounting | 5 | - | 4 | 25 | 75 | 100 |
| | | AlliedPractical CommercePractical | - | 2 | 2 | 40 | 60 | 100 |

THIRDOPTION

FirstYear/SecondYear(SelectanyoneoftheSubjectwithPractical)

| PART | SEMESTER | TITLEOFTHE SUBJECT | Hrs. | | CRE DIT | MARKS | | |
|------|----------|----------------------------|-------|-----|------------|-------|----|-------|
| | | | Lect. | Lab | | CIA | EA | TOTAL |
| III | I/III | AlliedMathematicsPaper-I | 7 | - | 4 | 25 | 75 | 100 |
| | II/IV | AlliedMathematicsPaper-II | 5 | - | 4 | 25 | 75 | 100 |
| | | AlliedMathematicsPractical | - | 2 | 2 | 40 | 60 | 100 |

FOURTHOPTION

FirstYear/SecondYear(SelectanyoneoftheSubjectwithPractical)

| PART | SEMESTER | TITLEOFTHE SUBJECT | Hrs. | | CRE DIT | MARKS | | |
|------|----------|------------------------|-------|-----|------------|-------|----|-------|
| | | | Lect. | Lab | | CIA | EA | TOTAL |
| III | I/III | Allied PhysicsPaper -I | 7 | - | 4 | 25 | 75 | 100 |
| | II/IV | AlliedPhysics PaperII | 5 | - | 4 | 25 | 75 | 100 |
| | | AlliedPhysicsPractical | - | 2 | 2 | 40 | 60 | 100 |

FIFTHOPTION

FirstYear/SecondYear(SelectanyoneoftheSubjectwithPractical)

| PART | SEMESTER | TITLEOFTHE SUBJECT | Hrs. | | CRE DIT | MARKS | | |
|------|----------|----------------------------|-------|-----|------------|-------|----|-------|
| | | | Lect. | Lab | | CIA | EA | TOTAL |
| III | I/III | AlliedElectronicsPaper -I | 7 | - | 4 | 25 | 75 | 100 |
| | II/IV | AlliedElectronicsPaperII | 5 | - | 4 | 25 | 75 | 100 |
| | | AlliedElectronicsPractical | - | 2 | 2 | 40 | 60 | 100 |

SEMESTER I

| | | | |
|---------------------|---------------------------------|-----------------------|----------|
| SubjectTitle | PROBLEMSOLVING THROUGH C | Semester | I |
| SubjectCode | 21UCS01 | Specialization | NA |
| Type | Core:Theory | L:T:P:C | 86:6:0:5 |

COURSE OBJECTIVE:

1. Itaimstoprovideexposuretoproblem-solvingthroughprogramming.
2. To apprehend the basic concepts of C- Programming language. This course introducesfundamentalconcepts such as arrays andstructures.
3. Itcoversconcepts suchasarrays,pointersandfile handlingmethods.
4. Itprovidestechnical skillstodesignanddevelopvariousapplications.

| CO Number | CO Statement | Knowledge Level |
|------------------|---|------------------------|
| CO1 | RecognizetheBasicTerminologies ofC Programming | K1 |
| CO2 | Understandingthe statement structureand apply simpleproblems | K2,K3 |
| CO3 | Understandandapplythepre-definedfunctionsand user defined functions and then apply insimpleproblems | K3 |
| CO4 | DemonstratetheoperationofStructuresand unions. | K3,K4 |
| CO5 | Recognizetheoperation ofFiles | K3,K4 |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| SubjectTitle | PROBLEMSOLVING THROUGH C | Semester | I | |
|--------------------------|---|----------------|-----------|--|
| SubjectCode | 21UCS01 | Specialization | NA | |
| Type | Core:Theory | L:T:P:C | 86:6:0:5 | |
| Unit | Contents | Levels | Sessions | |
| I | OverviewofComputersandProgramming:ElectronicComputersThenandNow,ComputerHardware,Computer Software , The Software Development Method,Applying the Software Development Method , ProfessionalEthicsforComputerProgrammersFundamentals ofCLanguages:History ofC,CharacterSet,IdentifiersandOverview of C:– Introduction - character set - C tokens -keyword & identifiers – constants – variables - data types – Declarationsofvariables,operators-expressions- Evaluation of expression - Mathematical functions - Formattedinput and output | K1 | 17 | |
| II | Decision Statements: If, if else, switch, break, continue - the?Operator-TheGOTOstatement.– LoopControlStatements: Introduction – for, nested for loops – while,do-whilestatements–Arrays:One-dimensional-Twodimensional -Multidimensional arrays | K2,K3 | 17 | |
| III | Character string handling - Declaring and initializing stringvariables - Reading strings from terminal - Writing stringstoscreen-Stringhandlingfunctions-User-definedfunctions:Needforuserdefinedfunctions– Typesoffunctions - calling a function category of functions - noarguments and no return values - Arguments but no returnvalues-Argumentswithreturnvalues–Recursion- functions with arrays - The scope and lifetime of variablesinfunctions | K2,K3 | 17 | |
| IV | Structure: Definition- Structure initialization - Comparisonof structure variables - Arrays of structures - Arrays withstructures - Structures within structures – unions. Pointers:understandingpointers-accessingthe address ofavariablenon- - declaring and initializing pointers - accessing a variablethrough its pointers - pointer expressions - pointers andarrays-pointersandcharacterstrings- pointersandfunctions -pointers and structures | K3,K4 | 17 | |
| V | FileManagementinC:definingandopeningfile-closingfile- I/Ooperationsonfiles-errorhandlingduring I/Ooperations-Randomaccesstofiles- commandlinearguments.Preprocessors | K3,K4 | 18 | |
| LearningResources | | | | |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | |
|------------------------|--|
| TextBooks | 1. ProblemsolvingandprogramdesigninC/JeriR.Hanly, ElliotB.Koffman .—7th ed.,PEARSON 2. E.Balagurusamy, ProgramminginANSIC, fifthedition, TataMcGraw-Hill. |
| Reference Books | 1.V.RajaramanComputerProgramminginCPrenticeHallofIndiaPvtLtd, 1st Edition, 2004 2YashwvantKanetkarLetusCBPBPublications 13thEdition, 2014 |
| Website/ Link | http://www.learn-c.org / http://crasseux.com/books/tutorial/ |

MappingwithProgrammeOutcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|------------------|------------|------------|------------|------------|
| CO1 | S | S | S | - |
| CO2 | S | M | M | S |
| CO3 | S | L | L | M |
| CO4 | M | S | M | S |
| CO5 | S | L | S | S |

S-Strong, M-Medium ,L-Low

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|----------------------|---------------------------------|-----------------------|-----------------|
| Subject Title | PRACTICALI:C-PROGRAMMING | Semester | I |
| Subject Code | 21UCSP01 | Specialization | NA |
| Type | Core:Practical | L:T:P:C | 45:0:3:2 |

COURSEOBJECTIVE:

1. To impart Practical Training in C Programming Language.
2. Familiarize the different control and decision making statements in -C.
3. Build programs using arrays and strings.
4. Provide knowledge on working with files and functions.

LIST OF PROGRAMS

1. Develop a C program to print prime numbers within the range of integers given..
2. Develop a C Program to find the sum and average of given N numbers.
3. Develop a C Program using all decision making and looping statements.
4. Develop a C Program to arrange the given numbers in ascending/descending order.
5. Develop a C Program to perform matrix multiplication.
6. Develop a C Program to manipulate string functions.
7. Develop a C Program to find the Fibonacci series for a given number using recursive function.
8. Develop a C Program to show Call by Value and Call by Reference.
9. Develop a C Program to swap two numbers using pointers.
10. Develop a C Program to update the student's details using various file modes.
11. Develop a C Program to copy the content of one file to another file.

COURSE OUTCOME:

1. Study all the Basic Statements in C Programming.
2. Practice the usage of branching and looping statements.
3. Apply string functions and arrays usage.
4. Analyze the use of pointers and files.

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|---------------------|--|-----------------------|-----------------|
| SubjectTitle | DATA STRUCTURES ANDALGORITHMS | Semester | II |
| SubjectCode | 21UCS02 | Specialization | NA |
| Type | Core:Theory | L:T:P:C | 45:3:0:5 |

COURSEOBJECTIVE:

1. Understandthebasicconceptofalgorithms.
2. Tointroducethevariousdatastructuresandtheirimplementations.
3. Evaluatetheperformance ofvarious sortingalgorithms.

| CO Number | COStatement | KnowledgeLevel |
|----------------------|---|-----------------------|
| CO1 | Remembertheconcept ofalgorithms. | K1 |
| CO2 | Understandingthestackandqueues. | K2 |
| CO3 | Applylinkedlist forother data structures. | K2,K3 |
| CO4 | Evaluatethe trees and sortingmethods. | K3,K4 |
| CO5 | Analyzethesortingandfileorganizations. | K5 |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | | |
|--------------------------|---|-----------------------|-----------------|--|
| Subject Title | DATASTRUCTURESANDALGORITHMS | Semester | II | |
| Subject Code | 21UCS02 | Specialization | NA | |
| Type | Core:Theory | L:T:P:C | 45:3:0:5 | |
| Unit | Contents | Levels | Sessions | |
| I | Introductionofalgorithms,analyzingalgorithms,Arrays:Representati on of Arrays, Implementation of Stacks and queues,Application of Stack: Evaluation of Expression - Infix to postfixConversion- Multiplestacks andQueues, SparseMatrices. | K1 | 8 | |
| II | Linkedlist:SinglyLinkedlist-Linkedstacksandqueues- polynomialaddition- More on linkedLists- Doubly linkedListandDynamicStorageManagement-Garbagecollectionand compaction. | K2 | 8 | |
| III | Trees: Basic Terminology - Binary Trees - Binary Treerepresentations-Binarytrees-Traversal- MoreonBinaryTrees-Threaded Binary trees -counting Binary trees. Graphs:Terminology and Representations - Traversals, connectedcomponentsandspanning Trees,Single SourceShortestpathproblem. | K2,K3 | 8 | |
| IV | SymbolTables:StaticTreeTables-DynamicTreeTables- HashTablesHashingFunctions-overflowHandling.Externalsorting: StorageDevices-sortingwithDisks:K-waymerging-sortingwithtapes. | K3,K4 | 10 | |
| V | Internal sorting : Insertion sort - Quick sort - 2 way Merge sort - Heap sort - shell sort - sorting on keys. Files: Files, Queries andsequentialorganizations- Index Techniques-File organization | K5 | 11 | |
| LearningResources | | | | |
| Text Books | 1.EllisHorowitz,SartajShani,FundamentalsofDataStructures,Galgotia publication. | | | |
| Reference Books | 1. DatastructuresUsingCAaronM.Tenenbaum,YedidiahLangsam,MosheJ.Augens tein, Kindersley(India)Pvt.Ltd., 2. DatastructureandAlgorithms,AlfredV.Aho,JohnE.Hopcroft,JeffreyD.Ullman,P earson Education Pvt.Ltd., | | | |
| Website/ Link | 1. www.freotechbooks.com/a-practical-introduction-to-data-structures-and-algorithm-analysis-thirdedition-c-version-t804.html 2. http://www.nptel.ac.in/courses/106101060/ 3. http://www.nptel.ac.in/courses/106104019/ | | | |

MappingwithProgrammeOutcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|------------------|------------|------------|------------|------------|
| CO1 | S | S | S | - |
| CO2 | S | M | M | S |
| CO3 | S | L | L | M |
| CO4 | M | S | M | S |
| CO5 | S | L | S | S |

S-Strong,M-Medium,L -Low

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | | | |
|----------------------|--------------------------------|-----------------------|-----------------|
| Subject Title | DATA STRUCTURES USING C | Semester | II |
| Subject Code | 21UCSP02 | Specialization | NA |
| Type | Core: Practical | L:T:P:C | 45:0:3:2 |

COURSE OBJECTIVE:

1. To impart Practical Training in C Programming Language.
2. Understanding the data structures stack and queues.
3. Apply linked list for other data structures.
4. Analyze the sorting and file organizations.

LIST OF PROGRAMS:

1. Write a C program to create two array list of integers. Sort and store the elements of both of them in third list.
2. Write a C program to multiply two matrices A and B and store the resultant matrix in C using arrays.
3. Write a C program to experiment the operation of STACK using array.
4. Write a C program to create menu driven option to implement QUEUE to perform the following
(i) Insertion (ii) Deletion (iii) Modification (iv) Listing of elements
5. Write a C program to create Linked list representation of employee records and do the following operations using pointers.
(i) To add a new record.
(ii) To delete an existing record.
(iii) To print the details about an employee.
(iv) To find the number of employees in the structure.
6. Write a C Program to count the total nodes of the linked list and to insert an element at the end of the linked list.
7. Write a C program to insert an element at the beginning of a doubly linked list.
8. Write a C program to display the hashtable, using the mid square method.
9. Write a C program to traverse the given binary tree using all traversal methods.
10. Write a C program to insert an element in a binary tree.

COURSE OUTCOME:

1. Study all the Basic operation of matrices and stack.
2. Practice the usage of branching and looping statements in hashtable.
3. Apply arrays for stack and queue.
4. Analysis the use of pointers for linked list, doubly linked list and tree traverse.

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|---------------------|--|-----------------------|-----------------|
| SubjectTitle | COMPUTERORGANIZATIONAND ARCHITECURE | Semester | II |
| SubjectCode | 21UCS03 | Specialization | NA |
| Type | Core:Theory | L:T:P:C | 56:4:0:5 |

COURSEOBJECTIVE:

1. ToknowStructureandfunctionsofComputerarchitectureandorganizations.
2. Observethe characteristics ofvariouscomputermemoryconcepts.
3. Tounderstandthecomputerarithmeticandmachineinstructions.
4. Understandtheparallelprocessingconcepts.

| CO Number | COStatement | KnowledgeLevel |
|----------------------|---|-----------------------|
| CO1 | Recognizethe Basic Numbersystem andlogicgates. | K1 |
| CO2 | Understandingthe flipflopsandKarnaughmaps. | K2,K3 |
| CO3 | Understandandapplymicrooperationand data transfer. | K3 |
| CO4 | Demonstratethe computerarithmeticandaddressing modes. | K3,K4 |
| CO5 | AnalyzethememoryandI/Oorganizations. | K3,K4 |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| SubjectTitle | COMPUTERORGANIZATIONAND ARCHITECTURE | Semester | II |
|---------------------|---|-----------------------|-----------------|
| SubjectCode | 21UCS03 | Specialization | NA |
| Type | Core:Theory | L:T:P:C | 56:4:0:5 |
| Unit | Contents | Levels | Sessions |
| I | DigitalPrinciples:Definitionfordigitalsignals– Digitalwaveforms–Digitallogic– MovingandStoringDigitalInformation– DigitalOperations–Digital computers – Digital Integrated Circuits. DigitalLogic: The Basic Gates - NOT, OR, AND –UniversalLogicGates–NOR,NAND– AND-OR-InvertGates– PositiveandNegativeLogic. | K1 | 12 |
| II | CombinationalLogicCircuits:BooleenLawsAndTheorems – Sum-of-products Method – Truth Table toKarnaugh Map – Pairs, Quads, and Octets – KarnaughSimplification – Don't-care Conditions – Product-of- sumsSimplification.Data–ProcessingCircuits:16-to- 1Multiplexer–1-to-16De-multiplexer–BCD-to-decimal Decoder–Decimal-to-BCD Encoder– Exclusive- orGates–ParityGenerationandApplication. | K2,K3 | 12 |
| III | Number Systems and Codes: Binary Number System – Binary-to-decimalConversion–Decimal-to- binaryConversion – Octal Numbers – Hexadecimal Numbers –TheASCIICode–TheExcess-3Code– TheGrayCode.ArithmeticCircuits:BinaryAddition– BinarySubtraction –UnsignedBinaryNumbers–Sign-magnitudeNumbers- 2'SComplementRepresentation- 2'SComplimentArithmetic. | K2,K3 | 12 |
| IV | Arithmetic Circuits: Arithmetic Building Blocks – TheAdder - Subtractor – Fast Adder – ArithmeticLogicUnit – Binary Multiplication and Division. Clocks andTimingCircuits:ClockWaveforms.Flip- Flops:RSFlip-flops–Edge-triggeredDFlip-flops- EdgetriggeredJKFlip-flops –JKMaster-slaveFlip-flops. | K3,K4 | 10 |
| V | Registers: Serial-In Serial-Out – Serial-In Parallel-Out – Parallel-InSerial-Out–Parallel-InParallel- Out.Memory:Introduction-MagneticMemory- OpticalMemory-MemoryAddressing- ROMs,PROMs,EPROMsandEEPROM– RAMs.ASimpleComputer | K3,K4 | 10 |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

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|--|---------|--|--|
| | Design. | | |
|--|---------|--|--|

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | LearningResources |
|------------------------|---|
| TextBooks | DonaldPLeach,AlbertPaulMalvinoandGoutamSaha,-DigitalPrinciplesand Applications,8 th Edition,TMH,2006. |
| Reference Books | <ol style="list-style-type: none">1. Morris Mano, "Digital Logic and Computer Design," 4thEdition, Pearson,20082. Thomas C Bartee, "Digital Computer Fundamentals," sixth edition, McGraw-Hill, 19853. Pradeep K. Sinha, PritiSinha , "Computer Fundamentals," Sixth Edition,BPBPublications,2007 |
| Website /Link | www.javatpoint.com/computer-organization-and-architecture-tutorial |

MappingwithProgrammeOutcomes

| CONumber | PO1 | PO2 | PO3 | PO4 |
|-----------------|------------|------------|------------|------------|
| CO1 | S | S | S | - |
| CO2 | S | M | M | S |
| CO3 | S | L | L | M |
| CO4 | M | S | M | S |
| CO5 | S | L | S | S |

S-Strong,M-Medium ,L-Low

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|---------------------|--|-----------------------|-----------------|
| SubjectTitle | RELATIONAL DATABASEMANAGEMENT SYSTEMS | Semester | III |
| SubjectCode | 21UCS04 | Specialization | NA |
| Type | Core:Theory | L:T:P:C | 41:3:0:5 |

COURSEOBJECTIVE:

1. UnderstandthebasicconceptofDataBaseanddatabasemanagementsystem.
2. UnderstandandapplytheSQLfundamentals.
3. EvaluatetheRelational databasedesign.

| CO Number | COStatement | KnowledgeLevel |
|----------------------|--|-----------------------|
| CO1 | Remembertheconceptofdatabase. | K1 |
| CO2 | UnderstandingthedatamodelsandER Diagram. | K2 |
| CO3 | ApplySQLcommands. | K2,K3 |
| CO4 | EvaluatetheDBMSinSQL. | K3,K4 |
| CO5 | AnalyzetheTransactionmanagement. | K5 |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| Subject Title | RELATIONAL DATABASEMANAGEMENTSYSTEMS | Semester | III |
|--------------------------|---|----------------|-----------------|
| Subject Code | 21UCS04 | Specialization | NA |
| Type | Core:Theory | L:T:P:C | 41:3:0:5 |
| Unit | Contents | Levels | Sessions |
| I | Introduction:DatabaseSystemApplications-PurposeofDatabaseSystems-ViewofData-DatabaseLanguages-Transaction Management-Database Architecture-Database usersandAdministrators. Relational Model: Structure of Relational Databases – DatabaseDesign–ERModel-OverviewoftheDesignProcess–The Entity – relationship Model – Constraints – Entity RelationshipDiagrams. | K1 | 10 |
| II | RelationalAlgebraOperations–RelationalLanguages:TheTuple Relational Calculus –The Domain Relational Calculus – SQL:Background–DataDefinition–BasicStructureofSQL Queries – Set Operations – Aggregate Functions – Null Values – NestedSub-Queries–Views–Modification oftheDatabase. | K2 | 7 |
| III | DataNormalization:PitfallsinRelational DatabaseDesign–Decomposition – Functional Dependencies – Normalization – FirstNormalForm– Second NormalForm – ThirdNormalForm – Boyce-Codd Normal Form – Fourth Normal Form–Fifth Normal Form – Denormalization – Database Security: DataSecurityRequirements–ProtectingtheDatawithin theDatabase –GrantingandRevokingPrivileges–DataEncryption. | K2,K3 | 8 |
| IV | PL/SQL: A programming Language: History - Fundamentals – Block Structure – Comments – Data Types – Other Data Types – Declaration–Assignmentoperation–Bindvariables– SubstitutionVariables–Printing– ArithmeticOperators.ControlStructuresandEmbeddedSQL:Contr olStructures–NestedBlocks–SQLINPL/SQL–DataManipulation- TransactionControlstatements.PL/SQLCursorsandExceptions:Cu rsors–Implicit&ExplicitCursorsandAttributes –CursorFORloops–SELECT...FORUPDATE–WHERE CURRENTOFclause–CursorwithParameters–CursorVariables– Exceptions–Typesof Exceptions. | K3,K4 | 8 |
| V | PL/SQL Composite Data Types: Records – Tables – V arrays.Named Blocks: Procedures – Functions – Packages - Triggers –DataDictionaryViews. | K5 | 8 |
| LearningResources | | | |
| Text Books | 1. –DatabaseSystem Concepts ,AbrahamSilberschatz, HenryF.Korth, S.Sudarshan, TMH5 th Edition (Units–I,II) 2. –Fundamentals ofDatabaseManagement Systems , AlexisLeon, MathewsLeon, VijayNicoleImprints PrivateLimited. (Unit-III) 3. –DatabaseSystemsUsingOracle NileshShah,2 nd edition,PHI.UNIT-IV: Chapters 10 &11UNIT-V:Chapters 12,13 &14. | | |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | |
|------------------------|---|
| Reference Books | 1.AlexisLeon&MathewsLeon,"EssentialofDBMS",2ndreprint,VijayNicolePublications, 2009. |
| Website /Link | <ul style="list-style-type: none">• https://www.w3schools.com/sql• https://www.tutorialspoint.com/sql• https://livesql.oracle.com |

MappingwithProgrammeOutcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|------------------|------------|------------|------------|------------|
| CO1 | S | S | S | - |
| CO2 | S | M | M | S |
| CO3 | S | L | L | M |
| CO4 | M | S | M | S |
| CO5 | S | L | S | S |

S-Strong,M-Medium ,L-Low

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|---------------------|----------------------------------|-----------------------|-----------------|
| SubjectTitle | PRACTICALIII–SQLandPL/SQL | Semester | III |
| SubjectCode | 21UCSP03 | Specialization | NA |
| Type | Core:Practical | L:T:P:C | 30:0:2:2 |

COURSEOBJECTIVE:

1. ToimpartPracticalTraininginDDLCommands.
2. FamiliarizethedifferentDMLCommands.
3. BuildquerieswithSQLCommands.
4. Provideknowledgeon workingwith bigtables.

LISTOFPROGRAMS:

NOTE:Demonstratethe followingSQLcommandsand cantakeanybackendRDBMS systemforimplementation purpose.

1. DataDefinitionofBaseTables.
2. DDLwithPrimarykeyconstraints.
3. DDLwith constraints andverification byinsertcommand.
4. DataManipulationof BaseTablesandViews.
5. DemonstratetheQuerycommands.
6. Write a PL/SQL code block that will accept an account number from the user and debit anamount of Rs. 2000 from the account if the account has a minimum balance of 500aftertheamount is debited. TheProcess is tofired on theAccounts table.
7. Write a PL/SQL code block to calculate the area of the circle for a value of radius varyingfrom 3 to 7. Store the radius and the corresponding values of calculated area in a tableAreas.Areas – radius, area.
8. WriteaPL/SQLblockofcodefor reversinganumber. (Example:1234 as 4321).
9. Create a transparent audit system for a table Client_master (client_no, name, address,Bal_due).Thesystemmust keeptrack oftherecordsthat arebeingdeletedor updated.Thefunctionality being when a record is deleted or modified the original record details and thedate of operation are stored in the audit client(client_no, name, bal_due, operation, user-id,opdate)table, then the deleteorupdateis allowedto go through.

COURSEOUTCOME:

1. Studyall theBasic DDL and DMLCommands.
2. PracticetheusageofSQLStatements.
3. ApplyPL/SQLcodeusage.
4. AnalysisitheuseofPL/SQLforcomplexproblems.

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|---------------------|-------------------------|-----------------------|-----------------|
| SubjectTitle | COMPUTERNETWORKS | Semester | III |
| SubjectCode | 21UCS05 | Specialization | NA |
| Type | Core:Theory | L:T:P:C | 41:3:0:4 |

COURSEOBJECTIVE:

1. To understand the concept of Computer network.
2. To impart knowledge about networking and internet devices.

| CO Number | CO Statement | Knowledge Level |
|------------------|---|------------------------|
| CO1 | Remember the concept of networks and its types. | K1 |
| CO2 | Understanding the wireless communications. | K2 |
| CO3 | Understand and Apply data link protocols. | K3 |
| CO4 | Evaluate the network design issues. | K3,K4 |
| CO5 | Analyze the connection issues. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | | | |
|------------------------|---|-----------------------|-----------------|
| Subject Title | COMPUTER NETWORKS | Semester | III |
| Subject Code | 21UCS05 | Specialization | NA |
| Type | Core: Theory | L:T:P:C | 41:3:0:4 |
| Unit | Contents | Levels | Sessions |
| I | Introduction – Network Hardware - Software - Reference Models - OSI and TCP/IP Models - Example Networks: Internet, ATM, Ethernet and Wireless LANs - Physical Layer - Theoretical Basis for Data Communication - Guided Transmission Media. | K1 | 8 |
| II | Wireless Transmission - Communication Satellites - Telephone System: Structure, Local Loop, Trunks and Multiplexing and Switching. Data Link Layer: Design Issues - Error Detection and Correction. | K2 | 8 |
| III | Elementary Data Link Protocols - Sliding Window Protocols - Data Link Layer in the Internet - Medium Access Layer - Channel Allocation Problem - Multiple Access Protocols - Bluetooth. | K3 | 8 |
| IV | Network Layer - Design Issues - Routing Algorithms - Congestion Control Algorithms - IP Protocol - IP Addresses - Internet Control Protocols. | K3, K4 | 8 |
| V | Transport Layer - Services - Connection Management - Addressing, Establishing and Releasing a Connection - Simple Transport Protocol - Internet Transport Protocols (ITP) - Network Security: Cryptography. | K5 | 9 |
| | Learning Resources | | |
| Text Books | 1. A. S. Tanenbaum, — Computer Networks, Prentice-Hall of India 2008, 4th Edition. | | |
| Reference Books | 1. Stallings, — Data and Computer Communications, Pearson Education 2012, 7th Edition. 2. B. A. Forouzan, — Data Communications and Networking, Tata McGraw Hill 2007, 4th Edition. 3. F. Halsall, — Data Communications, Computer Networks and Open Systems, Pearson Education 2008. | | |
| Website/ Link | NPTEL & MOOC courses titled Computer Networks https://nptel.ac.in/courses/106106091/ | | |

Mapping with Programme Outcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|------------|-----|-----|-----|-----|
| CO1 | S | S | S | - |
| CO2 | S | M | M | S |
| CO3 | S | L | L | M |
| CO4 | M | S | M | S |
| CO5 | S | L | S | S |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards
S-Strong, M-Medium,L-Low

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|----------------------|----------------------------------|-----------------------|-----------------|
| Subject Title | SBECI-OFFICEAUTOMATIONLAB | Semester | III |
| Subject Code | 21UCSSP01 | Specialization | NA |
| Type | SBEC:Practical | L:T:P:C | 30:0:2:3 |

COURSEOBJECTIVE:

1. Toacquireknowledgeoneditor,spreadsheetand slidepreparation.
2. Toimprovecreativethinkinginpresentationsoftware.

LISTOFPROGRAMS:

I. MS-WORD

1. TextManipulation:WriteaparagraphaboutyourinstitutionandChangethefontsizeandtype,Spell check, Aligningand justification of Text.
2. Biodata:PrepareaBio-data.
3. FindandReplace:Write aparagraph aboutyourselfanddothefollowing.FindandReplace-UseNumberingBullets,Footer and Headers.
4. Tablesandmanipulation:Creation,Insertion,Deletion(ColumnsandRows).Createamarksheet.
5. MailMerge:Prepareaninvitationtoinviteyourfriendstoyourbirthdayparty.Prepareatleastfiveletters.

II. MS-EXCEL

1. Datasorting-AscendingandDescending(bothnumbersandalphabets).
2. Marklistpreparation forastudent.
3. IndividualPayBillpreparation.
4. InvoiceReportpreparation.
5. DrawingGraphs.Takeyourowntable.

III. MS-POWERPOINT

1. Createasideshowpresentation foraseminar.
2. PreparationofOrganizationCharts.
3. Createasideshowpresentationtodisplaypercentageofmarksineachsemesterforallstudents
 - (1) Usebarchart(X-axis:Semester,Y-axis: %marks).
 - (2) Usedifferentpresentationtemplatedifferent transitioneffectforeachslide.

| CO Number | CO Statement | KnowledgeLevel |
|------------------|--|-----------------------|
| CO1 | Remember theconceptofwordprocessing. | K1 |
| CO2 | UnderstandingthetoolsinMicro softword. | K2 |
| CO3 | UnderstandandApplyExcelFeatures. | K3 |
| CO4 | EvaluatetheEXCELfunctions. | K3,K4 |
| CO5 | AnalyzethedifferentdesignsofMSPresentations. | K5 |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|----------------------|--------------------------|-----------------------|-----------------|
| Subject Title | PROGRAMMINGINJAVA | Semester | IV |
| Subject Code | 21UCS06 | Specialization | NA |
| Type | Core:Theory | L:T:P:C | 60:4:0:4 |

COURSEOBJECTIVE:

1. TounderstandtheconceptsofObjectOrientedProgramming.
2. Tolearnaboutthecontrol structures,class withattributesandmethodsused inJava.

| CO Number | COStatement | KnowledgeLevel |
|------------------|---|-----------------------|
| CO1 | RemembertheconceptsofOOPS. | K1 |
| CO2 | UnderstandthebasicTerminologiesoflanguagesand statements. | K2 |
| CO3 | Demonstratetheuseclassesandobjects. | K2,K3 |
| CO4 | Evaluatethepackages andexception handlingmethods. | K3,K4 |
| CO5 | AnalyzetheI/OStreams andgraphicsclasses. | K5 |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| Subject Title | PROGRAMMING IN JAVA | Semester | IV | |
|---------------|--|----------------|-----------|--|
| Subject Code | 21UCS06 | Specialization | NA | |
| Type | Core:Theory | L:T:P:C | 60:4:0:4 | |
| Unit | Contents | Levels | Sessions | |
| I | Introduction to OOPS: Paradigms of Programming Languages – Basic concepts of Object Oriented Programming – Differences between Procedure Oriented Programming and Object Oriented programming - Benefits of OOPs – Application of OOPs. Java:History–Javafeatures–JavaEnvironment–JDK–API.IntroductiontoJava:Typesofjavaprogram–CreatingandExecutingaJavaprogram–JavaTokens–JavaVirtualMachine (JVM) – Command Line Arguments–Comments in Javaprogram. | K1 | 12 | |
| II | Elements:Constants–Variables–Datatypes–Scopeofvariables–Typecasting–Operators:Specialoperators–Expressions – Evaluation of Expressions. Decision making and branching statements- Decision making and Looping– break –labeledloop–continueStatement.Arrays:One DimensionalArray–Creatinganarray–Arrayprocessing–Multidimensional Array – Vectors – ArrayList – Advantages ofArrayList over ArrayWrapperclasses. | K2 | 12 | |
| III | Classandobjects:Definingaclass–Methods–Creatingobjects –Accessingclassmembers–Constructors–Methodoverloading–Staticmembers–NestingofMethods–thiskeyword–Commandlineinput.Inheritance:Defininginheritance –types of inheritance– Overriding methods – Finalvariables and methods – Final classes – Final methods - Abstractmethods and classes – Visibility Control- Interfaces: Defininginterface–Extendinginterface-ImplementingInterface-Accessinginterfacevariables.Strings:StringArray–StringMethods– StringBufferClass. | K2,K3 | 12 | |
| IV | Packages:JavaAPIPackages–SystemPackages–NamingConventions –Creating & Accessing a Package– Adding Classto a Package – Hiding Classes. Exception Handling: Limitationsof Error handling –Advantages of Exception Handling –TypesofErrors–BasicsofExceptionHandling–tryblocks–throwinganexception–catchinganexception–finallystatement. Multithreading: Creating Threads – Life of a Thread –Defining&RunningThread– ThreadMethods–Thread Priority – Synchronization –Implementing Runnable interface – ThreadScheduling. | K3,K4 | 12 | |
| V | I/O Streams: File – Streams – Advantages - The stream classes – Byte streams –Character streams. Applets: Introduction – AppletLife cycle – Creating & Executing an Applet –Applet tags inHTML – Parameter tag – Aligning the display - Graphics Class:Drawingandfillinglines–Rectangles–Polygon–Circles– | K5 | 12 | |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|------------------------|--|--|--|
| | Arcs –Line Graphs – Drawing Bar charts AWT Components and Even Handlers: Abstract window tool kit – Event Handlers – Event Listeners – AWT Controls and Event Handling: Labels – TextComponent–ActionEvent–Buttons–CheckBoxes–ItemEvent–Choice–Scrollbars–LayoutManagers-InputEvents–Menus. | | |
| | LearningResources | | |
| Text books | 1. E. Balagurusamy,– <i>Programming with Java</i> , TataMc-GrawHill, 5 th Edition. 2. Sagayaraj,Denis,KarthickandGajalakshmi,– <i>JavaProgrammingforCoreand advancedlearners</i> ,UniversitiesPress(INDIA)PrivateLimited2018. | | |
| Reference Books | HerbertSchildt, – <i>The completereferece Java</i> ,TataMc-GrawHill,7 th Edition. | | |
| Website/ Link | 1. NPTEL & MOOC courses titled Java https://nptel.ac.in/courses/106105191/ 2. https://www.geeksforgeeks.org/ 3. https://www.tutorialspoint.com/java/ | | |

MappingwithProgrammeOutcomes

| CONumber | PO1 | PO2 | PO3 | PO4 |
|----------|-----|-----|-----|-----|
| CO1 | S | S | S | - |
| CO2 | S | M | M | S |
| CO3 | M | S | L | M |
| CO4 | M | S | M | S |
| CO5 | S | S | - | - |

S-Strong,M-Medium,L-Low

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|--------------|-----------------------------|----------------|----------|
| SubjectTitle | PRACTICALIV-JAVAPROGRAMMING | Semester | IV |
| SubjectCode | 21UCSP04 | Specialization | NA |
| Type | Core:Practical | L:T:P:C | 45:0:3:2 |

COURSEOBJECTIVE:

1. ToimpartPracticalTraininginJAVAProgrammingLanguage.
2. FamiliarizethedifferentcontrolanddecisionmakingstatementsinJAVA.
3. BuildprogramsusingPackages.
4. Provideknowledgeon workingwith Exception handlingfunctions.

LISTOFPROGRAMS:

1. WriteaprogramtofindtheAreaofSquare,RectangleandCircleusingMethodOverloading.
2. Writeaprogramtosortthelist ofnumbersusingCommandLineArguments.
3. Writeaprogram tomultiplythegiventwo matrices.
4. Writeaprogramtodesignaclassstorepresent abankaccount.Includethefollowing:
DataMembers:Nameof thedepositor,Accountnumber,Typeofaccount,and Balanceamountin theaccount.
Methods:Toassigninitialvalues,Todepositanamount,Towithdrawanamountaftercheckingbalance,and Todisplaythe nameand balance.
5. Writeaprogramthat importtheuserdefinedpackageandaccesstheMembervariableofclasseshat contained byPackage.
6. Writeaprogramto handle theException usingtryand multiplecatch blocks.
7. Writeaprogramtoillustrate theuseofmulti threads.
8. WriteaprogramtocreatestudentregistrationformusingappletwithName,Address,Sex,Class, Email-id.
9. Writeaprogramtodraw theline,rectangle, oval,text usingthegraphicsmethod.
10. Write a program to create a sequential file that could store details about five products.Details include product code, cost, and number of items available and are provided through thekeyboard.Computeandprint the total valueofallthefiveproducts

COURSEOUTCOME:

1. StudyalltheBasicStatementsinjavaProgramming.
2. Practicetheusageofbranchingand loopingstatements.
3. ApplyPackagesand Interfaces.

4. Analysis theuseof graphicstools inJAVA.

B.Sc.(ComputerScience)/BCA/B.Sc.(Information Science)

**SemesterIV:Add-
onCourseInternshipProgra
mme**

OBJECTIVES:

- Tomakestudents acquirepractical knowledgebygoingto a companyandlearn in aliveenvironment
- Tomakestudentslearnteamworkandwork ethics
- Tomakestudentstoknowtherecenttrends inWeb/MobileApplication Development,Networkingoranyotherarearelevant to their study
- Tomakestudentsanalyzetheirskills and interests
- Tohelpstudentsexamineacademicand careergoals

OUTCOME:

Attheendofthis internshipprogrammestudents willbeableto

- applytheoryto real life
- workasapartofteam
- learnfrom thecompanyexperts
- learnlatesttrendingtechnologies
- comeoutwithahighmorale
- enrichCV

About the internship programme: The internship programme provides students with practical,real-world experience and a valuable complement to their academic training. It enhances thestudents' skills in problem solving by making him/her work in a live environment in whichsystematicproblem solvingmethods arepractised.

Duration: Internshiprequiresstudentstospendaminimumof15days(duringvacation)employed, full-time, as IT interns or trainees during vacation at the end of fourth semester.Duringthisperiod, theyareengagedinworkofdirect relevancetotheirprogramme ofstudy.

Areas:Someofthefieldsthat areopen tostudentsinclude:

- OnlinePublishingand Editing
- OnlineAdvertising
- Web/MobileApplicationDevelopment
- E-Marketing/OnlineMarketing
- AnyotherfieldrelatedtoComputerScience/Applications/ Information Science

Certificate: A certificate is to be obtained from the organization in which the student undergoesinternship programme. This certificate is to be submitted to the college within fifteen days afterthecollegereopens for thenext semester.

Credits:TheInternshipprogrammedoesnotcarryanycredit.

B.Sc-ComputerScienceSyllabusunder CBCSPatternwiththeeffectfrom2021-2022Onwards

| | | | |
|---------------------|------------------------|-----------------------|-----------------|
| SubjectTitle | OPERATINGSYSTEM | Semester | V |
| SubjectCode | 21UCS07 | Specialization | NA |
| Type | Core:Theory | L:T:P:C | 71:5:0:4 |

COURSEOBJECTIVE:

1. To understand the fundamental concepts and role of Operating System.
2. To learn the Process Management and Scheduling Algorithms
3. To understand the Memory Management policies
4. To gain insight on I/O and File management techniques

| CO Number | CO Statement | Knowledge Level |
|------------------|--|------------------------|
| CO1 | Understand the structure and functions of Operating System | K1 |
| CO2 | Compare the performance of Scheduling Algorithms | K2 |
| CO3 | Understand and organize the memory | K1, K3 |
| CO4 | Evaluate the deadlock measures | K3, K4 |
| CO5 | Analyze the I/O hardware and software | K5 |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|------------------------|---|-----------------------|-----------------|
| SubjectTitle | OPERATINGSYSTEM | Semester | V |
| Subject Code | 21UCS07 | Specialization | NA |
| Type | Core:Theory | L:T:P:C | 71:5:0:4 |
| Unit | Contents | Levels | Sessions |
| I | Introduction–Historyofoperatingsystem-Differentkindsof operatingsystem–Operationsystemconcepts-Systemcalls- Operatingsystemstructure. | K1 | 11 |
| II | ProcessesandThreads:Processes–threads– threadmodelandusage– inter process communication. | K2 | 15 |
| III | Scheduling-MemoryManagement:MemoryAbstraction– Virtual Memory-pagereplacement algorithms. | K1,K3 | 15 |
| IV | Deadlocks:Resources-introductiontodeadlocks– deadlockdetectionandrecovery–deadlocksavoidance–deadlock prevention.Multipleprocessorsystem:multiprocessors– multicomputers. | K3,K4 | 15 |
| V | Input/Output:principlesofI/Ohardware-principlesofI/O software.Filesystems:Files– directories- filesystemsimplementation– FileSystemManagementandOptimization. | K5 | 15 |
| | LearningResources | | |
| TextBooks | AndrewS. Tanenbaum, –Modern OperatingSystemsll, 2ndEdition, PHIprivate Limited,New Delhi,2008. | | |
| Reference Books | 1. WilliamStallings,-OperatingSystems–Internals&Design Principlesll, 5th Edition,Prentice– Hall of India privateLtd,NewDelhi, 2004. 2. SridharVaidyanathan,-OperatingSystemll, 1stEdition, VijayNicole Publications, 2014. | | |
| Website /Link | 1. www.wikipedia.org/wiki/Operating_system 2. http://www.freetechbooks.com/introduction-to-operating-systems-t340.html | | |

MappingwithProgrammeOutcomes

| CONumber | PO1 | PO2 | PO3 | PO4 |
|-----------------|------------|------------|------------|------------|
| CO1 | S | S | S | - |
| CO2 | S | M | M | S |
| CO3 | S | L | L | M |
| CO4 | M | S | M | S |
| CO5 | S | L | S | S |

S-Strong,M-Medium,L –Low

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|---------------------|----------------------|-----------------------|-----------------|
| SubjectTitle | WEBTECHNOLOGY | Semester | V |
| SubjectCode | 21UCS08 | Specialization | NA |
| Type | Core:Theory | L:T:P:C | 71:5:0:4 |

COURSEOBJECTIVE:

1. Tounderstandthefundamentalconcepts androle ofWebTechnology.
2. TolearntheProcess ofCSS.
3. Tounderstandthewebpages.
4. Togaininsightonscriptobjects.

| CO Number | COStatement | Knowledge Level |
|------------------|---|------------------------|
| CO1 | Understandthestructureofthedocuments inWeb. | K1 |
| CO2 | Rememberandunderstand thehandlingtags. | K2 |
| CO3 | UnderstandandorganizeCSS. | K1,k3 |
| CO4 | Implementscriptsweb page. | K3,K4 |
| CO5 | Evaluatescriptobjects. | K5 |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| Subject Title | WEB TECHNOLOGY | Semester | V | |
|------------------------|---|-----------------------|-----------------|--|
| Subject Code | 21UCS08 | Specialization | NA | |
| Type | Core:Theory | L:T:P:C | 71:5:0:4 | |
| Unit | Contents | Levels | Sessions | |
| I | Structuring Documents for the Web: Introducing HTML andXHTML,BasicTextFormatting,PresentationalElements,Phra seElements,Lists,EditingText,CoreElementsandAttributes,Attri buteGroups.LinksandNavigation:BasicLinks, Creating Links with the <a> Element, Advanced E-mailLinks.Images,Audio,andVideo:AddingImagesUsingthe Element, Using Images as Links Image Maps, Choosingthe Right Image Format, Adding Flash, Video and Audio toyourwebpages. | K1 | 15 | |
| II | Tables:IntroducingTables,GroupingSectionofaTable,Nested Tables, Accessing Tables. Forms: Introducing Forms,FormControls,SendingFormDatatotheServer.Frames:Intr oducingFrameset,<frame>Element,CreatingLinksBetween Frames, Setting a Default Target Frame Using <base>Element,NestedFramesets,InlineorFloatingFrameswith <iframe>. | K2 | 15 | |
| III | Cascading Style Sheets: Introducing CSS, Where you can AddCSS Rules. CSS Properties: Controlling Text, Text Formatting,Text Pseudo Classes, Selectors, Lengths, Introducing the BoxModel.MoreCascadingStyleSheets:Links,Lists,Tables,Outli nes, The :focus and :activate Pseudo classes GeneratedContent,MiscellaneousProperties,AdditionalRules, PositioningandLayoutwit,PageLayoutCSS,DesignIssues. | K1,K3 | 15 | |
| IV | Java Script: How to Add Script to Your Pages, Variables andData Types– Statements and Operators,Control Structures,ConditionalStatements,LoopStatements–Functions- Message box, Dialog Boxes, Alert Boxes, Confirm Boxes,PromptBoxes | K3,K4 | 15 | |
| V | Working with JavaScript: Practical Tips for Writing Scripts,JavaScriptObjects:WindowObject-Documentobject- BrowserObject- FormObject-Navigator objectScreenobject -Events,EventHandlers,Forms– Validations,FormEnhancements,JavaScriptLibraries. | K5 | 11 | |
| | LearningResources | | | |
| Text Books | JonDuckett,BeginningHTML,XHTML,CSSandJavascript,WileyPublishin g | | | |
| Reference Books | 1. ChrisBates,-Web Programmingll, WileyPublishing3d Edition. 2. M. Srinivasan, -Web Technology:TheoryandPracticeII, Pearson Publication | | | |
| Website/ Link | www.tutorialspoint.com/internet_technologies/index.htm | | | |

MappingwithProgrammeOutcomes

| CONumber | PO1 | PO2 | PO3 | PO4 |
|-----------------|------------|------------|------------|------------|
| CO1 | S | S | S | - |
| CO2 | S | M | M | S |
| CO3 | S | L | L | M |
| CO4 | M | S | M | S |
| CO5 | S | L | S | S |

S-Strong,M-Medium,L-Low

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|----------------------|------------------------------------|-----------------------|-----------------|
| Subject Title | PRACTICALV:WEBTECHNOLOGYLAB | Semester | V |
| Subject Code | 21UCSP05 | Specialization | NA |
| Type | Core:Practical | L:T:P:C | 45:0:3:2 |

COURSEOBJECTIVE:

1. To impart Practical Training in Control panel tools.
2. Familiarize with HTML Tags.
3. Build programs using Javascript.
4. Provide knowledge on working with events and methods.

LIST OF PROGRAMS:

1. Create a form having number of elements (Textboxes, Radio buttons, Checkboxes, and soon). Write JavaScript code to count the number of elements in a form.
2. Create a HTML form that has number of Textboxes. When the form runs in the Browser fill the Text boxes with data. Write JavaScript code that verifies that all textboxes has been filled. If a textboxes has been left empty, popup an alert indicating which textbox has been left empty.
3. Develop a HTML Form, which accepts any Mathematical expression. Write JavaScript code to Evaluate the expression and Displays the result.
4. Create a page with dynamic effects. Write the code to include layers and basic animation.
5. Write JavaScript code to find the sum of N natural Numbers. (Use user-defined function).
6. Write JavaScript code block using arrays and generate the current date in words, this should include the day, month and year.
7. Create a form for Student information. Write JavaScript code to find Total, Average, Result and Grade.
8. Create a form for Employee information. Write JavaScript code to find DA, HRA, PF, TAX, Gross pay, Deduction and Net pay.
9. Create a form consists of two Multiple choicelists and one single choicelist.
(a) The first multiple choicelist, displays the Major dishes available.
(b) The second multiple choicelist, displays the Starters available.
(c) The single choicelist, displays the Soft drinks available.

COURSEOUTCOME:

1. Studyall the Basic tools.
2. Practicetheusageofwebpagecreationanduseableobjects.
3. Applyvariouseffects onwebpage.
4. Analysis theuseofjavascriptandhtmlcode.

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|---------------------|---------------------------------|-----------------------|-----------------|
| SubjectTitle | LINUXANDSHELLPROGRAMMING | Semester | V |
| Subject Code | 21UCS09 | Specialization | NA |
| Type | Core:Theory | L:T:P:C | 71:5:0:4 |

COURSEOBJECTIVE:

1. Tounderstandthe LinuxOS.
2. Studytheshellprogrammingand textformatting.

| CO Number | COStatement | KnowledgeLevel |
|------------------|--|-----------------------|
| CO1 | Understand the structure and functions of Linux OperatingSystem. | K1 |
| CO2 | UnderstandthebasiccommandsofShell. | K2 |
| CO3 | Implementtextprocessingandarrays. | K3 |
| CO4 | Evaluateshellscripting. | K4 |
| CO5 | Analyzedecision makingandscriptinginLinux. | K5 |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | | |
|--------------------------|--|-----------------------|-----------------|--|
| SubjectTitle | LINUXANDSHELLPROGRAMMING | Semester | V | |
| Subject Code | 21UCS09 | Specialization | NA | |
| Type | Core:Theory | L:T:P:C | 71:5:0:4 | |
| Unit | Contents | Levels | Sessions | |
| I | IntroductiontoLinux:operating systemandLinux-Historyof LinuxandUnix-Linuxoverview-LinuxDistributions-Vieditors.. | K1 | 15 | |
| II | Shell-comparisonofShells-workingintheshell-LearningBasicCommands-Compilerandinterpreterdifferences-variousdirectories-Drillingdeepintoprocessmanagement,jobcontrol and Automation. | K2 | 15 | |
| III | Textprocessing-TextfilteringTools-workingwith commands.-Logicaloperators.-localvariablesanditsscope-workingwitharrays. | K3 | 15 | |
| IV | Trickswithshellscripting-interactivehellscripts-Thehere documentand<<operator-sortcommand-WCcommand-filehandling-Debugging- | K4 | 15 | |
| V | AutomatingDecision-Makinginscripts-Automatingrepetitivetasks-workingwith Functions. | K5 | 15 | |
| LearningResources | | | | |
| TextBooks | 1.1TheCompleteReferenceLINUX-RichardL.Petersen, McGrawHill, 2. LINUXshellscriptingbyGaneshNaik,PacktPublishingLtd., | | | |
| Reference Books | YashwanthKanetkar,—UnixShellProgrammingI,B.P.BPublications1 st EditionRep rint 2012 | | | |
| Website /Link | 1.www.wikipedia.org/wiki/Operating_system2.http://www.freetechbooks.com/introduction-to-operating-systems-t340.html | | | |

MappingwithProgrammeOutcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|------------------|------------|------------|------------|------------|
| CO1 | S | S | S | --- |
| CO2 | S | M | M | S |
| CO3 | S | L | L | M |
| CO4 | M | S | M | S |
| CO5 | S | L | S | S |

S-Strong,M-Medium,L –Low

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|----------------------|-------------------------------------|-----------------------|-----------------|
| Subject Title | PRACTICALIV:SHELLPROGRAMMING | Semester | V |
| Subject Code | 21UCSP06 | Specialization | NA |
| Type | Core:Practical | L:T:P:C | 60:0:4:2 |

COURSEOBJECTIVE:

1. To impart Practical Training in file commands.
2. Familiarize with shell script for system configuration.
3. Build programs using filter commands.
4. Provide knowledge on working with simple programs with shell script.

LIST OF PROGRAMS:

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

COURSE OUTCOME:

1. Study all the Basic commands.
2. Practice the usage of shell script for system configuration.
3. Apply various effects of piping and redirection process.
4. Analyze the use of shell script for simple process.

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|---------------|---|----------------|-----------------|
| Subject Title | SBECIII:MOBILEAPPLICATIOND EVELOPMENTLAB | Semester | V |
| Subject Code | 21UCSSP03 | Specialization | NA |
| Type | SBEC:Practical | L:T:P:C | 45:0:3:3 |

COURSEOBJECTIVE:

1. To impart Practical Training in android developer tools.
2. Build programs using Flutter/Android Studio environment.
3. Provide knowledge on working with simple android apps.

LIST OF PROGRAMS:

1. Sample application about Android Resources
2. Sample application about Layouts.
3. Sample application about Intents.
4. Sample application about User Interfaces.
5. Sample application about Animations.
6. Create calculator app in Android.
7. Create sample android Camera Application.
8. Create basic list view demo in Android.

COURSE OUTCOME:

1. Study all the Basic Tools.
2. Practice the usage of control panel objects.
3. Apply various commands for layouts and animations.
4. Analyse the use of SQLite I.

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|---------------------|----------------------------|-----------------------|-----------------|
| SubjectTitle | PROGRAMMINGINPYTHON | Semester | VI |
| SubjectCode | 21UCS10 | Specialization | NA |
| Type | Core:Theory | L:T:P:C | 86:6:0:5 |

COURSEOBJECTIVE:

1. To understand the basic components of computer programming using the Python language.
2. To demonstrate significant experience with the Python program development environment.

| CO Number | CO Statement | Knowledge Level |
|------------------|---|------------------------|
| CO1 | Understand the Basic Programming Logic. | K1 |
| CO2 | Understand the basic Statements. | K2 |
| CO3 | Implement Files and SQL. | K3 |
| CO4 | Evaluate Graphics in python. | K4 |
| CO5 | Analyze Version control system. | K5 |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| Subject Title | PROGRAMMINGINPYTHON | Semester | VI |
|--------------------------|--|----------------|-----------------|
| Subject Code | 21UCS10 | Specialization | NA |
| Type | Core:Theory | L:T:P:C | 86:6:0:5 |
| Unit | Contents | Levels | Sessions |
| I | Python – origins – features – variable and assignment - Pythonbasics–statementandsyntax–Identifiers–Basicstyleguidelines–Pythonobjects–Standardtypesandotherbuilt-in types – Internal types – Standard type operators – Standard typebuilt-infunctions. | K1 | 13 |
| II | Numbers–IntroductiontoNumbers–Integers–Doubleprecisionfloatingpointnumbers–Complexnumbers–Operators–Numerictypefunctions–Sequences:Strings,Lists and Tuples – Sequences – Strings and strings operators – Stringbuilt-inmethods–Lists– List typeBuiltinMethods–Tuples. | K2 | 13 |
| III | Mappingtype:Dictionaries–Mappingtypeoperators–Mapping type Built-in and Factory Functions - Mapping typebuilt in methods – Conditionals and loops – if statement – elseStatement–elifstatement–conditionalexpression–whilestatement–forstatement–breakstatement–continuestatement – pass statement – Iterators and the iter() function - Files andInput/Output – File objects – File built-in functions – File built-in methods – File built-in attributes – Standard files – commandlinearguments. | K3 | 20 |
| IV | Functions and Functional Programming – Functions – callingfunctions – creating functions – passing functions – Built-inFunctions:apply(),filter(),map() andreduce()- Modules – Modules and Files – Modules built-in functions - classes – classattributes–Instances. | K4 | 20 |
| V | Database Programming – Introduction - Basic DatabaseOperationsandSQL- ExampleofusingDatabaseAdapters, Mysql-RegularExpression– SpecialSymbolsand Characters– REsand Python. | K5 | 20 |
| LearningResources | | | |
| TextBooks | TitleofBookPublisherYearofPublication1WesleyJ.ChunCorePythonProgr ammingPearsonEducationPublication2012 | | |
| Reference Books | 1.WesleyJ.ChunCorePythonApplicationProgrammingPearsonEducationPubl ication2015 2.Eric Matthes Python crash course William pollock 20163.ZedShaw LearnPythonthehardwayAdditionWesley2017 4.MarkLutzPythonpocketreferenceO'ReillyMedia2014Pedagogy | | |
| Website /Link | 1. https://www.tutorialspoint.com/python/ 2. www.spoken-tutorial.org | | |

MappingwithProgrammeOutcomes

| CONumber | PO1 | PO2 | PO3 | PO4 |
|-----------------|------------|------------|------------|------------|
| CO1 | S | S | M | --- |
| CO2 | M | M | M | S |
| CO3 | S | M | L | M |
| CO4 | M | S | M | S |
| CO5 | S | M | L | L |

S-Strong,M-Medium,L-Low

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|----------------------|--------------------------|-----------------------|-----------------|
| Subject Title | PYTHONPROGRAMMING | Semester | VI |
| Subject Code | 21UCSP07 | Specialization | NA |
| Type | Core:Practical | L:T:P:C | 60:0:4:3 |

COURSEOBJECTIVE:

1. To impart Practical Training in basic python statements.
2. Familiarize with control flow tools.
3. Build programs using data structure concepts.
4. Provide knowledge on working with exception and string handling.

LIST OF PROGRAMS:

1. Create a simple calculator to do all the arithmetic operations.
2. Write a program to use control flow tools like if.
3. Write a program to use for loop.
4. Data structures
 - a. use list as stack.
 - b. use list as queue.
 - c. tuple, sequence.
5. Create a new module for mathematical operations and use in your program.
6. Write a program to read and write files, create and delete directories.
7. Write a program with exception handling.
8. Write a program using classes.
9. Connect with MySQL and create address book.
10. Write a program using string handling and regular expressions.

COURSE OUTCOME:

1. Study all the Basic commands.
2. Practice the usage of control flow statements.
3. Apply various commands in files and directories.
4. Analyze the use of MySQL to connect database.

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | |
|---------------------|-----------------------------|-----------------------|-----------------|
| SubjectTitle | QUANTITATIVEAPTITUDE | Semester | VI |
| Subject Code | 21UCSS01 | Specialization | NA |
| Type | Theory | L:T:P:C | 41:3:0:3 |

COURSEOBJECTIVE:

1. Toimprovethequantitativeskills ofthe students.
2. Topreparethestudents forvariouscompetitiveexams.

| CO Number | COStatement | KnowledgeLevel |
|------------------|--|-----------------------|
| CO1 | Remember thebasicmathematicalfunctions. | K1 |
| CO2 | Understandtheproblemsofages,profitsandloss. | K2 |
| CO3 | Demonstratetherelationshipoftimewithworkanddistance. | K3 |
| CO4 | Implementpermutationandcombinationsproblem. | K4 |
| CO5 | Analyzedatarepresentationmethods. | K5 |

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | | | | |
|--------------------------|--|-----------------------|-----------------|--|
| SubjectTitle | QUANTITATIVEAPTITUDE | Semester | VI | |
| Subject Code | 21UCSS01 | Specialization | NA | |
| Type | SBEC:Theory | L:T:P:C | 41:3:0:3 | |
| Unit | Contents | Levels | Sessions | |
| I | Numbers-HCFandLCMofnumbers-Decimalfractions-Simplification-Squarerootsandcuberoots-Average-problemsonNumbers. | K1 | 8 | |
| II | Problems onAges-SurdsandIndices-percentage-profits andloss-ratioand proportion -partnership -Chainrule. | K2 | 8 | |
| III | Timeandwork -pipesandcisterns-TimeandDistance-problemsontrains-Boatsandstreams- simple interest-compoundinterest-Logarithms-Area- Volumeandsurface area -racesandGamesofskill. | K3 | 8 | |
| IV | Permutationandcombination-probability-TrueDiscount-BankersDiscount-HeightandDistances-Oddmanout&Series. | K4 | 8 | |
| V | Calendar-Clocks-stocksandshares-Datarepresentation-Tabulation -BarGraphs-Piecharts -Line graphs. | K5 | 9 | |
| LearningResources | | | | |
| TextBooks | -Quantitative Aptitude R.S. AGARWAL., S. Chand &CompanyLtd., | | | |
| Reference Books | -Quantitative Aptitudefor Competitive examinations AbhijitGuha- 4 th edition – TataMH | | | |
| Website /Link | https://textbook.com/aptitudewww.carrierbless.com/aptitude/qa/home.php | | | |

MappingwithProgrammeOutcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|------------------|------------|------------|------------|------------|
| CO1 | S | S | M | --- |
| CO2 | M | M | M | S |
| CO3 | S | M | L | M |
| CO4 | M | S | M | S |
| CO5 | S | M | L | L |

S-Strong, M-Medium ,L-Low

OBJECTIVES:

The aim of the mini project is that the student has to understand the real time software development environment. The student should gain a thorough knowledge in the problem and language/ software which he/she has selected for their project work.

Project Planning:

B.Sc (Computer Science /Information Science)/BCA Mini Project is an involved exercise, which has to be planned well in advance. The topic should be chosen in the beginning of final year itself. Related reading training and discussions of project should be completed in the first term of final year.

I Selection of Team

To meet the stated objectives, it is imperative that mini project is done through a team effort. Though it would be ideal to select the team members at random and this should be strongly recommended, due to practical consideration students may also be given the choice of forming themselves into teams with Two members. A team leader shall be selected. Team shall maintain the minutes of meeting of the team members and ensure that tasks have been assigned to every team member in writing. Team meeting minutes shall form a part of the project report. Even if students are doing project as groups, each one must independently take different modules of the work and must submit the report.

II Selection of Tools

No restrictions shall be placed on the students in the choice of platform/tools/languages to be utilized for their project work, though open source is strongly recommended, wherever possible. No value shall be placed on the use of tools in the evaluation of the project.

III Project Evaluation:

| | | |
|--------------------------------|---|----------|
| Continuous Internal Assessment | : | 40 Marks |
| Evaluation (External) | : | 40 Marks |
| Viva-voce (jointly) | : | 20 Marks |

There shall be a common written examination conducted for all the candidates in each group together for a minimum of 10 minutes.

- (i) Requirement Specification of Project
- (ii) Design of Project
- (iii) Testing and Implementation of Project

IV REGULATIONS OF PROJECT WORK

- Three copies of the project report must be submitted by each student..
- The final outer dimensions of the project report shall be 21 cm X 30 cm.
- Only hard bindings should be done. The text of the report should be set in 12 pt, Times New Roman, 1.5 spaced.
- Headings should be set as follows: CHAPTER HEADINGS 16 pt, Arial, Bold, All caps, Centered.

B.Sc-ComputerScienceSyllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

- SectionHeadings14ptBookmanoldstyle,Bold, Leftadjusted.
- SectionSub-heading12 pt,Bookmanoldstyle.
- Title of figures tables etc are done in 12 point, Times New Roman, Italics,centered.
- Only 1.5 space need be left above a section or subsection heading andnospacemaybeleft after them.
- References shall be IEEE format (see any IEEE magazine for detail) Whiledoing the project keep note of all books you refer, in the correct format andincludethem in alphabetical order inyourreferencelist.
- The Candidate should submit the filled in format as given in Annexure-I to thedepartmentforapproval duringtheFirst Week ofDecember.
- Periodicallytheproject shouldbereviewed.
- ASampleformatisenclosedinAnnexure-II.
- FormatoftheTitlepage andCertificateareenclosedinAnnexureIII.
- Thestudentsmayuse
powerpointpresentationduringtheirvivavoceexamination.

ANNEXURE-I

PERIYARUNIVERSITY

NameoftheCollege :

Programme :

Nameofthe Student :

RegisterNumber :

TitleoftheProjectWork :

AddressofOrganization/Institution:

Nameofthe Internal Guide :

Qualification :

Place:

Date:

SignatureofInternalGuide

CONTENTS

| Chapter | PageNo. |
|-------------------------------------|---------|
| COLLEGE BONA FIDE CERTIFICATE | |
| ACKNOWLEDGEMENT | |
| SYNOPSIS | |
| 1. INTRODUCTION | |
| 1.1 ORGANIZATION PROFILE (optional) | |
| 1.2 SYSTEM SPECIFICATION | |
| 1.2.1 HARDWARE CONFIGURATION | |
| 1.2.2 SOFTWARE SPECIFICATION | |
| 2. SYSTEM STUDY | |
| 2.1 EXISTING SYSTEM | |
| 2.1.1 DESCRIPTION | |
| 2.1.2 DRAWBACKS | |
| 2.2 PROPOSED SYSTEM | |
| 2.2.1 DESCRIPTION | |
| 2.2.2 FEATURES | |
| 3. SYSTEM DESIGN AND DEVELOPMENT | |
| 3.1 FILE DESIGN | |
| 3.2 INPUT DESIGN | |
| 3.3 OUTPUT DESIGN | |
| 3.4 CODE DESIGN | |
| 3.5 DATABASE DESIGN | |
| 3.6 SYSTEM DEVELOPMENT | |
| 3.6.1 DESCRIPTION OF | |
| MODULES (Detailed | |
| explanation about | |
| the project work) | |
| 4. TESTING AND IMPLEMENTATION | |
| 5. CONCLUSION | |
| 6. BIBLIOGRAPHY | |
| APPENDICES | |
| A. DATA FLOW DIAGRAM | |
| B. TABLE STRUCTURE | |
| C. SAMPLE CODING | |
| D. SAMPLE INPUT | |
| E. SAMPLE OUTPUT | |

ANNEXUREIII

A. Formatofthetitlepage

TITLEOFTHeprojectwork

A Project Work submitted in partial fulfillment
oftherequirementsfor thedegreeof
**BachelorofScienceinComputerScience/Inform
ation Science**

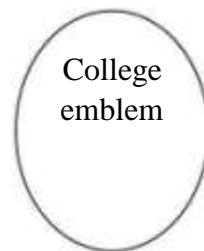
tothe

PeriyarUniversity,Salem-11

By

NAMEOFTHestudentr

EG.NO.



COLLEGENAME

(AFFILIATEDTOPERIYARUNIVERSITY)

PLACEwithPinCode

MONTH– YEAR

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

B. Format of the Certificate

Name and Address of the Internal Guide

Date

CERTIFICATE

This is to certify that the Project Work entitled _____
submitted in partial fulfillment of the requirements of the degree of Bachelor of Science in Computer Science at
the Periyar University, Salem is a record of bonafide work carried out by
..... Reg. No. under my supervision and guidance.

Head of the Department

Internal Guide

Date of Viva-voice:

Internal Examiner

External Examiner

ELECTIVE I

| | | | |
|----------------------|---|-----------------------|-----------------|
| Subject Title | SEMESTER – V PAPER - IDATAMINING AND WAREHOUSING | Semester | V |
| Subject Code | 21UCSE01 | Specialization | NA |
| Type | Elective: Theory | L:T:P:C | 71:5:0:4 |

COURSE OBJECTIVE:

1. To introduce the basic concepts and techniques of Data Mining.
2. To study the basic concepts of cluster analysis.
3. To study a set of typical clustering methodologies, algorithms and applications.

| CO Number | CO Statement | Knowledge Level |
|------------------|--|------------------------|
| CO1 | Remember the basic concepts of data mining and data preprocessing. | K1 |
| CO2 | Understanding the data mining primitives. | K2 |
| CO3 | Apply mining association rule. | K3 |
| CO4 | Evaluate classification and Prediction. | K4 |
| CO5 | Implement cluster analysis. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | SEMESTER – V PAPER - IDATAMINING AND WAREHOUSING | Semester | V | |
|---------------------------|---|-----------------------|-----------------|--|
| Subject Code | 21UCSE01 | Specialization | NA | |
| Type | Elective: Theory | L:T:P:C | 71:5:0:4 | |
| Unit | Contents | Levels | Sessions | |
| I | Introduction: Data mining application – data mining techniques – data mining case studies – the future of data mining – data mining software – Association rules mining: basics – task and naïve algorithm – Apriori algorithm – improve the efficiency of the Apriori algorithm – mining frequent pattern without candidate generation (FP-growth) – performance evaluation of algorithms. | K1 | 15 | |
| II | Classification : Introduction – decision tree – over fitting and pruning - DT rules- Naive bayes method- estimation predictive accuracy of classification methods- other evaluation criteria for classification method – classification software. | K2 | 15 | |
| III | Cluster analysis: cluster analysis – types of data – computing distances – types of cluster analysis methods – partitioned methods – hierarchical methods – density based methods – dealing with large databases – quality and validity of cluster analysis methods – cluster analysis software. | K3 | 15 | |
| IV | Web data mining: Introduction – web terminology and characteristics – locality and hierarchy in the web – web content mining – web usage mining – web structure mining – web mining software - Search engines: Search engines functionality – search engines architecture – ranking of web pages. | K4 | 15 | |
| V | Data warehousing: Introduction – Operational data sources – data warehousing - Data warehousing design – Guidelines for data warehousing implementation – Data warehousing metadata – Online analytical processing (OLAP): Introduction – OLAP characteristics of OLAP system – Multidimensional view and data cube - Data cube implementation - Data cube operations OLAP implementation guidelines. | K5 | 11 | |
| Learning Resources | | | | |
| Text Books | G.K.Gupta, – Introduction to Data Mining with case studies, 2 nd Edition, PHI Private limited, New Delhi, 2011 | | | |
| Reference Books | Arun K Pujari, — Data Mining Techniques, 10 th impression, University Press, 2008. | | | |
| Website /Link | NPTEL & MOOC courses titled Data Mining 1. https://nptel.ac.in/courses/106105174/ 2. http://cecs.louisville.edu/datamining/PDF/0471228524.pdf | | | |

B.Sc-Computer Science Syllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

MappingwithProgrammeOutcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|------------------|------------|------------|------------|------------|
| CO1 | S | S | M | - |
| CO2 | S | L | M | S |
| CO3 | S | M | L | M |
| CO4 | M | S | - | S |
| CO5 | S | L | M | S |

S-Strong,M-Medium ,L-Low

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | | | |
|----------------------|---|-----------------------|-----------------|
| Subject Title | SEMESTER–V PAPER– II SOFTWARE PROJECT MANAGEMENT | Semester | V |
| Subject Code | 21UCSE02 | Specialization | NA |
| Type | Elective: Theory | L:T:P:C | 71:5:0:4 |

COURSE OBJECTIVE:

1. To define and highlight importance of software project management.
2. To formulate and define the software management.
3. To evaluate metrics & strategy in managing projects.

| CO Number | CO Statement | Knowledge Level |
|------------------|---|------------------------|
| CO1 | Remember the basic concepts of software project management. | K1 |
| CO2 | Understanding domain processes in project management. | K1, K2 |
| CO3 | Apply task and activities. | K3 |
| CO4 | Evaluate issues in resource management. | K3, K4 |
| CO5 | Implement quality requirements. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | SEMESTER – V PAPER - II SOFTWARE PROJECT MANAGEMENT | Semester | V | |
|---------------------------|---|----------------|----------|--|
| Subject Code | 21UCSE02 | Specialization | NA | |
| Type | Elective: Theory | L:T:P:C | 71:5:0:4 | |
| Unit | Contents | Levels | Sessions | |
| I | Introduction to Competencies-Product Development Techniques - Management Skills - Product Development Life Cycle - Software Development Process and models - The SEICMM-International Organization for Standardization. | K1 | 15 | |
| II | Managing Domain Processes-Project Selection Models-Project Portfolio Management- Financial Processes - Selecting a Project Team- Goal and Scope of the Software Project-Project Planning- Creating the Work Breakdown Structure- Approaches to Building a WBS - Project Milestones - Work Packages-Building a WBS for Software. | K1,K2 | 15 | |
| III | Tasks and Activities-Software Size and Reuse Estimating- The SEICMM-Problems and Risks-Cost Estimation- Effort Measures-COCOMO: A Regression Model-COCOMO II-SLIM: A Mathematical Model- Organizational Planning - Project Roles and Skills Needed. | K3 | 15 | |
| IV | Project Management Resource Activities - Organizational Form and Structure-Software Development Dependencies- Brainstorming - Scheduling Fundamentals- PERT and CPM Leveling Resource Assignments - Map the Schedule to a Real Calendar-Critical Chain Scheduling. | K3,K4 | 15 | |
| V | Quality: Requirements – The SEICMM-Guidelines-Challenges- Quality Function Deployment-Building the Software Quality Assurance-Plan- Software Configuration Management: Principles- Requirements-Planning and Organizing - Tools - Benefits - Legal Issues in Software - Case Study | K5 | 11 | |
| Learning Resources | | | | |
| Text Books | Robert T. Futrell, Donald F. Shafer, Linda I. Safer, - <i>Quality Software Project Management</i> , Pearson Education Asia 2002. | | | |
| Reference Books | 1. Pankaj Jalote, - <i>Software Project Management in Practice</i> , Addison Wesley 2002. 2. Hughes, - <i>Software Project Management</i> , Tata McGraw Hill 2004, 3 rd Edition. | | | |
| Website /Link | NPTEL & MOOC courses titled Software Project Management https://nptel.ac.in/courses/106/105/106105218/ | | | |

B.Sc-Computer Science Syllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

MappingwithProgrammeOutcomes

| CONumber | PO1 | PO2 | PO3 | PO4 |
|-----------------|------------|------------|------------|------------|
| CO1 | S | M | L | L |
| CO2 | S | M | L | L |
| CO3 | S | M | L | M |
| CO4 | M | S | L | S |
| CO5 | S | M | M | L |

S-Strong,M-Medium ,L-Low

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | | | |
|----------------------|--|-----------------------|-----------------|
| Subject Title | SEMESTER – V PAPER-III SOFTWARE ENGINEERING | Semester | V |
| Subject Code | 21UCSE03 | Specialization | NA |
| Type | Elective: Theory | L:T:P:C | 71:5:0:4 |

COURSE OBJECTIVE:

1. To introduce the software development lifecycles.
2. To introduce concepts related to structured and object-oriented analysis & design.
3. To provide an insight into UML and software testing techniques.

| CO Number | CO Statement | Knowledge Level |
|------------------|--|------------------------|
| CO1 | Remember the basic concepts of software Engineering. | K1 |
| CO2 | Understanding requirement analysis. | K1, K2 |
| CO3 | Apply software design. | K3 |
| CO4 | Evaluate with UML. | K4 |
| CO5 | Implement coding and testing. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | SEMESTER-V PAPER-III SOFTWARE ENGINEERING | Semester | V | |
|---------------------------|--|----------------|----------|--|
| Subject Code | 21UCSE03 | Specialization | NA | |
| Type | Elective: Theory | L:T:P:C | 71:5:0:4 | |
| Unit | Contents | Levels | Sessions | |
| I | Introduction–Evolution–Software Development projects– Emergence of Software Engineering. Software Lifecycle models–Waterfall model– Rapid Application Development –Agile Model– Spiral Model | K1 | 15 | |
| II | Requirement Analysis and Specification–Gathering and Analysis –SRS– Formal System Specification | K1,K2 | 15 | |
| III | Software Design – Overview – Characteristics – Cohesion & Coupling – Layered design – Approaches Function Oriented Design – Structured Analysis – DFD – Structured Design – Detailed design | K3 | 15 | |
| IV | Object Modeling using UML –OO concepts–UML –Diagrams– Use case, Class, Interaction, Activity, State Chart –Postscript | K4 | 15 | |
| V | Coding & Testing–coding–Review–Documentation–Testing– Black-box, White-box, Integration, OOTesting, Smoketesting. | K5 | 11 | |
| Learning Resources | | | | |
| Text Books | Rajib Mall, – <i>Fundamentals of Software Engineering</i> ll, PHI 2018, 5th Edition. | | | |
| Reference Books | 1. Roger S. Pressman, – <i>Software Engineering - A Practitioner’s Approach</i> ll, McGraw Hill 2010, 7th Edition. 2. Pankaj Jalote, – <i>An Integrated Approach to Software Engineering</i> ll, Narosa Publishing House 2011, 3rd Edition. | | | |
| Website/ Link | NPTEL online course – Software Engineering - https://nptel.ac.in/courses/106105182/ | | | |

Mapping with Programme Outcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|-----------|-----|-----|-----|-----|
| CO1 | S | M | M | L |
| CO2 | S | M | L | L |
| CO3 | S | M | M | L |
| CO4 | M | S | L | L |
| CO5 | S | M | M | L |

S-Strong, M-Medium, L-Low

**B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards
ELECTIVE II**

| | | | |
|----------------------|--|-----------------------|-----------------|
| Subject Title | SEMESTER – VI PAPER – IMOBILE COMPUTING | Semester | VI |
| Subject Code | 21UCSE04 | Specialization | NA |
| Type | Elective: Theory | L:T:P:C | 86:6:0:4 |

COURSE OBJECTIVE:

1. To make the student to understand the concepts of mobile computing.
2. To familiar with the network protocol stack.
3. To be exposed to Ad-Hoc networks.
4. Gain knowledge about different mobile platforms and application development.

| CO Number | CO Statement | Knowledge Level |
|------------------|--|------------------------|
| CO1 | Remember the basic concepts of mobile computing. | K1 |
| CO2 | Understanding mobile IP. | K1, K2 |
| CO3 | Apply Mobile Telecommunications system. | K3 |
| CO4 | Evaluate mobile ad hoc system. | K4 |
| CO5 | Implement mobile operating system. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | SEMESTER – VI PAPER – I MOBILE COMPUTING | Semester | VI |
|---------------------------|--|----------------|----------|
| Subject Code | 21UCSE04 | Specialization | NA |
| Type | Elective: Theory | L:T:P:C | 86:6:0:4 |
| Unit | Contents | Levels | Sessions |
| I | Introduction-Mobile Computing – Mobile Computing Vs wireless Networking – Mobile Computing Applications – Characteristics of Mobile computing – Structure of Mobile Computing Application. MAC Protocols – Wireless MAC Issues. Fixed Assignment Schemes – Random Assignment Schemes – Reservation Based Schemes | K1 | 14 |
| II | Mobile Internet Protocol and Transport Layer-Overview of Mobile IP – Features of Mobile IP – Key Mechanism in Mobile IP – route Optimization. Overview of TCP/IP – Architecture of TCP/IP – Adaptation of TCP Window – Improvement in TCP Performance. | K1, K2 | 18 |
| III | Mobile Telecommunication System-Global System for Mobile Communication (GSM) – General Packet Radio Service (GPRS) – Universal Mobile Telecommunication System (UMTS). | K3 | 18 |
| IV | Mobile Ad-Hoc Networks-Ad-Hoc Basic Concepts – Characteristics – Applications – Design Issues – Routing – Essential of Traditional Routing Protocols – Popular Routing Protocols – Vehicular Ad Hoc networks (VANET) – MANET Vs VANET – Security. | K4 | 18 |
| V | Mobile Platforms and Applications-Mobile Device Operating Systems – Special Constraints & Requirements – Commercial Mobile Operating Systems – Software Development Kit: iOS, Android, BlackBerry, Windows Phone – M-Commerce – Structure – Pros & Cons – Mobile Payment System – Security Issues. | K5 | 18 |
| Learning Resources | | | |
| Text Books | Prasant Kumar Pattnaik, Rajib Mall, – <i>Fundamentals of Mobile Computing</i> , PHI Learning Pvt. Ltd, New Delhi 2012. | | |
| Reference Books | <ol style="list-style-type: none"> 1. Jochen H. Schiller, – <i>Mobile Communications</i> , Pearson Education, New Delhi, 2007, 2nd Edition. 2. Dharma Prakash Agarwal, Qing and An Zeng, "Introduction to Wireless and Mobile systems", Thomson Asia Pvt Ltd. 2005. 3. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, – <i>Principles of Mobile Computing</i> , Springer 2003. | | |

B.Sc-Computer Science Syllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | |
|--------------------------|---|
| Website/ Link | NPTEL&MOOC courses titled MobileComputing 1. https://nptel.ac.in/courses/106/106/106106147/ 2. https://www.smartzworld.com/notes/mobile-computing-pdf-notes-mc-notes-pdf/ |
|--------------------------|---|

MappingwithProgrammeOutcomes

| CONumber | PO1 | PO2 | PO3 | PO4 |
|-----------------|------------|------------|------------|------------|
| CO1 | M | S | M | L |
| CO2 | S | M | M | L |
| CO3 | S | M | M | L |
| CO4 | M | S | M | L |
| CO5 | S | M | L | L |

S-Strong,M-Medium ,L-Low

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | | | |
|----------------------|--|-----------------------|-----------------|
| Subject Title | SEMESTER – VI PAPER – II WIRELESS NETWORK | Semester | VI |
| Subject Code | 21UCSE05 | Specialization | NA |
| Type | Elective: Theory | L:T:P:C | 86:6:0:4 |

COURSE OBJECTIVE:

1. To understand about Wireless Networks,
2. To be familiar with Protocol Stack and Standards.
3. To be exposed to 3G/4G Services.
4. Gain knowledge about its Protocols and Applications.

| CO Number | CO Statement | Knowledge Level |
|------------------|---|------------------------|
| CO1 | Remember the basic concepts of WLAN technologies. | K1 |
| CO2 | Understanding mobile IP. | K2 |
| CO3 | Apply TCP enhancements. | K3 |
| CO4 | Evaluate UTMS. | K4 |
| CO5 | Implement 4G. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | SEMESTER – VI PAPER – II WIRELESS NETWORK | Semester | VI | |
|---------------------------|---|----------------|-----------|--|
| Subject Code | 21UCSE05 | Specialization | NA | |
| Type | Elective: Theory | L:T:P:C | 86:6:0:4 | |
| Unit | Contents | Levels | Sessions | |
| I | Introduction-WLAN Technologies: Infrared, UHF Narrowband, Spread Spectrum -IEEE802.11: System Architecture, Protocol Architecture, Physical Layer, MAC Layer, 802.11b, 802.11a – HiperLAN: WATM, BRAN, HiperLAN2 – Bluetooth: Architecture, Radio Layer, Baseband Layer, Link Manager Protocol, Security – IEEE802.16- WIMAX: Physical Layer, MAC, Spectrum Allocation For WIMAX. | K1 | 14 | |
| II | Introduction – Mobile IP: IP Packet Delivery, Agent Discovery, Tunneling And Encapsulation, IPV6- Network Layer In The Internet- Mobile IP Session Initiation Protocol – Mobile Ad-Hoc Network: Routing, Destination Sequence Distance Vector, Dynamic Source Routing. | K2 | 18 | |
| III | TCP Enhancements For Wireless Protocols – Traditional TCP: Congestion Control, Fast Retransmit/Fast Recovery, Implications Of Mobility – Classical TCP Improvements: Indirect TCP, Snooping TCP, Mobile TCP, Time Out Freezing, Selective Retransmission, Transaction Oriented TCP – TCP Over 3G Wireless Networks. | K3 | 18 | |
| IV | Overview Of UTRAN Terrestrial Radio Access Network- UMTS Core Network Architecture: 3G-MSC, 3G-SGSN, 3G-GGSN, SMS-GMSC/SMS-IW MSC, Firewall, DNS/DHCP- High Speed Downlink Packet Access (HSDPA)- LTE Network Architecture And Protocol. | K4 | 18 | |
| V | 4G Introduction – 4G Vision – 4G Features And Challenges – Applications Of 4G – 4G Technologies: Multicarrier Modulation, Smart Antenna Techniques, OFDM- MIMO Systems, Adaptive Modulation And Coding With Time Slot Scheduler, Cognitive Radio. | K5 | 18 | |
| Learning Resources | | | | |
| Text Books | 1. Jochen Schiller, Mobile Communications , Second Edition, Pearson Education 2012. (Unit I, II, III) 2. Vijay Garg, –Wireless Communications And Networking , First Edition, Elsevier 2007. (Unit IV, V) | | | |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | |
|------------------------|--|
| Reference Books | <ol style="list-style-type: none">1. Erik Dahlman, Stefan Parkvall, Johan Skold And Per Beming, -3G Evolution HSPA And LTE For Mobile Broadband, Second Edition, Academic Press, 2008.2. Anurag Kumar, D. Manjunath, Joy Kuri, -Wireless Networking, First Edition, Elsevier 2011.3. Simon Haykin, Michael Moher, David Koilpillai, -Modern Wireless Communications, First Edition, Pearson Education 2013 |
| Website/ Link | <p>www.tutorialspoint.com/wireless-network www.iqytechnicalcollege.com w.rejinPaul.com</p> |

MappingwithProgrammeOutcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|------------------|------------|------------|------------|------------|
| CO1 | M | S | S | L |
| CO2 | S | S | M | L |
| CO3 | S | M | L | L |
| CO4 | M | S | L | L |
| CO5 | S | M | M | L |

S-Strong,M-Medium ,L-Low

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | | | |
|----------------------|--|-----------------------|-----------------|
| Subject Title | SEMESTER – VI PAPER – III COMPUTER GRAPHICS | Semester | VI |
| Subject Code | 21UCSE06 | Specialization | NA |
| Type | Elective: Theory | L:T:P:C | 86:6:0:4 |

COURSE OBJECTIVE:

1. To understand about Computer Graphics,
2. To be familiar with scan and I/O devices.
3. To be exposed to 2D Transformations and clipping.

| CO Number | CO Statement | Knowledge Level |
|------------------|---|------------------------|
| CO1 | Remember the basic concepts of Graphics system. | K1 |
| CO2 | Understand the scan system and I/O devices. | K2 |
| CO3 | Apply 2D Transformations. | K3 |
| CO4 | Evaluate 3D Transformations. | K4 |
| CO5 | Implement visual surface techniques. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | SEMESTER – VI PAPER – III COMPUTER GRAPHICS | Semester | VI | |
|---------------------------|--|----------------|----------|--|
| Subject Code | 21UCSE06 | Specialization | NA | |
| Type | Elective: Theory | L:T:P:C | 86:6:0:4 | |
| Unit | Contents | Levels | Sessions | |
| I | Overview of graphics Systems: Video Display Device – Refresh Cathode-Ray tubes Raster–Scan Displays Random–Scan Displays–Color CRT Monitors–Direct view Storage tubes Flat–Panel Displays Three–Dimensional Viewing Devices. Stereoscopic and Virtual–Reality Systems. | K1 | 14 | |
| II | Raster–Scan Systems Video Controller–Random–Scan Systems Video Controller–Random–Scan Systems–Input device–Keyboard Mouse–Trackball and Spaceball. Joysticks – Data Glove – Digitizers- Image Scanners – Touch Panels – Light pens. Voice Systems – Hard-Copy Devices – Line Drawing Algorithms DDA Algorithms– Circle generating Algorithm Properties of Ellipses | K2 | 18 | |
| III | Two Dimensional Geometric Transformation: Basic Transformations – Translation–Rotation–Scaling– Matrix Representations and Homogeneous Coordinates– Other Transformations Reflections Two Dimensional Viewing: Windows to view point coordinate Transformations – Clipping Operations – Point Clipping – Line Clipping – Curve Clipping – Text Clipping– Exterior Clipping. | K3 | 18 | |
| IV | Three Dimensional Concepts: Three Dimensional Display method – Parallel projection – Depth cueing - visible line and surface– Three Dimensional Geometric and modeling Transformations: Translation – Rotation – Scaling – Composite Transformations. Three Dimensional Viewing: Viewing pipeline – Viewing Coordinates– Projections– Parallel Projections– Perspective Projections. | K4 | 18 | |
| V | Visible Surface Detection Methods: Classification Visible Surface Detection Algorithms– Back Face Detection– Depth– Buffer Method– A-Buffer Method– Scan line method– Depth sorting method – BSP tree method – Area Subdivision Method. | K5 | 18 | |
| Learning Resources | | | | |
| Text Books | Donald Hearn & M. Pauline Baker, – Computer Graphics II, 2 nd Edition, 1996 | | | |
| Reference Books | John f. Hughes, Andries Van Dam, Morgan Mcguire, David F. Sklar, James D. Foley, Steven K. Feiner, Kurt Akeley, – <i>Computer Graphics Principles and Practice</i> 3 rd Edition, Pearson Education, 2014. | | | |
| Website /Link | www.javatpoint.com/computer-graphics www.taylorfrancis.com | | | |

MappingwithProgrammeOutcomes

| CONumber | PO1 | PO2 | PO3 | PO4 |
|-----------------|------------|------------|------------|------------|
| CO1 | M | S | M | L |
| CO2 | S | M | M | M |
| CO3 | S | M | L | L |
| CO4 | M | S | L | M |
| CO5 | S | S | M | L |

S-Strong,M-Medium ,L-Low

**B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards
ELECTIVE III**

| | | | |
|----------------------|--|-----------------------|-----------------|
| Subject Title | SEMESTER – VI PAPER – IS SOFTWARE TESTING | Semester | VI |
| Subject Code | 21UCSE07 | Specialization | NA |
| Type | Elective: Theory | L:T:P:C | 86:6:0:4 |

COURSE OBJECTIVE:

1. To study various Software techniques
2. To study fundamental concepts in software testing

| CO Number | CO Statement | Knowledge Level |
|------------------|-------------------------------------|------------------------|
| CO1 | Remember the basic concepts of SDLC | K1 |
| CO2 | Understanding Block box testing | K2 |
| CO3 | Apply system testing | K3 |
| CO4 | Evaluate performance testing | K4 |
| CO5 | Implement test planning. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | SEMESTER – VI PAPER – ISOFTWARE TESTING | Semester | VI |
|---------------------------|---|----------------|----------|
| Subject Code | 21UCSE07 | Specialization | NA |
| Type | Elective: Theory | L:T:P:C | 86:6:0:4 |
| Unit | Contents | Levels | Sessions |
| I | SOFTWARE DEVELOPMENT LIFECYCLE MODELS: Phases of Software project – Quality, Quality Assurance, Quality control – Testing, Verification and Validation – Process Model to represent Different Phases – Life Cycle models. White-Box Testing: Static Testing – Structural Testing – Challenges in White-Box Testing | K1 | 14 |
| II | BLACK-BOX TESTING: What is Black-Box Testing? - Why Black-Box Testing? – When to do Black-Box Testing? – How to do Black- Box Testing? Integration Testing: Integration Testing as Type of Testing – Integration Testing as a Phase of Testing – Scenario Testing-Defect Bash | K2 | 18 |
| III | SYSTEM AND ACCEPTANCE TESTING: System Testing Overview – Why is System testing done? – Functional versus Non-functional Testing - Functional System Testing - Non-Functional Testing- Acceptance Testing- Summary of Testing Phases | K3 | 18 |
| IV | PERFORMANCE TESTING: Factors Governing Performance T esting – Methodology for Performance Testing - Tools for Performance Testing - Process for Performance Testing - Challenges. Regression Testing: What is Regression Testing? – Types of Regression Testing – When to do Regression Testing? – How to do Regression Testing? – Best Practices in Regression Testing | K4 | 18 |
| V | TEST PLANNING, MANAGEMENT, EXECUTION AND REPORTING: Test Planning – Test Management- Test Process – Test Reporting. Quick Test Professional (QTP): Overview of QTP – Testing an Application using QTP – Creating Check Points – Testing Database Application – Testing a Web Application | K5 | 18 |
| Learning Resources | | | |
| Text Books | Srinivasan Desikan, Gopalaswamy Ramesh Software Testing Principles and Practices, Pearson Education 2012 | | |
| Reference Books | <ol style="list-style-type: none"> 1. Dr.K.V.K.K.Prasad, Software Testing Tools, Dreamtech Press 2012 2. Renu Rajani, Testing Practitioner, Handbook Packt Publishing Limited 2017 3. Naresh Chauhan, Software Testing, Oxford University Press 2nd edition, 2016 | | |
| Website/ Link | https://s3-ap-southeast-1.amazonaws.com/tv-prod/documents%2F7619-2.software+system+principles+and+practices_srinivasan+desikan_gopalaswamy+ramesh.pdf | | |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards
Mapping with Programme Outcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|------------------|------------|------------|------------|------------|
| CO1 | S | M | L | L |
| CO2 | S | M | L | M |
| CO3 | S | M | L | L |
| CO4 | L | S | M | M |
| CO5 | S | M | M | L |

S-Strong, M-Medium, L-Low

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | | | |
|----------------------|--|-----------------------|-----------------|
| Subject Title | SEMESTER – VI PAPER – II NETWORK SECURITY | Semester | VI |
| Subject Code | 21UCSE08 | Specialization | NA |
| Type | Elective: Theory | L:T:P:C | 86:6:0:4 |

COURSE OBJECTIVE:

1. To Understand OSI security architecture.
2. To acquire fundamental knowledge of finite fields and number theory.
3. To Understand various block cipher and stream cipher models.
4. Study the principles of symmetric & public key cryptosystems.
5. To learn the system security practices.

| CO Number | CO Statement | Knowledge Level |
|------------------|--|------------------------|
| CO1 | Remember the OSI Security Architecture. | K1 |
| CO2 | Understanding Number theory and finite fields. | K2 |
| CO3 | Apply Block Ciphers and Data Encryption Std. | K3 |
| CO4 | Evaluate Public Key Cryptography and RSA. | K4 |
| CO5 | Implement Hash functions. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | SEMESTER–VIPAPER–II NETWORK SECURITY | Semester | VI | |
|---------------------------|--|----------------|-----------|--|
| Subject Code | 21UCSE08 | Specialization | NA | |
| Type | Elective: Theory | L:T:P:C | 86:6:0:4 | |
| Unit | Contents | Levels | Sessions | |
| I | OSI Security Architecture – Security attacks, services and mechanisms – Network security Model – Classical encryption techniques: Symmetric cipher model, Substitution techniques – Transposition techniques – Rotor machines – Steganography | K1 | 14 | |
| II | Number theory and finite fields: The Euclidean algorithm – Modular arithmetic - Groups, Rings and Fields – Finite fields of the Form GF (p) – Polynomial arithmetic – prime numbers – Fermat’s and Euler’s theorems | K2 | 18 | |
| III | Block Ciphers and Data Encryption Standard: Traditional block cipher structure – Data Encryption – Strengths of DES – Block Cipher Design Principles – Advanced Encryption Standard – AES structure – AES transformation functions – AES Key expansion – implementation | K3 | 18 | |
| IV | Public Key Cryptography and RSA – Principles of Public-key Cryptosystems – RSA algorithm – Diffie–Hellman Key exchange – ElGamal Cryptographic System | K4 | 18 | |
| V | Hash functions – Applications – two simple hash functions – Hash functions based on Cipher block chaining - Secure Hash Algorithm (SHA) | K5 | 18 | |
| Learning Resources | | | | |
| Text Books | William Stallings, – <i>Cryptography and Network Security: Principles and Practice</i> , Pearson Education 2013, 6 th Edition. | | | |
| Reference Books | <ol style="list-style-type: none"> Behrouz A. F. erouzan, – <i>Cryptography & Network Security</i> , Tata McGraw Hill 2007. Man Young Rhee, – <i>Internet Security: Cryptographic Principles, Algorithms and Protocols</i> , Wiley Publications 2003. Charles Pfleeger, – <i>Security in Computing</i> , Prentice Hall of India 2006, 4th Edition. Ulysess Black, – <i>Internet Security Protocols</i>”, Pearson Education Asia 2000. Charlie Kaufman and Radia Perlman, Mike Speciner, – <i>Network Security, Private Communication in Public World</i> , PHI 2002, 2nd Edition. | | | |
| Website /Link | <ol style="list-style-type: none"> NPTEL & MOOC courses titled Network Security https://nptel.ac.in/courses/106/105/106105031/ | | | |

MappingwithProgrammeOutcomes

| CONumber | PO1 | PO2 | PO3 | PO4 |
|-----------------|------------|------------|------------|------------|
| CO1 | S | M | M | L |
| CO2 | S | M | L | L |
| CO3 | S | M | L | L |
| CO4 | M | L | S | M |
| CO5 | S | M | M | L |

S-Strong,M-Medium ,L-Low

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | | | |
|----------------------|---|-----------------------|-----------------|
| Subject Title | SEMESTER – VI PAPER – III INTERNET OF THINGS | Semester | VI |
| Subject Code | 21UCSE09 | Specialization | NA |
| Type | Elective: Theory | L:T:P:C | 86:6:0:4 |

COURSE OBJECTIVE:

1. Use of Devices, Gateways and Data Management in IoT.
2. Design IoT Applications in different domains and be able to analyze their performance.
3. Implement basic IoT applications on an embedded platform.

| CO Number | CO Statement | Knowledge Level |
|------------------|---|------------------------|
| CO1 | Remember IoT and Web technology. | K1 |
| CO2 | Understanding M2M to IoT. | K2 |
| CO3 | Apply IoT Architecture. | K3 |
| CO4 | Evaluate IoT Applications. | K4 |
| CO5 | Implement IoT Privacy, Security and Governance. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | SEMESTER–VIPAPER–III INTERNET OF THINGS | Semester | VI | |
|-------------------|--|----------------|-----------|--|
| Subject Code | 21UCSE09 | Specialization | NA | |
| Type | Elective: Theory | L:T:P:C | 86:6:0:4 | |
| Unit | Contents | Levels | Sessions | |
| I | IoT & Web Technology, The Internet of Things Today, Time for Convergence, Towards the IoT Universe, Internet of Things Vision, IoT Strategic Research and Innovation Directions, IoT Applications, Future Internet Technologies, Infrastructure, Networks and Communication, Processes, Data Management, Security, Privacy & Trust, Device Level Energy Issues, IoT Related Standardization, Recommendations on Research Topics. | K1 | 14 | |
| II | M2M to IoT – A Basic Perspective – Introduction, Some Definitions, M2M Value Chains, IoT Value Chains, An emerging industrial structure for IoT, The international driven global value chain and global information monopolies. M2M to IoT – An Architectural Overview – Building an architecture, Main design principles and needed capabilities, An IoT architecture outline, standards considerations. | K2 | 18 | |
| III | IoT Architecture – State of the Art – Introduction, State of the art, Architecture. Reference Model – Introduction, Reference Model and architecture, IoT Reference Model, IoT Reference Architecture – Introduction, Functional View, Information View, Deployment and Operational View, Other Relevant architectural views | K3 | 18 | |
| IV | IoT Architecture Introduction, IoT Applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, Smart Applications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT for Oil and Gas Industry, Opinion on IoT Application and Value for Industry, Home Management, eHealth. | K4 | 18 | |
| V | Internet of Things Privacy, Security and Governance Introduction, Overview of Governance, Privacy and Security Issues, Contribution from FP7 Projects, Security, Privacy and Trust in IoT – Data – Platforms for Smart Cities, First Steps Towards a Secure Platform, Smartie Approach. Data Aggregation for the IoT in Smart Cities, Security | K5 | 18 | |
| | Learning Resources | | | |
| Text Books | Vijay Madiseti and Arshdeep Bahga, – <i>Internet of Things: (A Hands-on Approach)</i> //, Universities Press (INDIA) Private Limited 2014, 1 st Edition. | | | |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | |
|------------------------|---|
| Reference Books | <ol style="list-style-type: none">1. Michael Miller, <i>-The Internet of Things: How Smart TVs, Smart Cars, Smart Homes, and Smart Cities Are Changing the World</i>, Pearson Education 2015.2. Francis da Costa, <i>-Rethinking the Internet of Things: A Scalable Approach to Connecting Everything</i>, Apress Publications 2013, 1st Edition. |
|------------------------|---|

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

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|----------------------|--|
| | <ol style="list-style-type: none">3. Walteneus Dargie, Christian Poellabauer, "<i>Fundamentals of Wireless Sensor Networks: Theory and Practice</i>", Wiley 2014.4. Cuno Pfister, "<i>Getting Started with the Internet of Things</i>", O'Reilly Media 2011. |
| Website /Link | <ol style="list-style-type: none">1. https://github.com/connectIOT/iottoolkit2. https://www.arduino.cc/3. http://www.zettajs.org/ |

Mapping with Programme Outcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|------------------|------------|------------|------------|------------|
| CO1 | S | M | M | L |
| CO2 | S | M | M | L |
| CO3 | S | M | M | M |
| CO4 | M | L | S | M |
| CO5 | S | L | M | L |

S-Strong, M-Medium, L-Low

NON MAJOR ELECTIVE COURSE (NMEC)-I

| | | | |
|----------------------|--|-----------------------|-----------------|
| Subject Title | SEMESTER – III PAPER – IBASICS OF COMPUTERS | Semester | III |
| Subject Code | 21UCSN01 | Specialization | NA |
| Type | NMEC:Theory | L:T:P:C | 26:2:0:2 |

COURSE OBJECTIVE:

1. To understand the basics of computers.
2. To prepare the students for analyzed data processing.

| CO Number | CO Statement | Knowledge Level |
|------------------|---|------------------------|
| CO1 | Remember the basics of computers. | K1 |
| CO2 | Understand number system. | K2 |
| CO3 | Demonstrate the functions of computer system. | K3 |
| CO4 | Study the input and output system. | K4 |
| CO5 | Analyzed data processing. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | SEMESTER – III PAPER – I BASICS OF COMPUTERS | Semester | III | |
|----------------------|---|-----------------------|-----------------|--|
| Subject Code | 21UCSN01 | Specialization | NA | |
| Type | NMEC:Theory | L:T:P:C | 26:2:0:2 | |
| Unit | Contents | Levels | Sessions | |
| I | Introduction to Computer: Introduction – Types of computers – Characteristics of Computers. Generations of Computers: First Generation – Second Generation – Third Generation – Fourth Generation – Fifth Generation. Classification of Digital Computers: Introduction – Microcomputers – Personal Computer – Portable Computers – Mini Computers – Super Computers – Main Frames. | K1 | 5 | |
| II | Number System: Introduction – Decimal Number System – Binary Number System – Binary-Decimal Conversion – Decimal Binary Conversion – Binary Addition – Binary Subtraction – Complements – 9's Complement – 10's Complement – 1's Complements – 2's Complements – BCD - Bits, Bytes, Words – Octal – Hexadecimal Number System. | K2 | 5 | |
| III | Anatomy of Digital Computer : Functions and Components of Computer – Central Processing Unit – Control Unit – Arithmetic – Logic Unit – Memory – Registers – Addresses. Memory Units: RAM, ROM, PROM, EPROM, EEPROM, and Flash Memory | K3 | 5 | |
| IV | Input Devices: Introduction – Keyboard – Mouse – Types of Mice – Connections – Mouse pad – Trackball – joystick – Digitizing Tablet – Scanners – Digital Camera – MICR – OCR – OMR – Bar Code Reader – Speech Input Device- Touch Screen – Touch Pad – Light Pen. Output Devices: Introduction – Monitor – Classification of Monitors – Monochrome – Gray Scale – Color – Digital Monitor – Analog Monitor – Characteristics of monitor – Printers. | K4 | 5 | |
| V | Computer Software: Introduction – Operating System – Utilities – Compiler and Interpreters – Word Processor – Spreadsheets – Presentation Graphics – DBMS – Programming Languages: Machine Language – Assembly Language – High level language – Types of High Level Language. Data Processing: Data VS Information – File Processing – Sequential File Processing – Direct Access File Processing. | K5 | 6 | |
| | Learning Resources | | | |
| Text Books | Alexis Leon and Mathews Leon, – Fundamentals of Computer Science and Communication Engineering I, Leon Techworld, 1998. | | | |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | |
|------------------------|--|
| Reference Books | <ol style="list-style-type: none">1. B. Ram and Sanjay Kumar, -Computer Fundamentals, 5th Edition, New Age International Publishers, 2014.2. Pradeep K Sinha, Priti Sinha, -Computer Fundamentals, BPB Publications, 2004.3. Anita Goel, -Computer Fundamentals, 1st Edition, Pearson Education India, 2010. |
|------------------------|--|

B.Sc-Computer Science Syllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

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|--------------------------|--|
| Website/ Link | basics_of_computer">https://www.gopeaople.edu/blog/the_basics_of_computer_science_how_to_get_started/ www.tutorialspoint.com>basics_of_computer |
|--------------------------|--|

MappingwithProgrammeOutcomes

| CONumber | PO1 | PO2 | PO3 | PO4 |
|-----------------|------------|------------|------------|------------|
| CO1 | S | M | M | --- |
| CO2 | M | M | - | S |
| CO3 | S | M | L | M |
| CO4 | M | S | M | - |
| CO5 | S | M | - | L |

S-Strong,M-Medium ,L-Low

**B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards
NON MAJOR ELECTIVE COURSE (NMEC)-I**

| | | | |
|----------------------|---|-----------------------|-----------------|
| Subject Title | SEMESTER – III PAPER – II COMPUTER APPLICATIONS FOR AUTOMATION | Semester | III |
| Subject Code | 21UCSN02 | Specialization | NA |
| Type | NMEC: Theory | L:T:P:C | 26:2:0:2 |

COURSE OBJECTIVE:

1. To acquire knowledge on editor, spreadsheet, slide preparation.
2. To improve creative thinking in presentation software.

| CO Number | CO Statement | Knowledge Level |
|------------------|---|------------------------|
| CO1 | Remember the basics of computers. | K1 |
| CO2 | Understand MS Word. | K2 |
| CO3 | Demonstrate the functions of MS Excel. | K3 |
| CO4 | Study the basics of MS Power Point. | K4 |
| CO5 | Analyze data processing with MS Access. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | SEMESTER – III PAPER – II COMPUTER APPLICATIONS FOR AUTOMATION | Semester | III | |
|---------------------------|---|----------------|----------|--|
| Subject Code | 21UCSN02 | Specialization | NA | |
| Type | NMEC:Theory | L:T:P:C | 26:2:0:2 | |
| Unit | Contents | Levels | Sessions | |
| I | Introduction to Computers: Introduction-Importance-History-Anatomy | K1 | 5 | |
| II | MS-Word: Basics–Do's and Don'ts–Menus–Commands–ToolBars–Icons – Word Formatting Tool Bar | K2 | 5 | |
| III | MS-Excel: Basics–Do's and Don'ts–Menus–Commands–ToolBars–Icons | K3 | 5 | |
| IV | MS-PowerPoint: Basics–Menus–ToolBars–Navigation | K4 | 5 | |
| V | MS-Access: Introduction –Parts of a Window:-Creating a New Data Base – Table Wizard – Renaming – Saving the Database – Relationships –Query–Form– Reports–Exiting MS-Access | K5 | 6 | |
| Learning Resources | | | | |
| Text Books | Sanjay Saxena, –MS-Office 2000 for everyone, Vikas Publishing House Pvt.Ltd, Reprint 2006 | | | |
| Reference Books | 1. Nellai Kannan, –MS-Office, Nels Publications, 3 rd Edition, 2004. 2. John Walkenbach, Herb Tyson, Michael R.Groh, Faithe Wempen and Lisa A.Bucki, –Microsoft Office 2010 Bible–, Wiley India Pvt.Ltd, Reprint 2010 | | | |
| Website/ Link | 1. https://ptgmedia.pearsoncmg.com/images/9780735623026/samplepages/9780735623026.pdf 2. https://www.dit.ie/media/ittraining/msoffice/MOAC_Excel_2016_Core.pdf 3. https://ptgmedia.pearsoncmg.com/images/9780735697799/samplepages/9780735697799.pdf 2010 | | | |

Mapping with Programme Outcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|-----------|-----|-----|-----|-----|
| CO1 | S | M | M | --- |
| CO2 | S | M | - | - |
| CO3 | S | S | L | M |
| CO4 | M | S | M | - |
| CO5 | S | M | M- | L |

S-Strong, M-Medium, L-Low

NON MAJOR ELECTIVE COURSE (NMEC) – II

| | | | |
|----------------------|--|-----------------------|-----------------|
| Subject Title | SEMESTER – IV PAPER – IBASICS OF INTERNET | Semester | IV |
| Subject Code | 21UCSN03 | Specialization | NA |
| Type | NMEC: Theory | L:T:P:C | 26:2:0:2 |

COURSE OBJECTIVE:

1. To improve the skills of surfing internet.
2. To prepare the students for developing web page using HTML.

| CO Number | CO Statement | Knowledge Level |
|------------------|---|------------------------|
| CO1 | Remember the basics of Internet. | K1 |
| CO2 | Understand internet technologies. | K2 |
| CO3 | Demonstrate tags in HTML. | K3 |
| CO4 | Study the basics of create list and tables. | K4 |
| CO5 | Analyze frames and forms. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | SEMESTER – IV PAPER – IBASICSOFINTERNET | Semester | IV | |
|--------------------------|---|----------------|----------|--|
| Subject Code | 21UCSN03 | Specialization | NA | |
| Type | NMEC:Theory | L:T:P:C | 26:2:0:2 | |
| Unit | Contents | Levels | Sessions | |
| I | IntroductionToTheInternet:ComputerinBusiness–Networking – Internet -E-mail – Resource Sharing – Gopher – WorldWideWeb–Telnet–BulletinBoardService–Wide AreaInformationService. | K1 | 5 | |
| II | InternetTechnologies:Modem-Internetaddressing–Physical connections–TelephoneLines–Internetbrowsers – InternetExplorer–NetscapeNavigator. | K2 | 5 | |
| III | IntroductiontoHTML:Designingahomepage –HTML documents–Anchor tag– HyperLinks.Traditionaltextandformatting | K3 | 5 | |
| IV | Types of lists: Ordered, Unordered – Nesting Lists – Othertags:Marquee, HR,BR-UsingImages– CreatingHyperlinks ,Tables: Creating basic Table, Table elements, Caption – Tableandcell alignment – Rowspan,Colspan –Cellpadding | K4 | 5 | |
| V | Frames: Frameset – Targeted Links – No frame – Forms:Input,Textarea, Select,Option. | K5 | 6 | |
| LearningResources | | | | |
| TextBooks | 1. C Xavier,-World Wide Web withHTML, TataMcGrawHill Education, 2000. 2. H.M.Deital,P.J.Deital,—InternetandWorldWideWeb– HowtoProgram,4 th Edition -PHILearning | | | |
| Reference Books | Laura Lemay,-HTMLComplete Reference,Teach YourselfWeb Publishing with HTML”. | | | |
| Website/ Link | https://www.codecademy.com/learn/learn-html/ | | | |

MappingwithProgrammeOutcomes

| CONumber | PO1 | PO2 | PO3 | PO4 |
|----------|-----|-----|-----|-----|
| CO1 | S | S | M | --- |
| CO2 | S | M | - | - |
| CO3 | S | S | M | L |
| CO4 | M | S | L | - |
| CO5 | S | L | M- | L |

B.Sc-Computer Science Syllabusunder CBCSPatternwitheffectfrom2021-2022Onwards
S-Strong,M-Medium ,L-Low

NON MAJOR ELECTIVE COURSE (NMEC) – II

| | | | |
|----------------------|---|-----------------------|-----------------|
| Subject Title | SEMESTER – IV PAPER – III IMAGE EDITING TOOL | Semester | IV |
| Subject Code | 21UCSN04 | Specialization | NA |
| Type | NMEC: Theory | L:T:P:C | 26:2:0:2 |

COURSE OBJECTIVE:

1. To impart Practical Training in PHOTOSHOP image editing Tool.
2. Familiarize the different text and filter effects.
3. Build programs using stamp tools.
4. Provide knowledge on working with several layouts.

| CO Number | CO Statement | Knowledge Level |
|------------------|--|------------------------|
| CO1 | Remember the basics of Photoshop. | K1 |
| CO2 | Understand the working with images. | K2 |
| CO3 | Demonstrate the layering in Photoshop. | k3 |
| CO4 | Implement the layer style. | K4 |
| CO5 | Analyze the action concept. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | SEMESTER – IV PAPER – III IMAGE EDITING TOOL | Semester | IV | |
|------------------------|---|----------------|----------|--|
| Subject Code | 21UCSN04 | Specialization | NA | |
| Type | NMEC:Theory | L:T:P:C | 26:2:0:2 | |
| Unit | Contents | Levels | Sessions | |
| I | Getting Started with Photoshop CS5: Launching Photoshop CS5 - Exploring the Interface - Using Screen Modes - Opening an Existing Image - Opening an Image Using Adobe Bridge - Exploring Commonly Used Tools in the Tools Panel - Creating a New Document - Saving a Document - Reverting a Document - Selecting a Workspace - Creating a New Workspace - Deleting a Workspace - Working with Panels in Photoshop CS5 - Keyboard Shortcuts and Menu Settings - Customizing Preferences. | K1 | 5 | |
| II | Working with Images: Differences between Bitmap and Vector Images - Understanding Image Resolution - Editing Images - Different Color Modes in Photoshop CS5 - Making Color Adjustments - File Formats in Photoshop CS5 - Creating a PDF File in Photoshop CS5 - Importing a PDF File into Photoshop CS5 - Making a Selection with Selections Tools - Modifying a Selection - Transforming a Selection - Transforming Pixels. | K2 | 5 | |
| III | Mastering Layers in Photoshop CS5: Exploring LAYERS Panel - Working with Layers - Organizing Layers Working with Opacity and Blend Modes - Working with Adjustment Layers - Masking in Photoshop CS5 - Setting the Current Foreground and Background Colors - Filling a Selection with the Current Foreground Color - Using the Content-Aware Feature - Exploring Drawing Tools - Exploring Painting Tools - Exploring Retouching Tools. | K3 | 5 | |
| IV | Working with Layer Styles and Filter Effects: Understanding Layer Styles - Working with Smart Objects - Understanding Filters. | K4 | 5 | |
| V | Animation, 3D, and Printing in Photoshop CS5: Working with Actions - Working with Automate Commands - Exploring 3D in Photoshop - Working with Animation in Photoshop CS5 - Printing in Photoshop CS5. | K5 | 6 | |
| | Learning Resources | | | |
| Text Books | C Kogent Learning Solutions Inc, - Photoshop CS5 in Simple Steps, Dreamtech Press, New Delhi, 2012. | | | |
| Reference Books | <ol style="list-style-type: none"> 1. Brie Gyncild, - Adobe Photoshop CS6 Classroom in a Book, Adobe Press/Peachpit, 2012 2. Lisa Danae Dayley, Brad Dayley, - Adobe Photoshop Cs6 Bible, Wiley India Pvt Ltd. 3. Edward Bailey, - Photoshop: 7 Ways to Use Adobe Photoshop Like a Pro, Create space Independent Publishing Platform | | | |
| Website/ Link | <ol style="list-style-type: none"> 1. www.online_image_editor.com 2. www.cs5_on_demand_sampler.pdf | | | |

MappingwithProgrammeOutcomes

| CONumber | PO1 | PO2 | PO3 | PO4 |
|-----------------|------------|------------|------------|------------|
| CO1 | S | M | L | --- |
| CO2 | S | M | - | L |
| CO3 | S | M | L | L |
| CO4 | M | S | L | L |
| CO5 | S | L | - | M |

S-Strong, M-Medium ,L-Low

ALLIED OPTION I

| | | | |
|----------------------|---|-----------------------|-----------------|
| Subject Title | SEMESTER I/III PAPER-I FUNDAMENTALS OF COMPUTERS | Semester | I/III |
| Subject Code | 21UCSA01 | Specialization | NA |
| Type | Allied: Theory | L:T:P:C | 86:6:0:4 |

COURSE OBJECTIVE:

1. To Understand the basics of computers.
2. To prepare the students for the analyze of data processing.

| CO Number | CO Statement | Knowledge Level |
|------------------|---|------------------------|
| CO1 | Remember the basics of computers. | K1 |
| CO2 | Understand the number system. | K2 |
| CO3 | Demonstrate the functions of computer system. | K3 |
| CO4 | Study the input and output system. | K4 |
| CO5 | Analyze of data processing. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | SEMESTER I/III PAPER-I FUNDAMENTALS OF COMPUTERS | Semester | I/III | |
|------------------------|---|-----------------------|-----------------|--|
| Subject Code | 21UCSA01 | Specialization | NA | |
| Type | Allied: Theory | L:T:P:C | 86:6:0:4 | |
| Unit | Contents | Levels | Sessions | |
| I | Introduction to Computer: Introduction – Types of computers – Characteristics of Computers. Generations of Computers: First Generation – Second Generation – Third Generation – Fourth Generation – Fifth Generation. Classification of Digital Computers: Introduction – Microcomputers – Personal Computer – Portable Computers – Mini Computers – Super Computers – Main Frames. | K1 | 17 | |
| II | Number System: Introduction – Decimal Number System – Binary Number System – Binary-Decimal Conversion – Decimal Binary Conversion – Binary Addition – Binary Subtraction – Complements – 9's Complement – 10's Complement – 1's Complements – 2's Complements – BCD - Bits, Bytes, Words – Octal – Hexadecimal Number System. | K2 | 17 | |
| III | Anatomy of Digital Computer: Functions and Components of Computer – Central Processing Unit – Control Unit – Arithmetic – Logic Unit – Memory – Registers – Addresses. Memory Units: RAM, ROM, PROM, EPROM, EEPROM, and Flash Memory. | K3 | 17 | |
| IV | Input Devices: Introduction – Keyboard – Mouse – Types of Mice – Connections – Mouse pad – Trackball – joystick – Digitizing Tablet – Scanners – Digital Camera – MICR – OCR – OMR – Bar Code Reader – Speech Input Device- Touch Screen – Touch Pad – Light Pen. Output Devices: Introduction – Monitor – Classification of Monitors – Monochrome – Gray Scale – Color – Digital Monitor – Analog Monitor – Characteristics of monitor – Printers. | K4 | 17 | |
| V | Computer Software: Introduction – Operating System – Utilities – Compiler and Interpreters – Word Processor – Spreadsheets – Presentation Graphics – DBMS – Programming Languages: Machine Language – Assembly Language – High level language – Types of High Level Language. Data Processing: Data VS Information – File Processing – Sequential File Processing – Direct Access file Processing. | K5 | 18 | |
| | Learning Resources | | | |
| Text Books | Alexis Leon and Mathews Leon, – Fundamentals of Computer Science and Communication Engineering, Leon Techworld, 1998. | | | |
| Reference Books | 1. B Ram and Sanjay Kumar, – Computer Fundamentals, 5 th Edition, New Age International Publishers, 2014. 2. Pradeep K Sinha, Priti Sinha, – Computer Fundamentals, BPB Publications, 2004. Anita Goel, – Computer Fundamentals, 1 st Edition, Pearson Education India, 2010. | | | |

B.Sc-Computer Science Syllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

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|--------------------------|---|
| Website/ Link | basics_of_computer">https://www.gopeople.edu/blog/the basics of computer science how to get started/www.tutorialspoint.com>basics_of_computer |
|--------------------------|---|

Mapping with Programme Outcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|------------------|------------|------------|------------|------------|
| CO1 | S | M | M | --- |
| CO2 | M | M | - | S |
| CO3 | S | M | L | M |
| CO4 | M | S | M | - |
| CO5 | S | M | - | L |

S-Strong, M-Medium, L-Low

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | | | |
|----------------------|--|-----------------------|-----------------|
| Subject Title | COMPUTER APPLICATIONS IN OFFICE | Semester | II/IV |
| Subject Code | 21UCSA02 | Specialization | NA |
| Type | Allied: Theory | L:T:P:C | 56:4:0:4 |

COURSE OBJECTIVE:

1. To improve the quality of students in office automation process.
2. To prepare the students for various ability to prepare reports and presentations.

| CO Number | CO Statement | Knowledge Level |
|------------------|--|------------------------|
| CO1 | Remember the basics of MS word. | K1 |
| CO2 | Understand MS word. | K2 |
| CO3 | Demonstrate the functions of MS excel. | K3 |
| CO4 | Study the basics of MS excel workbooks. | K4 |
| CO5 | Analyze of data processing with MS powerpoint. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | COMPUTER APPLICATIONS IN OFFICE | Semester | II/IV | |
|---------------------------|---|-----------------------|-----------------|--|
| Subject Code | 21UCSA02 | Specialization | NA | |
| Type | Allied: Theory | L:T:P:C | 56:4:0:4 | |
| Unit | Contents | Levels | Sessions | |
| I | MS Word Exploring Word 2007: Working in the Word Environment – Opening, Moving Around in, and closing Document – Creating and Saving A Document – Previewing and Printing Document – Editing and Proofreading Documents: Making Changes to document – Inserting Saved Text – Finding the Most Appropriate Word – Reorganizing a Document Outline – Finding and Replacing Text – Correcting spelling and Grammatical errors – Finalizing Document | K1 | 12 | |
| II | MS Word Changing the Look of Text: Quickly Formatting Text and Paragraphs – Manually changing the look of characters – Manually changing the look of paragraphs – Creating and modifying Lists – Presenting Information in Columns and Tables : Presenting Information in Columns – Creating Tabular List – Presenting Information in a Table – Formatting Table Information – Performing Calculations in a Table – Using a Table to control Page Layout. | K2 | 12 | |
| III | MS Excel Setting Up a Workbook: Creating Workbooks – Modifying Workbooks - Modifying Worksheets – Working with Data and Data Tables : Entering and Revising Data – Moving Data within a Workbook – Finding and Replacing Data – Correcting and Expanding Upon Worksheet Data – Defining a Table – Performing Calculations on Data : Naming Groups of Data – Creating Formulas to Calculate Values – Summarizing Data that meets Specific Conditions – Finding and Correcting Errors in Calculations – Changing Document Appearance. | K3 | 12 | |
| IV | MS-Access: Introduction – Parts of a Window :- Creating a New Data Base – Table Wizard – Renaming – Saving the Database – Relationships – Query – Form – Reports – Exiting MS-Access | K4 | 10 | |
| V | MS PowerPoint Starting a New Presentation – Working with Slide Text : Entering Text – Editing Text – Adding and Manipulating Text Boxes – Correcting and Sizing text – Checking Spelling – Finding and replacing text and fonts – Changing the size, Alignment, Spacing – Adjusting the Slide Layout, Order and Look : Changing the Layout of a slide – Rearranging Slides in a Presentation – Applying a theme – Switching to a Different Color Scheme – Adding Shading and texture to the background of a slide – Delivering a Presentation Electronically. | K5 | 10 | |
| Learning Resources | | | | |

B.Sc-Computer Science Syllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | |
|-------------------|--|
| Text Books | <ol style="list-style-type: none"><li data-bbox="368 165 1461 241">1. StepbyStep2007MicrosoftOfficeSystem- JoyceCoxandTeam,PHIlearningPrivate ltd, Newdelhi 2009<li data-bbox="368 241 1461 318">2. SanjaySaxena,-MS-Office2000foreveryonell, VikasPublishingHousePvt. Ltd,Reprint 2006 |
|-------------------|--|

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | |
|------------------------|---|
| Reference Books | 1. NellaiKannan,-MS-Office, NelsPublications, 3 rd Edition, 2004. 2. John Walkenbach, Herb Tyson, Michael R.Groh, FaitheWempen and LisaA.Bucki,-MicrosoftOffice2010Bible-,WileyIndiaPvt.Ltd,Reprint 2010 |
| Website/ Link | 1. https://ptgmedia.pearsoncmg.com/images/9780735623026/samplepages/9780735623026.pdf 2. https://www.dit.ie/media/ittraining/msoffice/MOAC_Excel_2016_Core.pdf 3. https://ptgmedia.pearsoncmg.com/images/9780735697799/samplepages/9780735697799.pdf 2010 |

Mapping with Programme Outcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|-----------|-----|-----|-----|-----|
| CO1 | S | M | M | M |
| CO2 | S | M | L | M |
| CO3 | S | S | L | M |
| CO4 | M | S | L | M |
| CO5 | S | M | M- | L |

S-Strong, M-Medium ,L-Low

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | | | |
|----------------------|------------------------------|-----------------------|-----------------|
| Subject Title | OFFICE AUTOMATION LAB | Semester | II/IV |
| Subject Code | 21UCSAP01 | Specialization | NA |
| Type | Allied: Practical | L:T:P:C | 30:0:2:2 |

COURSE OBJECTIVE:

1. To enable the students to design and develop the Office applications.
2. To qualify the students working in editor, spread sheet and slide preparation.
3. To improve creative thinking in presentation software.

LIST OF PROGRAMS

I. MS-WORD

1. Text Manipulation: Write a paragraph about your institution and Change the font size and type, Spell check, Aligning and justification of Text.
2. Bio data: Prepare a Bio-data.
3. Find and Replace: Write a paragraph about yourself and do the following. Find and Replace - Use Numbering Bullets, Footer and Headers.
4. Tables and manipulation: Creation, Insertion, Deletion (Columns and Rows). Create a mark sheet.
5. Mail Merge: Prepare an invitation to invite your friend to your birthday party. Prepare at least five letters.

II. MS-EXCEL

1. Data sorting - Ascending and Descending (both numbers and alphabets).
2. Mark list preparation for a student.
3. Individual Pay Bill preparation.
4. Invoice Report preparation.
5. Drawing Graphs. Take your own table.

III. MS-POWERPOINT

1. Create a slide show presentation for a seminar.
2. Preparation of Organization Charts.
3. Create a slide show presentation to display percentage of marks in each semester for all students.
4. Use bar chart (X-axis: Semester, Y-axis: % marks).
5. Use different presentation templates and different transition effects for each slide.

COURSE OUTCOME:

On successful completion of the course, the students will

1. Understand the features in MS Word.
2. Select and apply worksheet and functions in MS EXCEL.
3. Combine multiple features in MS POWERPOINT to prepare presentations.

ALLIED OPTION II

| | | | |
|----------------------|-------------------------|-----------------------|-----------------|
| Subject Title | DATABASE SYSTEMS | Semester | I/III |
| Subject Code | 21UCSA03 | Specialization | NA |
| Type | Allied: Theory | L:T:P:C | 86:6:0:4 |

COURSE OBJECTIVE:

1. To improve the understanding of database theory and practices.
2. To prepare the students implement database manipulation in SQL.

| CO Number | CO Statement | Knowledge Level |
|------------------|---|------------------------|
| CO1 | Remember the basics of Database. | K1 |
| CO2 | Understand Database Systems Concept and Architecture. | K2 |
| CO3 | Demonstrate the functions of the Relational Data Model and SQL. | K3 |
| CO4 | Study the basics of Basics SQL. | K4 |
| CO5 | Analyze advanced SQL commands and statements. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | DATABASE SYSTEMS | Semester | I/III | |
|---------------------------|--|-----------------------|-----------------|--|
| Subject Code | 21UCSA03 | Specialization | NA | |
| Type | Allied: Theory | L:T:P:C | 86:6:0:4 | |
| Unit | Contents | Levels | Sessions | |
| I | Introduction to Databases – Introduction- Characteristics of the Database Approach- Advantages of Using the DBMS Approach- A Brief History of Database Applications. | K1 | 14 | |
| II | Database Systems Concept and Architecture: Data Models, Schemas, and Instances- Three Schema Architecture and Data Independence - Database Languages and Interfaces- - The Database System Environment - Centralized and Client/Server Architectures for DBMSs- Classification of Database Management Systems. | K2 | 18 | |
| III | The Relational Data Model and SQL- Database Constraints- Relational Model Concepts- Key concepts- Relational Model Constraints and Relational Database Schemas- Update Operations, Transactions, and Dealing with Constraint Violations. | K3 | 18 | |
| IV | Basic SQL- SQL Data Definition and Data Types- Specifying Constraints in SQL- Basic Retrieval Queries in SQL- INSERT, DELETE, and UPDATE Statements in SQL- Additional Features of SQL. | K4 | 18 | |
| V | More SQL: Complex Queries, Triggers, Views, and Schema Modification- More Complex SQL Retrieval Queries- Specifying Constraints as Assertions and Actions as Triggers- Views (Virtual Tables) in SQL. | K5 | 18 | |
| Learning Resources | | | | |
| Text Books | Ramez Elmasri and Shamkant B. Navathe, - Fundamentals of database systems, 6 th Edition, Addison-Wesley Publication, 2011. | | | |
| Reference Books | Raghu Ramakrishnan, Madison, Johannes Gehrke, - Database Management Systems, 3 rd Edition, McGraw-Hill Higher Education, 2003. | | | |
| Website/ Link | 1. www.db-book.com/db72 . www.mheducation.co.in | | | |

MappingwithProgrammeOutcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|------------------|------------|------------|------------|------------|
| CO1 | S | S | M | M |
| CO2 | S | M | L | S |
| CO3 | S | M | L | M |
| CO4 | M | S | M | M |
| CO5 | S | M | L | L |

S-Strong,M-Medium ,L-Low

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | | | |
|----------------------|------------------------------|-----------------------|-----------------|
| Subject Title | E-COMMERCE TECHNIQUES | Semester | II/IV |
| Subject Code | 21UCSA04 | Specialization | NA |
| Type | Allied: Theory | L:T:P:C | 56:4:0:4 |

COURSE OBJECTIVE:

1. To improve the understanding of E-COMMERCE and E-payments.
2. To prepare the students to implement HTML and E-mail creation.

| CO Number | CO Statement | Knowledge Level |
|------------------|--|------------------------|
| CO1 | Remember the basics of E-commerce and Indian Business. | K1 |
| CO2 | Understand WWW. | K2 |
| CO3 | Demonstrate the E-payments system. | K3 |
| CO4 | Study the basics of Web Designing. | K4 |
| CO5 | Analyze Email components. | K5 |

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| Subject Title | E-COMMERCE TECHNIQUES | Semester | II/IV | |
|---------------------------|---|-----------------------|-----------------|--|
| Subject Code | 21UCSA04 | Specialization | NA | |
| Type | Allied: Theory | L:T:P:C | 56:4:0:4 | |
| Unit | Contents | Levels | Sessions | |
| I | History of E-commerce and Indian Business Context: E-Commerce – Emergence of the Internet – Emergence of the WWW – Advantages of E-Commerce – Transition to E-Commerce in India – The Internet and India – E-transition Challenges for Indian Corporate. Business Models for E-commerce: Business Model – E-business Models Based on the Relationship of Transaction Parties – E-business Models Based on the Relationship of Transaction Types. | K1 | 12 | |
| II | Enabling Technologies of the World Wide Web: World Wide Web – Internet Client-Server Applications – Networks and Internets – Software Agents – Internet Standards and Specifications – ISP. E-Marketing: Traditional Marketing – Identifying Web Presence Goals – Online Marketing – E-advertising – E-branding. | K2 | 12 | |
| III | E-Payment Systems: Main Concerns in Internet Banking – Digital Payment Requirements – Digital Token-based payment Systems – Classification of New Payment Systems – Properties of Electronic Cash – Cheque Payment Systems on the Internet. Information systems for Mobile Commerce: Introduction – Wireless Applications – Cellular Network – Wireless Spectrum – Technologies for Mobile Commerce – Wireless Technologies. | K3 | 12 | |
| IV | HTML and Web Designing: Brief History of HTML – HTML Tags – Table Creation – Hyperlink – Reference – Headings – Alignment – Simple Web Page Creation. | K4 | 10 | |
| V | E-mail: Email – Email Components - use of Email – Email creation – browsing – search engines – downloads. | K5 | 10 | |
| Learning Resources | | | | |
| Text Books | <ol style="list-style-type: none"> 1. P.T. Joseph, –E-Commerce-An Indian Perspective ll, 4th Edition, PHI Learning, 2012. 2. C Xavier, –World Wide Web Design with HTML ll, 13th Reprint, Tata McGraw Hill, 2006. 3. A. Leon and M. Leon, –Introduction to Information Technology ll, 1st Edition, Vijay Nicole Publications, 2013. | | | |

B.Sc-Computer Science Syllabusunder CBCSPatternwitheffectfrom2021-2022Onwards

| | |
|------------------------|---|
| Reference Books | <ol style="list-style-type: none"><li data-bbox="303 156 1466 257">1. David Whiteley,-E-CommerceStrategy, TechnologiesandApplications ,1stEdition,Tata Mc-Graw-Hill, 2001.<li data-bbox="303 257 1466 360">2. KamaleshKBajajand DebjaniNag,-E-Commerce– Thecuttingedgeof Business ,2ndEdition, TataMcGraw-HillEducation, 2005. |
|------------------------|---|

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

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|--------------------------|--|
| | 3. Alexis Leon and Mathews Leon, -Internet for Everyone II, 15 th Anniversary Edition, LeonTechworld, UBS Publications, 2012. 4. Ritendra Goel, -e-commerce II, New Age International Publishers, 2016. |
| Website/ Link | https://e-commerce-pdf-download.peatix.com/www.tutorialpoints.com/html https://books.google.com/books/about/a/_wide_web_design_with_html.html?id=6apoxl=z4nwc |

Mapping with Programme Outcomes

| CO Number | PO1 | PO2 | PO3 | PO4 |
|-----------|-----|-----|-----|-----|
| CO1 | S | M | L | L |
| CO2 | S | M | L | L |
| CO3 | S | M | L | L |
| CO4 | M | S | M | M |
| CO5 | S | M | M | L |

S-Strong, M-Medium, L-Low

Note: This paper should be handled and valued by Department of Computer Science.

B.Sc-Computer Science Syllabus under CBCS Pattern with effect from 2021-2022 Onwards

| | | | |
|----------------------|---|-----------------------|-----------------|
| Subject Title | ALLIED PRACTICAL - II HTML PROGRAMMING | Semester | II/IV |
| Subject Code | 21UCSAP02 | Specialization | NA |
| Type | Allied:Practical | L:T:P:C | 30:0:2:2 |

COURSE OBJECTIVE:

1. To enable the students to design and develop the WEB PAGES.
2. To qualify the students working with tags in table.
3. To improve creative thinking in forms, lists and frames.

LIST OF PROGRAMS

1. Write HTML code to develop a web page that contains the different background and foreground color, with various styles.
2. Write HTML code to create a Webpage that contains an Image at its left hand side of the page when user clicks on the image; it should open another web page that displays the details of that image.
3. Create a web page using HREF tag having the attribute ALINK, VLINK etc.
4. Create a web page, when user clicks on the link it should go to the bottom of the page.
5. Write a HTML code to create a web page of pink color and display moving message in red color.
6. Create a web page, showing an ordered list of name of your five friends and unordered list of any five your hobbies.
7. Create a HTML document containing a nested list showing the content page of any book.
8. Create a student mark list in HTML using Tables.
9. Create a HTML page to demonstrate the usage of Frames. Choose the content of the page on your own.
10. Design an application for payslip through HTML forms.

COURSE OUTCOME:

On successful completion of the course, the students will

1. Understand the features in HTML.
2. Select and apply tags for creating text, list and table.
3. Combine multiple features in forms, frames and texts.

Note: For University Practical Exam, both Internal and External should be appointed from Department of Computer Science.

