

K.S. Rangasamy College of Technology

(Autonomous)



Curriculum & Syllabi

for

B.Tech. Information Technology

(For the batch admitted in 2023 – 2024)

R 2022

**Courses Accredited by NBA, Accredited by NAAC with 'A++' grade,
Approved by AICTE, Affiliated to Anna University, Chennai.**

**KSR Kalvi Nagar, Tiruchengode – 637 215.
Namakkal District, Tamil Nadu, India.**

INFORMATION TECHNOLOGY

VISION

To emerge as an Information Technology knowledge hub by imparting quality education, promoting research and innovation.

MISSION

- To provide holistic education through curriculum update, inspired and experiential learning
- To mould the students as responsible professionals to compete with the emerging global challenges

1. PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

- PEO1:** **Core Competence:** Graduates will have core competence in engineering fundamentals and computing to solve hardware and software engineering problems
- PEO2:** **Successful Career:** Graduates will demonstrate successful professional practices in industry, academia and e-governance
- PEO3:** **Ethics and life-long learning:** Graduates will continue to advance in their career through life-long learning with a social and ethical concern

2. PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:

- PO1:** **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2:** **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3:** **Design /development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4:** **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5:** **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
- PO6:** **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7:** **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8:** **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9:** **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10:** **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11:** **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12:** **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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3. PROGRAMME SPECIFIC OUTCOMES (PSOs):

Engineering Graduates will be able to:

- PSO1:** **Develop IT infrastructure:** Develop suitable IT infrastructure in diverse domains through acquired foundation skills and knowledge
- PSO2:** **Design / Develop software products:** Apply necessary tools and methodologies to design and develop software products
- PSO3:** **Innovative Career:** Create a zest for innovative career path through value-based software courses and entrepreneurial skills resulting in competent IT solution providers

4. PEO / PO MAPPING

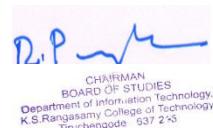
| Programme Educational Objectives | Programme Outcomes | | | | | | | | | | | |
|----------------------------------|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| PEO 1 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 |
| PEO 2 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 2 |
| PEO 3 | 3 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 |

Contributions: 1- low, 2- medium, 3- high

MAPPING – UG - INFORMATION TECHNOLOGY

| Year | Semester | Course Name | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|--------|----------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| Year I | I | Professional English I | | | | | | | | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |
| | | Matrices and Calculus | 3 | 3 | 3 | 2 | 3 | | | | | | | | 2 | | 3 |
| | | Engineering Chemistry | 3 | 3 | 2 | 3 | 2 | 2 | 2 | | | | | | 3 | 3 | 3 |
| | | Engineering Graphics | 3 | 3 | 3 | | 3 | | | 3 | | | | | | 3 | 2 |
| | | C Programming | 3 | 3 | 3 | | 3 | | | | 2 | 2 | | | 2 | 3 | 3 |
| | | Environmental Studies and Climate Change | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | | | | | 2 | 2 | 3 |
| | | Heritage of tamils | | | | | | | | | | | 3 | 3 | | 2 | 3 |
| | | Fabrication and Reverse Engineering Laboratory | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | | | |
| | | C Programming Laboratory | 3 | 3 | 3 | | 3 | | | | 2 | 2 | | | 2 | 3 | 3 |
| | II | Professional English II | | | | | | | | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 |
| | | Integrals and Partial Differential Equations | 3 | 3 | 3 | 2 | 3 | | | | | | | | 2 | 3 | 2 |

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| | | | | | | | | | | | | | | | | |
|-----------------|------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year II | III | Mathematical Statistics and Numerical Methods | 3 | 3 | 3 | 3 | 2 | | | | | 2 | 2 | | 2 | |
| | | Data Structures | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 | | 2 | 3 | 3 |
| | | Java Programming | 3 | 3 | 3 | 2 | 2 | | | | 2 | | | 2 | 3 | 3 |
| | | Digital Logic and Microprocessor | 3 | 3 | 3 | 3 | 2 | | | | | 1 | 1 | 1 | 3 | 2 |
| | | Software Engineering | 3 | 3 | 2 | 2 | | 3 | 2 | | 3 | 2 | | 2 | 3 | 3 |
| | | Universal Human Values | | | | | | 3 | 3 | 3 | 3 | 3 | 2 | 3 | | |
| | | Data Structures Laboratory | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | | 2 | 3 | 3 |
| | | Java Programming Laboratory | 3 | 3 | 3 | 2 | 2 | | | | 2 | | | 2 | 3 | 3 |
| | IV | Discrete Mathematics | 3 | 3 | 2 | 3 | 2 | | | | | | | 2 | | 2 |
| | | Design and Analysis of Algorithms | 3 | 3 | 3 | 2 | 3 | | | | | 2 | | | 3 | 2 |
| | | Computer Organization and Architecture | 3 | 2 | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 2 | 3 | 2 |
| | | Database Management Systems | 3 | 3 | 3 | 3 | 2 | | | | | 2 | 2 | 1 | 2 | 2 |
| | | Web Technology | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 |
| | | Database Management Systems Laboratory | 2 | 2 | 3 | 2 | 3 | | | | 2 | | | 2 | 3 | 3 |
| Year III | V | Operating Systems | 3 | 3 | 3 | 3 | 2 | | | | | | | | 2 | 2 |
| | | Computer Networks | 3 | 3 | 3 | 3 | 2 | | | | | | | | 3 | 3 |
| | | Embedded Systems And IOT | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | 3 | 3 |
| | | Design Thinking | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | 3 | 3 |
| | | Operating Systems and Open Source Laboratory | 3 | 3 | 3 | 2 | 2 | | | | | | | | 2 | 2 |
| | | Computer Networks Laboratory | 3 | 3 | 3 | 3 | 3 | | | | 2 | | 3 | 3 | 3 | |
| | | Career Skill Development IV | 3 | 3 | 3 | 3 | | 2 | | | | 2 | 3 | 3 | 2 | 3 |
| | VI | Data Mining and Analytics | 3 | 2 | 2 | 2 | 2 | 2 | | | | 1 | 1 | 1 | 3 | 2 |
| | | Full Stack Development | 3 | 3 | 3 | 3 | 2 | 1 | | | 2 | 1 | 2 | 2 | 2 | 1 |
| | | Machine Learning | 3 | 2 | 3 | 3 | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| | | Software Testing | 3 | 3 | 3 | 3 | 3 | 2 | | | | | | 3 | 3 | |
| | | Data Mining and Analytics Laboratory | 2 | 2 | 3 | 2 | 3 | | | | | | 2 | 3 | 3 | |
| | | Full Stack Development Laboratory | 3 | 3 | 3 | 2 | 3 | | | | | | | 1 | 2 | 2 |

K.S. RANGASAMY COLLEGE OF TECHNOLOGY

Credit Distribution for B.Tech (IT) Programme–2023 –2027Batch

| S.No. | Category | Credits Per Semester | | | | | | | | Total Credits | Percentage % |
|--------------|-----------------|-----------------------------|-----------|------------|-----------|----------|-----------|------------|-------------|----------------------|---------------------|
| | | I | II | III | IV | V | VI | VII | VIII | | |
| 1. | HS | 02 | 02, 03* | - | - | - | - | 03 | - | 07 | 04.27 |
| 2. | BS | 07 | 09 | 04 | 04 | - | - | - | - | 24 | 14.63 |
| 3. | ES | 11 | 09 | 03 | - | - | - | - | - | 23 | 14.02 |
| 4. | PC | - | - | 13 | 14 | 17 | 17 | 14 | - | 75 | 45.73 |
| 5. | PE | - | - | - | - | 03 | 03 | 06 | 03 | 15 | 09.15 |
| 6. | OE | - | - | - | 03 | 03 | 03 | - | - | 09 | 05.49 |
| 7. | CGC | - | CSD I | CSD II | CSD III | CSD IV | 1 | 02 | 08 | 11 | 06.71 |
| 8. | MC | MC I | - | MC II | - | MC III | - | - | - | - | - |
| 9. | AC | - | - | - | - | - | - | AC I | AC II | - | - |

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| | | | | | | | | | | |
|-------|----|----|----|----|----|----|----|----|----|-----|
| Total | 20 | 20 | 20 | 20 | 21 | 23 | 24 | 25 | 11 | 164 |
|-------|----|----|----|----|----|----|----|----|----|-----|

HS - HUMANITIESANDSOCIALSCIENCES**BS - BASICSCIENCE****ES - ENGINEERINGSCIENCES****PC -PROFESSIONALCORE****PE - PROFESSIONALELECTIVES****MC - MANDATORYCOURSES****OE - OPENELECTIVES****CGC- CAREER GUIDANCECOURSES****AC- AUDIT COURSES**

- Open Electives are courses offered by different departments that do not have any prerequisites and could be of interest to students of any branch

K.S.RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE –637215**(An Autonomous Institution affiliated to Anna University)****HUMANITIES AND SOCIAL SCIENCES (HS)**

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C | Prerequisite |
|-------|-------------|--|----------|-----------------|---|---|---|---|---|
| 1. | 60 EN 001 | Professional English I | HS | 3 | 1 | 0 | 2 | 2 | Basic knowledge of reading and writing in English |
| 2. | 60 EN 002 | Professional English II | HS | 3 | 1 | 0 | 2 | 2 | Basic knowledge of reading and writing in English and should have completed Professional English I. |
| 3. | 60 HS 001 | Engineering Economics and Financial Accounting | HS | 3 | 3 | 0 | 0 | 3 | Basic Mathematics |
| 4. | 60 AB 001 | National Cadet Corps (Air Wing) | HS | 4 | 2 | 0 | 2 | 3 | |
| 5. | 60 AB 002 | National Cadet Corps (Army Wing) | HS | 4 | 2 | 0 | 2 | 3 | |

BASIC SCIENCES (BS)

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C | Prerequisite |
|-------|-------------|---|----------|-----------------|---|---|---|---|--------------|
| 1. | 60 MA 001 | Matrices and Calculus | BS | 4 | 3 | 1 | 0 | 4 | NIL |
| 2. | 60 CH 004 | Engineering Chemistry | BS | 3 | 3 | 0 | 0 | 3 | NIL |
| 3. | 60 MA 003 | Integrals, Partial Differential Equations and Laplace Transform | BS | 4 | 3 | 1 | 0 | 4 | NIL |
| 4. | 60 PH 004 | Physics for Computer Technology | BS | 3 | 3 | 0 | 0 | 3 | NIL |
| 5. | 60 CP 0P2 | Engineering Physics and Chemistry Laboratory | BS | 4 | 0 | 0 | 4 | 2 | NIL |

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| | | | | | | | | | |
|----|-----------|---|----|---|---|---|---|---|---------------------------|
| 6. | 60 MA 010 | Mathematical Statistics and Numerical Methods | BS | 4 | 3 | 1 | 0 | 4 | Basis Algebra, Statistics |
| 7. | 60 MA 017 | Discrete Mathematics | BS | 4 | 3 | 1 | 0 | 4 | Calculus I,II |

ENGINEERING SCIENCES (ES)

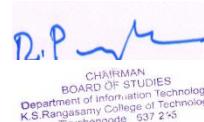
| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C | Prerequisite |
|-------|-------------|--|----------|-----------------|---|---|---|---|---|
| 1. | 60 ME 002 | Engineering Graphics | ES | 6 | 2 | 0 | 4 | 4 | NIL |
| 2. | 60 CS 001 | C Programming | ES | 3 | 3 | 0 | 0 | 3 | NIL |
| 3. | 60 ME 0P1 | Fabrication and Reverse Engineering Laboratory | ES | 4 | 0 | 0 | 4 | 2 | NIL |
| 4. | 60 CS 0P1 | C Programming Laboratory | ES | 4 | 0 | 0 | 4 | 2 | NIL |
| 5. | 60 EE 001 | Basic Electrical and Electronics Engineering | ES | 3 | 3 | 0 | 0 | 3 | NIL |
| 6. | 60 CS 201 | Python Programming | ES | 3 | 3 | 2 | 0 | 4 | Basic knowledge of Higher Secondary Mathematics, Binary Operations & Mathematical Logic |
| 7. | 60 CS 2P1 | Python Programming Laboratory | ES | 4 | 0 | 0 | 4 | 2 | Basic knowledge of Higher Secondary Mathematics, Binary Operations & Mathematical Logic |
| 8. | 60 EC 001 | Digital Logic and Microprocessor | ES | 4 | 2 | 0 | 2 | 3 | Basics of Electrical and Electronics Engineering |

PROFESSIONAL CORE (PC)

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C | Prerequisite |
|-------|-------------|--|----------|-----------------|---|---|---|---|--|
| 1. | 60 CS 003 | Data Structures | PC | 3 | 3 | 0 | 0 | 3 | C |
| 2. | 60 CS 004 | Java Programming | PC | 3 | 3 | 0 | 0 | 3 | C++ |
| 3. | 60 IT 301 | Software Engineering | PC | 5 | 3 | 0 | 0 | 3 | UML Concepts |
| 4. | 60 CS 0P3 | Data Structures Laboratory | PC | 4 | 0 | 0 | 4 | 2 | C |
| 5. | 60 CS 0P4 | Java Programming Laboratory | PC | 4 | 0 | 0 | 4 | 2 | C++ |
| 6. | 60 IT 002 | Design and Analysis of Algorithms | PC | 3 | 3 | 0 | 0 | 3 | Data Structure |
| 7. | 60 IT 401 | Computer Organization and Architecture | PC | 4 | 3 | 0 | 0 | 3 | Foundations of Computer Design |
| 8. | 60 IT 402 | Database Management Systems | PC | 3 | 3 | 0 | 0 | 3 | Relational Algebra, Data Structure, Java Programming |
| 9. | 60 IT 403 | Web Technology | PC | 4 | 1 | 0 | 4 | 3 | Java Programming |
| 10. | 60 IT 4P1 | Database Management Systems Laboratory | PC | 4 | 0 | 0 | 4 | 2 | Relational Algebra, Data Structure, Java Programming |
| 11. | 60 IT 501 | Operating Systems | PC | 3 | 3 | 0 | 0 | 3 | Good knowledge of C, Computer Organization and Architecture, x86 |

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|-----|-----------|--|----|---|---|---|---|---|---|
| | | | | | | | | | Assembly level programming. |
| 12. | 60 IT 502 | Computer Networks | PC | 5 | 3 | 0 | 0 | 3 | C or Java Programming |
| 13. | 60 IT 503 | Embedded systems and IoT | PC | 5 | 3 | 0 | 0 | 3 | Microprocessor, Basic programming |
| 14. | 60 IT 504 | Design Thinking | PC | 4 | 3 | 1 | 0 | 4 | Basic Programming Skills |
| 15. | 60 IT 5P1 | Operating Systems and Open Source Laboratory | PC | 4 | 0 | 0 | 4 | 2 | Good knowledge of C, Computer Organization and Architecture |
| 16. | 60 IT 5P2 | Computer Networks Laboratory | PC | 4 | 0 | 0 | 4 | 2 | C or Java Programming |
| 17. | 60 IT 601 | Data Mining and Analytics | PC | 3 | 3 | 0 | 0 | 3 | Database Management Systems, Basic Statistics |
| 18. | 60 IT 602 | Full Stack Development | PC | 3 | 3 | 0 | 0 | 3 | Front-end Languages and Frameworks (HTML, CSS, JavaScript), Backend Technologies and Frameworks (NodeJS, ExpressJS, Django, Flask, C++), Database Management Systems (MySQL, SQL SERVER and PostgreSQL, MongoDB, and Oracle Database) |
| 19. | 60 IT 603 | Machine Learning | PC | 4 | 3 | 1 | 0 | 4 | Data Mining, Basic Statistics |
| 20. | 60 IT 604 | Software Testing | PC | 3 | 3 | 0 | 0 | 3 | Software Engineering |
| 21. | 60 IT 6P1 | Data Mining and Analytics Laboratory | PC | 4 | 0 | 0 | 4 | 2 | Database Management Systems, Basic Statistics |
| 22. | 60 IT 6P2 | Full Stack Development Laboratory | PC | 4 | 0 | 0 | 4 | 2 | Front-end Languages and Frameworks (HTML, CSS, JavaScript), Backend Technologies and Frameworks |
| 23. | 60 IT 6P3 | Mini Project | PC | 2 | 0 | 0 | 2 | 0 | |
| 24. | 60 IT 701 | Mobile Communication | PC | 3 | 3 | 0 | 0 | 3 | Analog and Digital Communication |
| 25. | 60 IT 702 | Cryptography and Network Security | PC | 3 | 3 | 0 | 0 | 3 | Basic Mathematics |
| 26. | 60 IT 703 | Cloud Computing | PC | 3 | 3 | 0 | 0 | 3 | Basics of Computer |

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| | | | | | | | | | |
|-----|-----------|---------------------------------------|----|---|---|---|---|---|--|
| | | | | | | | | | Architecture and Organization, Networking |
| 27. | 60 IT 704 | Computer Graphics for Virtual Reality | PC | 3 | 3 | 0 | 0 | 3 | Knowledge of data structures and algorithm |
| 28. | 60 IT 7P1 | Cloud Computing Laboratory | PC | 4 | 0 | 0 | 4 | 2 | Basic programming skill |

PROFESSIONAL ELECTIVES (PE)**SEMESTER V, ELECTIVE I**

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C | Prerequisite |
|-------|-------------|--|----------|-----------------|---|---|---|---|---|
| 1. | 60 IT E11 | C# and .NET Framework | PE | 3 | 3 | 0 | 0 | 3 | Basic knowledge of C or C++ or any programming language or programming fundamentals |
| 2. | 60 IT E12 | Open Source Software | PE | 3 | 3 | 0 | 0 | 3 | SQL,MySQL, PHP |
| 3. | 60 IT E13 | Mathematical Foundations of Data Science | PE | 3 | 3 | 0 | 0 | 3 | Data Mining, Machine Learning |
| 4. | 60 IT E14 | Telecommunication Systems | PE | 3 | 3 | 0 | 0 | 3 | Basic Knowledge of Digital Logic Circuits |
| 5. | 60 IT E15 | Bioinformatics | PE | 3 | 3 | 0 | 0 | 3 | Data Mining |
| 6. | 60 IT E16 | Compiler Design | PE | 3 | 3 | 0 | 0 | 3 | knowledge of automata theory, context free languages, computer architecture, data structures and simple graph algorithms, logic or algebra. |

SEMESTER VI, ELECTIVE II

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C | Prerequisite |
|-------|-------------|------------------------------------|----------|-----------------|---|---|---|---|--|
| 1. | 60 IT E21 | High Performance Networks | PE | 3 | 3 | 0 | 0 | 3 | Computer Networks |
| 2. | 60 IT E22 | Distributed Component Architecture | PE | 3 | 3 | 0 | 0 | 3 | Web Technology |
| 3. | 60 IT E23 | Distributed Computing | PE | 3 | 3 | 0 | 0 | 3 | Data Structures and Algorithms Ideal: Basic networking concepts, Basic OS concepts |
| 4. | 60 IT E24 | Computational Data Analytics | PE | 3 | 3 | 0 | 0 | 3 | Data Mining, Machine Learning |
| 5. | 60 IT E25 | Digital Image Processing | PE | 3 | 3 | 0 | 0 | 3 | Calculus and probability, Basic programming skills. |

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| | | | | | | | | | |
|----|-----------|----------------------------------|----|---|---|---|---|---|-------------|
| 6. | 60 IT E26 | Information Retrieval Techniques | PE | 3 | 3 | 0 | 0 | 3 | Data Mining |
|----|-----------|----------------------------------|----|---|---|---|---|---|-------------|

SEMESTER VII, ELECTIVE III

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C | Prerequisite |
|-------|-------------|--------------------------------|----------|-----------------|---|---|---|---|--|
| 1. | 60 IT E31 | Wireless Sensor Networks | PE | 3 | 3 | 0 | 0 | 3 | Computer Networks |
| 2. | 60 IT E32 | Information Security | PE | 3 | 3 | 0 | 0 | 3 | Cryptography and Network Security |
| 3. | 60 IT E33 | Mobile Application Development | PE | 3 | 3 | 0 | 0 | 3 | Java Programming |
| 4. | 60 IT E34 | Web Mining | PE | 3 | 3 | 0 | 0 | 3 | Data Mining |
| 5. | 60 IT E35 | Intelligent Database Systems | PE | 3 | 3 | 0 | 0 | 3 | Database Management Systems |
| 6. | 60 IT E36 | Social Network Analysis | PE | 3 | 3 | 0 | 0 | 3 | Python programming, Probability and Statistics, Machine Learning |

SEMESTER VIII, ELECTIVE IV

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C | Prerequisite |
|-------|-------------|--|----------|-----------------|---|---|---|---|--|
| 1. | 60 IT E41 | Deep Learning and Neural Network | PE | 3 | 3 | 0 | 0 | 3 | Python programming, Probability and Statistics, Machine Learning |
| 2. | 60 IT E42 | Soft Computing and Optimization | PE | 3 | 3 | 0 | 0 | 3 | Python programming, Probability and Statistics, Machine Learning |
| 3. | 60 IT E43 | Cyber Security and Forensics | PE | 3 | 3 | 0 | 0 | 3 | Cryptography and Network Security |
| 4. | 60 IT E44 | Natural Language Processing and Text Analytics | PE | 3 | 3 | 0 | 0 | 3 | Python programming, Probability and Statistics, Machine Learning |
| 5. | 60 IT E45 | Big Data Framework | PE | 3 | 3 | 0 | 0 | 3 | Data Mining, Machine Learning |
| 6. | 60 IT E46 | Blockchain Technologies | PE | 3 | 3 | 0 | 0 | 3 | Cryptography and Network Security |

SEMESTER VIII, ELECTIVE V

| SNo. | Course Code | Course Title | Category | Contact Periods | L | T | P | C | Prerequisite |
|------|-------------|--|----------|-----------------|---|---|---|---|--|
| 1. | 60 IT E51 | Business Intelligence | PE | 3 | 3 | 0 | 0 | 3 | Data Mining, Data Warehousing |
| 2. | 60 IT E52 | Database Security and Access Control | PE | 3 | 3 | 0 | 0 | 3 | Database Management Systems, Cryptography and Network Security |
| 3. | 60 IT E53 | Analyzing, Visualizing and Applying Data Science with python | PE | 3 | 3 | 0 | 0 | 3 | Python programming, Probability and |

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| | | | | | | | | | |
|----|-----------|------------------|----|---|---|---|---|---|-----------------------------------|
| | | | | | | | | | Statistics, Machine Learning |
| 4. | 60 IT E54 | XML Web Services | PE | 3 | 3 | 0 | 0 | 3 | Database Management Systems |
| 5. | 60 IT E55 | Ethical Hacking | PE | 3 | 3 | 0 | 0 | 3 | Cryptography and Network Security |
| 6. | 60 IT E56 | Web of Things | PE | 3 | 3 | 0 | 0 | 3 | Data Mining, Web Mining |

SEMESTER VII & SEMESTER VIII, AUDIT COURSES (AC)

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C | Prerequisite |
|-------|-------------|--------------------------|----------|-----------------|---|---|---|---|--------------|
| 1. | 60 AC 001 | Research Methodology – I | AC | 1 | 1 | 0 | 0 | 0 | |
| 2. | 60 AC 002 | Research Methodology –II | AC | 1 | 1 | 0 | 0 | 0 | |

MANDATORY COURSES (MC)

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C | Prerequisite |
|-------|-------------|---|----------|-----------------|---|---|---|---|--------------|
| 1. | 60 MY 001 | Environmental Studies and Climatic Change | MC | 2 | 2 | 0 | 0 | 0 | |
| 2. | 60 MY 002 | Universal Human Values | MC | 3 | 3 | 0 | 0 | 3 | |
| 3. | 60 MY 003 | Start-ups and Entrepreneurship | MC | 2 | 2 | 0 | 0 | 0 | |

CAREER GUIDANCE COURSES (CGC)

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C | Prerequisite |
|-------|-------------|------------------------------|----------|-----------------|---|---|----|--------|--------------|
| 1. | 60 IT 7P2 | Project Work - Phase I | CGC | 4 | 0 | 0 | 4 | 2 | |
| 2. | 60 IT 8P1 | Project Work - Phase II | CGC | 16 | 0 | 0 | 16 | 8 | |
| 3. | 60 CG 0P1 | Career Skill Development I | CGC | 2 | 0 | 0 | 2 | 0 | |
| 4. | 60 CG 0P2 | Career Skill Development II | CGC | 2 | 0 | 0 | 2 | 0 | |
| 5. | 60 CG 0P3 | Career Skill Development III | CGC | 2 | 0 | 0 | 2 | 0 | |
| 6. | 60 CG 0P4 | Career Skill Development IV | CGC | 2 | 0 | 0 | 2 | 0 | |
| 7. | 60 CG 0P5 | Comprehension Test | CGC | 2 | 2 | 0 | 0 | 0 | |
| 8. | 60 CG 0P6 | Internship | CGC | 0 | 0 | 0 | 0 | 1/2/3* | |

GENERAL ENGINEERING (GE)

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C | Prerequisite |
|-------|-------------|--|----------|-----------------|---|---|---|-----|--------------|
| 1. | 60 GE 001 | Heritage of Tamils / தமிழர் மரபு | GE | 1 | 1 | 0 | 0 | 1\$ | |
| 2. | 60 GE 002 | Tamils and Technology/தமிழகும் தொழில்நுட்பமும் | GE | 1 | 1 | 0 | 0 | 1\$ | |

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K.S.RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE – 637215
(An Autonomous Institution affiliated to Anna University)
COURSES OF STUDY
(For the candidates admitted from 2023-2024 onwards)

SEMESTER I

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C | |
|-------------------|-------------|--|----------|-----------------|----|----|----|-----|----|
| | | Induction Programme | - | - | - | - | - | 0 | |
| THEORY | | | | | | | | | |
| 1. | 60 EN 001 | Professional English I | HS | 3 | 1 | 0 | 2 | 2 | |
| 2. | 60 MA 001 | Matrices and Calculus | BS | 4 | 3 | 1 | 0 | 4 | |
| 3. | 60 CH 004 | Engineering Chemistry | BS | 3 | 3 | 0 | 0 | 3 | |
| 4. | 60 ME 002 | Engineering Graphics | ES | 6 | 2 | 0 | 4 | 4 | |
| 5. | 60 CS 001 | C Programming | ES | 3 | 3 | 0 | 0 | 3 | |
| 6. | 60 MY 001 | Environmental Studies and Climate Change | MC | 2 | 2 | 0 | 0 | 0 | |
| 7. | 60 GE 001 | Heritage of Tamils / தமிழர் மரபு | GE | 1 | 1 | 0 | 0 | 1\$ | |
| PRACTICALS | | | | | | | | | |
| 8. | 60 ME 0P1 | Fabrication and Reverse Engineering Laboratory | ES | 4 | 0 | 0 | 4 | 2 | |
| 9. | 60 CS 0P1 | C Programming Laboratory | ES | 4 | 0 | 0 | 4 | 2 | |
| | | | | Total | 30 | 15 | 01 | 14 | 20 |

* Scientific Thoughts in Tamil, Extra 1 credit is offered

\$Heritage of Tamils/ தமிழர் மரபு, Extra 1 credit is offered

SEMESTER II

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C | |
|-------------------|-------------|---|----------|-----------------|----|----|----|--------|----|
| THEORY | | | | | | | | | |
| 1. | 60 EN 002 | Professional English II | HS | 3 | 1 | 0 | 2 | 2 | |
| 2. | 60 MA 003 | Integrals, Partial Differential Equations and Laplace Transform | BS | 4 | 3 | 1 | 0 | 4 | |
| 3. | 60 EE 001 | Basic Electrical and Electronics Engineering | ES | 3 | 3 | 0 | 0 | 3 | |
| 4. | 60 PH 004 | Physics for Computer Technology | BS | 3 | 3 | 0 | 0 | 3 | |
| 5. | 60 IT 001 | Python Programming | ES | 4 | 3 | 1 | 0 | 4 | |
| 6. | 60 AB 00* | NCC/NSS/NSO/YRC/RRC/Fine Arts* | HS | 4 | 2 | 0 | 2 | 3* | |
| 7. | 60 GE 002 | Tamils and Technology /தமிழரும் தொழில்நுட்பமும் | GE | 1 | 1 | 0 | 0 | 1\$ | |
| PRACTICALS | | | | | | | | | |
| 8. | 60 CP 0P2 | Engineering Physics and Chemistry Laboratory | BS | 4 | 0 | 0 | 4 | 2 | |
| 9. | 60 IT 0P1 | Python Programming Laboratory | ES | 4 | 0 | 0 | 4 | 2 | |
| 10. | 60 CG 0P1 | Career Skill Development I | CG | 2 | 0 | 0 | 2 | 0 | |
| 11. | 60 CG 0P6 | Internship | CG | 0 | - | - | - | 1/2/3* | |
| | | | | Total | 32 | 16 | 02 | 14 | 20 |

NCC/NSS/NSO/YRC/RRC/Fine Arts 3 credits can be waived /extra credit is offered.

Internship* additional credits is offered based on the duration

SEMESTER III

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C |
|---------------|-------------|---|----------|-----------------|---|---|---|----|
| THEORY | | | | | | | | |
| 1. | 60 MA 010 | Mathematical Statistics and Numerical Methods | BS | 4 | 3 | 1 | 0 | 4 |
| 2. | 60 CS 003 | Data Structures | PC | 3 | 3 | 0 | 0 | 3 |
| 3. | 60 CS 004 | Java Programming | PC | 3 | 3 | 0 | 0 | 3 |
| 4. | 60 EC 001 | Digital Logic and Microprocessor | ES | 4 | 2 | 0 | 2 | 3 |
| 5. | 60 IT 301 | Software Engineering | PC | 3 | 3 | 0 | 0 | 3 |
| 6. | 60 MY 002 | Universal Human Values | MC | 3 | 3 | 0 | 0 | 3* |

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| PRACTICALS | | | | | | | | |
|-------------------|-------------|-----------------------------|----------|-----------|-----------|-----------|-----------|-----------|
| S.No. | Course Code | Course Title | Category | L | T | P | C | |
| 7. | 60 CS 0P3 | Data Structures Laboratory | PC | 4 | 0 | 0 | 4 | 2 |
| 8. | 60 CS 0P4 | Java Programming Laboratory | PC | 4 | 0 | 0 | 4 | 2 |
| 9. | 60 CG 0P2 | Career Skill Development II | CG | 2 | 0 | 2 | 0 | 1* |
| 10. | 60 CG 0P6 | Internship | CG | 0 | - | - | - | 1/2/3* |
| | | | | 30 | 16 | 04 | 10 | 20 |

* UHV extra credit is offered.

* Career Skill Development additional credits is offered based on the duration

* Internship additional credits is offered based on the duration

SEMESTER IV

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C |
|-------------------|-------------|--|----------|-----------------|-----------|-----------|-----------|-----------|
| THEORY | | | | | | | | |
| 1. | 60 MA 017 | Discrete Mathematics | BS | 4 | 3 | 1 | 0 | 4 |
| 2. | 60 IT 002 | Design and Analysis of Algorithms | PC | 3 | 3 | 0 | 0 | 3 |
| 3. | 60 IT 401 | Computer Organization and Architecture | PC | 3 | 3 | 0 | 0 | 3 |
| 4. | 60 IT 402 | Database Management Systems | PC | 3 | 3 | 0 | 0 | 3 |
| 5. | 60 IT 403 | Web Technology | PC | 5 | 1 | 0 | 4 | 3 |
| 6. | 60 IT L** | Open Elective – I | OE | 3 | 3 | 0 | 0 | 3 |
| PRACTICALS | | | | | | | | |
| 7. | 60 IT 4P1 | Database Management Systems Laboratory | PC | 4 | 0 | 0 | 4 | 2 |
| 8. | 60 CG 0P3 | Career Skill Development III | CG | 2 | 0 | 0 | 2 | 0 |
| 9. | 60 CG 0P6 | Internship | CG | 0 | - | - | - | 1/2/3* |
| | | | | Total | 27 | 16 | 01 | 10 |
| | | | | | | | | 21 |

* Career Skill Development additional credits is offered based on the duration

* Internship additional credits is offered based on the duration

SEMESTER V

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C |
|-------------------|-------------|--|----------|-----------------|-----------|-----------|-----------|-----------|
| THEORY | | | | | | | | |
| 1. | 60 IT 501 | Operating Systems | PC | 3 | 3 | 0 | 0 | 3 |
| 2. | 60 IT 502 | Computer Networks | PC | 3 | 3 | 0 | 0 | 3 |
| 3. | 60 IT 503 | Embedded Systems And IOT | PC | 3 | 3 | 0 | 0 | 3 |
| 4. | 60 IT 504 | Design Thinking | PC | 4 | 3 | 1 | 0 | 4 |
| 5. | 60 IT E1* | Elective – I | PE | 3 | 3 | 0 | 0 | 3 |
| 6. | 60 IT L** | Open Elective – II | OE | 3 | 3 | 0 | 0 | 3 |
| 7. | 60 MY 003 | Start-ups and Entrepreneurship | MC | 2 | 2 | 0 | 0 | 0 |
| PRACTICALS | | | | | | | | |
| 8. | 60 IT 5P1 | Operating Systems and Open Source Laboratory | PC | 4 | 0 | 0 | 4 | 2 |
| 9. | 60 IT 5P2 | Computer Networks Laboratory | PC | 4 | 0 | 0 | 4 | 2 |
| 10. | 60 CG 0P4 | Career Skill Development IV | CG | 2 | 0 | 0 | 2 | 0 |
| 11. | 60 CG 0P6 | Internship | CG | 0 | - | - | - | 1/2/3* |
| | | | | Total | 31 | 20 | 01 | 10 |
| | | | | | | | | 23 |

* Career Skill Development additional credits is offered based on the duration

* Internship additional credits is offered based on the duration

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SEMESTER VI

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C |
|-------------------|-------------|--------------------------------------|----------|-----------------|-----------|-----------|-----------|-----------|
| THEORY | | | | | | | | |
| 1. | 60 IT 601 | Data Mining and Analytics | PC | 3 | 3 | 0 | 0 | 3 |
| 2. | 60 IT 602 | Full Stack Development | PC | 3 | 3 | 0 | 0 | 3 |
| 3. | 60 IT 603 | Machine Learning | PC | 4 | 3 | 1 | 0 | 4 |
| 4. | 60 IT 604 | Software Testing | PC | 3 | 3 | 0 | 0 | 3 |
| 5. | 60 IT E2* | Elective – II | PE | 3 | 3 | 0 | 0 | 3 |
| 6. | 60 IT L** | Open Elective – III | OE | 3 | 3 | 0 | 0 | 3 |
| PRACTICALS | | | | | | | | |
| 7. | 60 IT 6P1 | Data Mining and Analytics Laboratory | PC | 4 | 0 | 0 | 4 | 2 |
| 8. | 60 IT 6P2 | Full Stack Development Laboratory | PC | 4 | 0 | 0 | 4 | 2 |
| 9. | 60 IT 6P3 | Mini Project | PC | 2 | 0 | 0 | 2 | 0 |
| 10. | 60 CG 0P5 | Comprehension Test | CG | 2 | 2 | 0 | 0 | 0 |
| 11. | 60 CG 0P6 | Internship | CG | 0 | - | - | - | 1/2/3* |
| Total | | | | 31 | 20 | 01 | 10 | 23 |

Internship* additional credit is offered based on the duration**SEMESTER VII**

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C |
|-------------------|-------------|--|----------|-----------------|-----------|----------|-----------|-----------|
| THEORY | | | | | | | | |
| 1. | 60 HS 001 | Engineering Economics and Financial Accounting | HS | 3 | 3 | 0 | 0 | 3 |
| 2. | 60 IT 701 | Mobile Communication | PC | 3 | 3 | 0 | 0 | 3 |
| 3. | 60 IT 702 | Cryptography and Network Security | PC | 3 | 3 | 0 | 0 | 3 |
| 4. | 60 IT 703 | Cloud Computing | PC | 3 | 3 | 0 | 0 | 3 |
| 5. | 60 IT 704 | Computer Graphics and Virtual Reality | PC | 3 | 3 | 0 | 0 | 3 |
| 6. | 60 IT E3* | Elective – III | PE | 3 | 3 | 0 | 0 | 3 |
| 7. | 60 IT E4* | Elective – IV | PE | 3 | 3 | 0 | 0 | 3 |
| 8. | 60 AC 001 | Research Methodology – I | AC | 1 | 1 | 0 | 0 | 0 |
| PRACTICALS | | | | | | | | |
| 9. | 60 IT 7P1 | Cloud Computing Laboratory | PC | 4 | 0 | 0 | 4 | 2 |
| 10. | 60 IT 7P2 | Project Work - Phase I | CG | 4 | 0 | 0 | 4 | 2 |
| 11. | 60 CG 0P6 | Internship | CG | 0 | - | - | - | 1/2/3* |
| Total | | | | 30 | 22 | 0 | 08 | 25 |

Internship* additional credits is offered based on the duration**SEMESTER VIII**

| S.No. | Course Code | Course Title | Category | Contact Periods | L | T | P | C |
|-------------------|-------------|---------------------------|----------|-----------------|-----------|-----------|-----------|-----------|
| THEORY | | | | | | | | |
| 1. | 60 IT E5* | Elective – V | PE | 3 | 3 | 0 | 0 | 3 |
| 2. | 60 AC 002 | Research Methodology – II | AC | 1 | 1 | 0 | 0 | 0 |
| PRACTICALS | | | | | | | | |
| 3. | 60 IT 8P1 | Project Work - Phase II | CG | 16 | 0 | 0 | 16 | 8 |
| Total | | | | 20 | 04 | 00 | 16 | 11 |

TOTAL NUMBER OF CREDITS TO BE EARNED FOR AWARD OF THE DEGREE =163

- BS** : Basic Science
HS : Humanities and Social Science
ES : Engineering Science
MC : Mandatory Course
L : Lecture
T : Tutorial
P : Practical

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K.S.RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE – 637215
(An Autonomous Institution affiliated to Anna University)
B.E. / B.Tech. Degree Programme
SCHEME OF EXAMINATIONS
(For the candidates admitted from 2023-2027 onwards)
FIRSTSEMESTER

| S.No. | Course Code | Name of the Course | Duration of Internal Exam | Weightage of Marks | | | Minimum Marks for Pass in End Semester Exam | |
|------------------|--------------------|--|----------------------------------|-------------------------------|-----------------------------|-------------------|--|--------------|
| | | | | Continuous Assessment* | End Semester Exam ** | Max. Marks | End Semester Exam | Total |
| THEORY | | | | | | | | |
| 1 | 60 EN 001 | Professional English I | 2 | 40 | 60 | 100 | 45 | 100 |
| 2 | 60 MA 001 | Matrices and Calculus | 2 | 40 | 60 | 100 | 45 | 100 |
| 3 | 60 CH 004 | Engineering Chemistry | 2 | 40 | 60 | 100 | 45 | 100 |
| 4 | 60 ME 002 | Engineering Graphics | 2 | 50 | 50 | 100 | 45 | 100 |
| 5 | 60 CS 001 | C Programming | 2 | 40 | 60 | 100 | 45 | 100 |
| 6 | 60 MY 001 | Environmental Studies and Climate Change | 2 | 100 | - | 100 | - | |
| PRACTICAL | | | | | | | | |
| 7 | 60 ME 0P1 | Fabrication and Reverse Engineering Laboratory | 2 | 60 | 40 | 100 | 45 | 100 |
| 8 | 60 CS0P1 | C Programming Laboratory | 2 | 60 | 40 | 100 | 45 | 100 |

* CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follows the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks

| 60 EN 001 | Professional English I | Category | L | T | P | Credit |
|-----------|------------------------|----------|---|---|---|--------|
| | | HS | 1 | 0 | 2 | 2 |

Objectives

- To help learners improve their vocabulary and to enable them to use words appropriately in different academic and professional contexts
- To help learners develop strategies that could be adopted while reading texts
- To help learners acquire the ability to speak effectively in English in real life and career related situations
- To equip students with effective speaking and listening skills in English
- To facilitate learners to enhance their writing skills with coherence and appropriate format effectively

Prerequisite

Basic knowledge of reading and writing in English.

Course Outcomes

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

| | | |
|-----|---|------------|
| CO1 | Listen and comprehend complex academic texts | Understand |
| CO2 | Read and infer the denotative and connotative meanings of technical texts | Analyze |
| CO3 | Write definitions, descriptions, narrations, and essays on various topics | Apply |
| CO4 | Speak fluently and accurately in formal and informal communicative contexts | Apply |

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| | | |
|-----|---|---------|
| CO5 | Express their opinions effectively in both oral and written medium of communication | Analyze |
|-----|---|---------|

Mapping with Programme Outcomes

| Cos | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | | | | | | | | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |
| CO2 | | | | | | | | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |
| CO3 | | | | | | | | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |
| CO4 | | | | | | | | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |
| CO5 | | | | | | | | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |

3- Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 10 | 10 | 10 |
| Apply (Ap) | 20 | 20 | 40 |
| Analyse (An) | 30 | 30 | 50 |
| Create (Cr) | 0 | 0 | 0 |

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|--|------------|---|---|-----------|--------|---------------|----|-------|--|
| Professional English I | | | | | | | | | |
| Common to All Branches | | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | | |
| | L | T | P | | C | CA | ES | Total | |
| I | 1 | 0 | 2 | 45 | 2 | 40 | 60 | 100 | |
| Introduction to Fundamentals of Communication* | | | | | | | | [9] | |
| Listening: General information-specific details-conversation: introduction to classmates – audio / video (formal & informal). | | | | | | | | | |
| Speaking: Self Introduction; Introducing a friend; conversation – politeness strategies. | | | | | | | | | |
| Reading: Reading brochures (technical context), telephone messages / social media messages relevant to technical contexts and emails. | | | | | | | | | |
| Writing: Writing letters – informal and formal – basics and format orientation | | | | | | | | | |
| Language Focus: Present Tenses; word formation (affixes); synonyms, antonyms and contronyms, and phrasal verbs; abbreviations & acronyms (as used in technical contexts). | | | | | | | | | |
| Narration and Summation* | | | | | | | | [9] | |
| Listening: Podcast, anecdotes / stories / event narration; documentaries and interviews with celebrities. | | | | | | | | | |
| Speaking: Narrating personal experiences / events; Interviewing a celebrity; reporting / and summarizing of documentaries / podcasts/ interviews. | | | | | | | | | |
| Reading: Biographies, travelogues, newspaper reports, excerpts from literature, and travel & technical blogs. | | | | | | | | | |
| Writing: Paragraph writing, short report on an event (field trip etc.). | | | | | | | | | |
| Language Focus: Past tenses and prepositions; One-word substitution. | | | | | | | | | |
| Description of a process / product* | | | | | | | | [9] | |
| Listening: Listen to a product and process descriptions; advertisements about products or services | | | | | | | | | |
| Speaking: Picture description; giving instruction to use the product; presenting a product. | | | | | | | | | |
| Reading: Advertisements, gadget reviews and user manuals. | | | | | | | | | |
| Writing: Definitions; instructions; and product /process description. | | | | | | | | | |
| Language Focus: Imperatives; comparative adjectives; future tenses. Homonyms; and Homophones, discourse markers (connectives & sequence words) | | | | | | | | | |
| Classification and Recommendations* | | | | | | | | | |
| Listening: TED Talks; scientific lectures; and educational videos. | | | | | | | | | |
| Speaking: Small Talk; Mini presentations | | | | | | | | | |

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| | |
|---|------------------------------|
| Reading: Newspaper articles and Journal reports Writing: Note-making / Note-taking; recommendations; Transferring information from non-verbal (chart, graph etc, to verbal mode) Language Focus: Articles; Pronouns -Possessive & Relative pronouns; ; subject-verb agreement; collocations. | [9] |
| Expression* Listening: Debates/ discussions; different viewpoints on an issue; and panel discussions. Speaking: Group discussions, debates & role plays. Reading: Editorials; and opinion blogs. Writing: Essay Writing (Descriptive or narrative). Language Focus: Punctuation; Compound Nouns; simple, compound & complex sentences. Cause & effect expressions. | [9] |
| | Total Hours 45 |
| Textbook(s): | |
| 1. 'English for Engineers & Technologists' Orient Blackswan Private Ltd. Department of English, Anna University, 2020 | |
| 2. Norman Lewis, 'Word Power Made Easy – The Complete Handbook for Building a Superior Vocabulary Book', Penguin Random House India, 2020 | |
| Reference(s): | |
| 1. Paul Emmerson and Nick Hamilton, 'Five Minute Activities for Business English', Cambridge University Press, New York, 2005 | |
| 2. Arthur Brookes and Peter Grundy, ' Beginning to Write: Writing Activities for Elementary and Intermediate Learners', Cambridge University Press, New York, 2003 | |
| 3. Michael McCarthy and Felicity O Dell, 'English Vocabulary in Use: Upper Intermediate', Cambridge University Press, N.York, 2012 | |
| 4. Lakshmi Narayanan, 'A Course Book on Technical English' Scitech Publications (India) Pvt. Ltd. 2020 | |

* SDG- 04- Quality Education

Course Contents and Lecture Schedule

| S.No. | Topic | No.of Hours |
|------------|--|-------------|
| 1.0 | Introduction to Fundamentals of Communication | |
| 1.1 | Listening for general information and Specific details | 1 |
| 1.2 | Self-introduction | 1 |
| 1.3 | Narrating personal experiences | 1 |
| 1.4 | Reading relevant to technical contexts and emails | 1 |
| 1.5 | Writing letters – informal | 1 |
| 1.6 | Writing letters – formal | 1 |
| 1.7 | Present Tenses | 1 |
| 1.8 | synonyms, antonyms and contronyms, and affixes | 1 |
| 1.9 | phrasal verbs; abbreviations & acronyms | 1 |
| 2.0 | Narration and Summation | |
| 2.1 | Listening to podcasts, documentaries and interviews with celebrities | 1 |
| 2.2 | Narrating personal experiences | 1 |
| 2.3 | Summarizing of documentaries | 1 |
| 2.4 | Reading travelogues, and excerpts from literature | 1 |
| 2.5 | Paragraph writing | 1 |
| 2.6 | Short report on an event (field trip etc.). | 1 |
| 2.7 | Past tenses | 1 |

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| | | |
|------------|---|-----------|
| 2.8 | Prepositions | 1 |
| 2.9 | One-word substitution | 1 |
| 3.0 | Description of a process / product | |
| 3.1 | Listen to a product and process descriptions | 1 |
| 3.2 | Picture description | 1 |
| 3.3 | Giving instruction to use the product | 1 |
| 3.4 | Reading Advertisements, gadget reviews and user manuals | 1 |
| 3.5 | Writing Definitions and instructions | 1 |
| 3.6 | Future Tenses | 1 |
| 3.7 | Homonyms and Homophones | 1 |
| 3.8 | Imperatives | 1 |
| 3.9 | comparative adjectives, and discourse markers | 1 |
| 4.0 | Classification and Recommendations | |
| 4.1 | Listening to TED Talks and educational videos | 1 |
| 4.2 | Listening to scientific lectures | 1 |
| 4.3 | Small Talk and mini presentations | 1 |
| 4.4 | Reading newspaper articles and journal reports | 1 |
| 4.5 | Note-making / Note-taking | 1 |
| 4.6 | Recommendations | 1 |
| 4.7 | Transferring information from non-verbal | 1 |
| 4.8 | Articles and Pronouns | 1 |
| 4.9 | Subject-verb agreement and collocations | 1 |
| 5.0 | Expression | |
| 5.1 | Listening to debates and panel discussions | 1 |
| 5.2 | Group discussions | 2 |
| 5.3 | Role plays | 1 |
| 5.4 | Reading editorials and opinion blogs | 1 |
| 5.5 | Essay Writing (Descriptive or narrative) | 1 |
| 5.6 | Punctuation and cause & effect expressions. | 1 |
| 5.7 | Compound Nouns | 1 |
| 5.8 | Simple, compound & complex sentences | 1 |
| | Total | 45 |

CourseDesigners1. Dr.A.Palaniappan - palaniappan@ksrct.ac.in

| 60 MA 001 | Matrices and Calculus | Category | L | T | P | Credit |
|-----------|-----------------------|----------|---|---|---|--------|
| | | BS | 3 | 1 | 0 | 4 |

Objective

- To familiarize the basic concepts in Cayley-Hamilton theorem and orthogonal transformation.
- To get exposed to the fundamentals of differentiation.
- To acquire skills to understand the concepts involved in Jacobians and maxima and minima.

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- To solve various linear differential equations and method of variation of parameters.
- To learn various techniques and methods in solving definite and indefinite integrals.

Prerequisite

NIL

Course Outcomes

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

| | | |
|-----|--|-----------------------------|
| CO1 | Apply the concepts of Cayley-hamilton theorem and orthogonal transformation to the matrix. | Remember, Understand Apply |
| CO2 | Apply the concepts of differentiation in solving various Engineering problems. | Remember, Understand, Apply |
| CO3 | Obtain Jacobians and maxima and minima of functions of two variables. | Remember, Understand, Apply |
| CO4 | Employ various methods in solving differential equations. | Remember, Understand, Apply |
| CO5 | Apply different techniques to evaluate definite and indefinite integrals. | Remember, Understand, Apply |

Mapping with Programme Outcomes

| Cos | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | 3 | 3 | | | | | | | 2 | | 3 | |
| CO2 | 3 | 3 | 2 | 2 | 3 | | | | | | | 2 | | 3 | |
| CO3 | 3 | 3 | 3 | 2 | 3 | | | | | | | 2 | | 3 | |
| CO4 | 3 | 3 | 3 | 3 | 3 | | | | | | | 2 | | 3 | |
| CO5 | 3 | 3 | 3 | 2 | 3 | | | | | | | 2 | | 3 | |

3- Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests(Marks) | | Model Exam | End Sem Examination(Marks) |
|------------------|------------------------------------|----|------------|----------------------------|
| | 1 | 2 | | |
| Remember (Re) | 10 | 10 | 10 | 10 |
| Understand (Un) | 10 | 10 | 20 | 20 |
| Apply (Ap) | 40 | 40 | 70 | 70 |
| Analyze (An) | 0 | 0 | 0 | 0 |
| Evaluate (Ev) | 0 | 0 | 0 | 0 |
| Create (Cr) | 0 | 0 | 0 | 0 |
| Total | 60 | 60 | 100 | 100 |

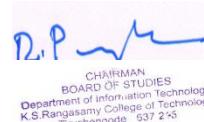
| K.S.Rangasamy College of Technology–AutonomousR2022 | | | | | | | | | |
|--|------------|---|---|-----------|--------|---------------|----|----|-------|
| 60 MA 001 –Matrices and Calculus | | | | | | | | | |
| Common to MECH, ECE, EEE, CSE, MCT, CIVIL, IT, TXT, BT, FT, AI&DS, AI&ML | | | | | | | | | |
| Semester | Hours/Week | | | Total Hrs | Credit | Maximum Marks | | | |
| | L | T | P | | | C | CA | ES | Total |
| I | 3 | 1 | 0 | 60 | 4 | 40 | 60 | 60 | 100 |

Matrices

Characteristic equation - Eigen values and Eigen vectors of a real matrix - Properties of Eigen values and Eigen vectors - Cayley-Hamilton theorem - Orthogonal transformation of a symmetric matrix to diagonal form - Reduction of quadratic form to canonical form by an Orthogonal transformation - Nature of quadratic form - Applications: Stretching of an elastic membrane.

[9]

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| | |
|---|-----------|
| Differentiation Representation of functions - Limit of a function - Continuity - Derivatives - Differentiation rules (sum, product, quotient, chain rules) - Successive Differentiation - Leibnitz's theorem - Applications: Maxima and Minima of functions of one variable.* | [9] |
| Functions of Several Variables Partial differentiation - Homogeneous functions and Euler's theorem - Jacobians - Taylor's series for functions of two variables - Applications: Maxima and minima of functions of two variables - Constrained maxima and minima: Lagrange's Method of Undetermined Multipliers.* | [9] |
| Differential Equations Linear differential equations of second and higher order with constant coefficients - R.H.S is of the form $e^{\alpha x}$, $\sin \alpha x$, $\cos \alpha x$, x^n , $n > 0$ - Differential equations with variable coefficients: Cauchy's and Legendre's form of linear equations - Method of variation of parameters. | [9] |
| Integration Definite and Indefinite integrals - Substitution rule - Techniques of Integration: Integration by parts, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals - Applications: Hydrostatic force and pressure, moments and centres of mass. | [9] |
| Total Hours: 45 + 15(Tutorial) | 60 |
| Text Book(s): | |
| 1. Grewal B.S, "Higher Engineering Mathematics", 44 th Edition, Khanna Publishers, Delhi, 2017. | |
| 2. Kreyszig Erwin, "Advanced Engineering Mathematics", 10 th Edition, John Wiley and Sons (Asia) Limited, New Delhi, 2016. | |
| Reference(s): | |
| 1. Dass H.K, "Higher Engineering Mathematics", 3 rd (Revised) Edition, S.Chand & Company Ltd, New Delhi, 2014. | |
| 2. Veerarajan T, "Engineering Mathematics", for Semesters I & II, 1 st Edition, Tata McGraw Hill Publishing Co., New Delhi, 2019. | |
| 3. Kandasamy P, Thilagavathy K and Gunavathy K, "Engineering Mathematics - I", S.Chand & Company Ltd, New Delhi, 2017. | |
| 4. Bali N P and Manish Goyal, "A text book of Engineering Mathematics", 10 th Edition, Laxmi Publications (P) Ltd, 2016. | |

* SDG- 04- Quality Education

Course Contents and Lecture Schedule

| S.No. | Topic | Number of Hours | Mode of Content Delivery |
|-------|---|-----------------|--------------------------|
| 1 | Matrices | | |
| 1.1 | Characteristic equation | 1 | Black Board |
| 1.2 | Eigen values and Eigen vectors of a real matrix | 1 | Black Board |
| 1.3 | Properties of Eigen values and Eigen vectors | 1 | Black Board |
| 1.4 | Cayley-Hamilton theorem | 1 | Black Board |
| 1.5 | Tutorial | 2 | |

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| | | | |
|----------|---|---|---------------|
| 1.6 | Orthogonal transformation of a symmetric matrix to diagonal form | 1 | Black Board |
| 1.7 | Reduction of quadratic form to canonical form by Orthogonal transformation | 1 | Black Board |
| 1.8 | Nature of quadratic form | 1 | Flipped Class |
| 1.9 | Stretching of an elastic membrane | 1 | Black Board |
| 1.10 | Tutorial | 2 | |
| 2 | Differentiation | | |
| 2.1 | Representation of functions | 1 | Black Board |
| 2.2 | Limit of a function and Continuity | 1 | Black Board |
| 2.3 | Differentiation rules (sum, product, quotient, chain rules) | 2 | Flipped Class |
| 2.4 | Successive differentiation | 1 | Black Board |
| 2.5 | Tutorial | 2 | |
| 2.6 | Leibnitz's theorem | 1 | Black Board |
| 2.7 | Maxima and minima of functions of one variable | 2 | Black Board |
| 2.8 | Tutorial | 2 | |
| 3 | Functions of Several Variables | | |
| 3.1 | Partial differentiation | 1 | Black Board |
| 3.2 | Homogeneous functions and Euler's theorem | 1 | Flipped Class |
| 3.3 | Jacobians | 2 | Black Board |
| 3.4 | Tutorial | 2 | |
| 3.5 | Taylor's series for functions of two variables | 1 | Black Board |
| 3.6 | Maxima and minima of functions of two variables | 1 | Black Board |
| 3.7 | Lagrange's Method of Undetermined Multipliers | 2 | Black Board |
| 3.8 | Tutorial | 2 | |
| 4 | Differential Equations | | |
| 4.1 | Linear differential equations of second and higher order with constant co-efficient | 1 | Flipped Class |
| 4.2 | R.H.S is of the form $e^{\alpha x}$, $\sin \alpha x$, $\cos \alpha x$, x^n , $n > 0$ | 2 | Black Board |
| 4.3 | Tutorial | 2 | |

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| | | | |
|--------------|--|-----------|---------------|
| 4.4 | Differential equations with variable coefficients: Cauchy's form of linear equations | 2 | Black Board |
| 4.5 | Differential equations with variable coefficients: Legendre's form of linear equations | 2 | Black Board |
| 4.6 | Method of variation of parameters | 1 | Black Board |
| 4.7 | Tutorial | 2 | |
| 5 | Integration | | |
| 5.1 | Definite and Indefinite integrals | 1 | Black Board |
| 5.2 | Substitution rule | 1 | Black Board |
| 5.3 | Techniques of Integration: Integration by parts | 1 | Black Board |
| 5.4 | Integration of rational functions by partial fraction | 1 | Black Board |
| 5.5 | Tutorial | 2 | |
| 5.6 | Integration of irrational functions | 1 | Black Board |
| 5.7 | Improper integrals | 1 | Black Board |
| 5.8 | Hydrostatic force. | 1 | Black Board |
| 5.9 | Pressure, moments and centres of mass. | 1 | Flipped Class |
| 5.10 | Tutorial | 2 | |
| Total | | 60 | |

List of MATLAB Programs:

1. Introduction to MATLAB.
2. Matrix Operations - Addition, Multiplication, Transpose, Inverse and Rank.
3. Solution of system of linear equations.
4. Compute of Eigen values and Eigen vectors of a Matrix.
5. Solve first and second order ordinary differential equations.
6. Compute Maxima and Minima of a function of one variable.

Course Designers

1. Dr.C.Chandran–cchandran@ksrct.ac.in
2. Mr.G.Mohan - mohang@ksrct.ac.in

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| | | | | | | |
|------------------|--|-----------------|----------|----------|----------|---------------|
| 60 CH 004 | Engineering Chemistry (Common to CS, IT, AD,AM) | Category | L | T | P | Credit |
| | | BS | 3 | 0 | 0 | 3 |

Objective(s)

- To help the learners, analyze the hardness of water and its removal.
- To analyze the concepts of electrochemistry and its applications.
- To recall the basics and application of chemical sensors.
- To endow an overview of smart materials.
- To analyze the concepts of cheminformatics.

Prerequisite

Nil

Course Outcomes

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

| | | |
|------------|---|-----------------------------|
| CO1 | Identify the types of hardness of water and its removal | Understand, Apply & Analyse |
| CO2 | Understand the concept of electrochemistry and its applications | Understand |
| CO3 | Interpret the principles of sensors in various applications | Apply |
| CO4 | Recognize the types of smart materials. | Understand |
| CO5 | Interpret the structures by cheminformatics. | Understand & Apply |

Mapping with Programme Outcomes

| Cos | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|
| CO1 | 2 | | 2 | | 2 | | 2 | | | | | 2 | | 2 | |
| CO2 | 2 | 2 | 2 | | 2 | | | | | | | | 2 | | |
| CO3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | | | | | | 3 | 3 | 3 |
| CO4 | 3 | 2 | 2 | 3 | | 2 | | | | | | | 3 | 2 | 2 |
| CO5 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | | | | | | 3 | 3 | 3 |

3- Strong; 2-Medium; 1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests | | | Terminal Examination |
|-------------------------|------------------------------------|----------|----------|-----------------------------|
| | 1 | 2 | 3 | |
| Remember | 20 | 20 | 20 | 20 |
| Understand | 40 | 40 | 40 | 40 |
| Apply | 40 | 40 | 40 | 40 |
| Analyze | - | - | - | - |
| Evaluate | - | - | - | - |
| Create | - | - | - | - |

K.S.Rangasamy College of Technology–Autonomous R2022**60 CH 004 – Engineering Chemistry****Common to CS, IT,AD,AM**

| Semester | Hours/Week | | | Total Hours | Credit | Maximum Marks | | |
|-----------------|-------------------|----------|----------|--------------------|---------------|----------------------|-----------|--------------|
| | L | T | P | | C | CA | ES | Total |
| I | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |

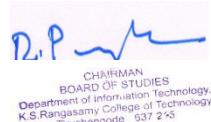
WATER TECHNOLOGY*

Introduction – Commercial and industrial uses of water – hardness – types – estimation of hardness by EDTA method- Internal conditioning (colloidal, phosphate, 22algon and carbonate conditioning methods) – external conditioning (Zeolite process, demineralization process) – Desalination methods (Reverse Osmosis and Electro dialysis). Flash evaporation.

[7]

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ELECTROCHEMISTRY**

Electrode potential – Nernst Equation – derivation and problems – reversible and irreversible cells – Types of Electrodes and its applications - reference electrodes - pH, conductometric and Potentiometric titrations – Principles of electro plating and electro less plating- fabrication process of Printed Circuit Board.

[9]

CHEMICAL SENSORS**

Sensors – Chemical Sensors – Characteristics – Elements and Characterization – Potentiometric Sensors - Amperometric Sensors – Sensors Based on Electrochemical Methods – Electrochemical Biosensors – Optical Biosensors : Enzyme Sensors – Bio affinity Sensors - DNA Sensors. Chemical Sensors as Detectors and Indicators: Indicators for Titration Processes – Separation Methods. Nano technology in chemical sensors.

[10]

SMART MATERIALS**

Liquid crystal polymers – Organic Light Emitting Diode (OLED) – [polythiopene] – working and applications – Conductive polymers and Semi conducting polymers: principle and applications- organic: Organic dielectric material [Polystyrene, PMMA]. Smart screen materials: Inorganic Rare earth metals [yttrium, lanthanum, cerium] – Conductive components: Indium tin oxide [properties and applications] – touch screen [resistive and capacitive] – magnetic storage [Iron oxide, cobalt alloy] – optical storage [photo chromic materials] – solid storage.

[9]

CHEMINFORMATICS**

Definition – coordinate – bonds – bond length – bond angles – torsional angles – chemical structure – definition – conformation – representation of structural information – linear format – SMILEYF notation – MOL format – PDB format – storage of structural data in a database – structural keys – finger print -canonical structure using chemdraw – similarity search – sub structure search – application of chem-informatics in drugs designing.

[10]

Total Hours **45****Text Book(s):**

- O.G. Palanna "Engineering Chemistry" Tata McGraw-Hill Pub.Co.Ltd, New Delhi, 2017.

Reference(s):

- Jain. P.C. and Monica Jain, "Engineering Chemistry", Dhanpatrai publishing co. New Delhi, 14th edition, 2015.
- Peter Grundler "Chemical Sensors" ISBN 978-3-540-45742-8 Springer Berlin Heidelberg New York, 2007
- O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013.
- Shikha Agarwal, "Engineering Chemistry-Fundamentals and Applications", Cambridge University Press, Delhi, 2nd Edition, 2019.

* SDG 6: Improve Clean Water and Sanitation

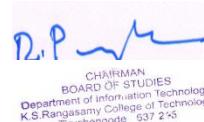
** SDG 9 Industry, innovation and infrastructure

Course Contents and Lecture Schedule

| S. No. | Topic | No. of hours |
|---------------|--|---------------------|
| 1.0 | WATER TECHNOLOGY | |
| 1.1 | Introduction – Commercial and Industrial uses of water | 1 |
| 1.2 | Hardness – types | 1 |
| 1.3 | Estimation of Hardness of Water by EDTA method | 1 |
| 1.4 | Internal conditioning (Colloidal, Phosphate, Calgon and Carbonate) | 1 |
| 1.5 | External conditioning (Zelite process & Demineralization process) | 1 |
| 1.6 | Desalination methods (Reverse Osmosis and Electrodialysis) | 1 |
| 1.7 | Flash Evaporation | 1 |
| 2.0 | ELECTROCHEMISTRY | |
| 2.1 | Electrode potential – Nernst Equation – derivation and problems | 2 |
| 2.2 | Reversible and irreversible cells | 1 |

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| | | |
|------------|---|---|
| 2.3 | Types of Electrodes and its applications | 1 |
| 2.4 | Reference electrodes - Ph | 1 |
| 2.5 | Conductometric and Potentiometric titrations | 1 |
| 2.6 | Principles of electro plating and electro less plating- | 2 |
| 2.7 | Fabrication process of Printed Circuit Board. | 1 |
| 3.0 | CHEMICAL SENSORS | |
| 3.1 | Sensors – Chemical Sensors – Characteristics | 1 |
| 3.2 | Elements and Characterization | 1 |
| 3.3 | Potentiometric Sensors, Amperometric Sensors | 1 |
| 3.4 | Sensors Based on Electrochemical Methods | 1 |
| 3.5 | Electrochemical Biosensors | 1 |
| 3.6 | Optical Biosensors : Enzyme Sensors – Bio affinity Sensors | 1 |
| 3.7 | DNA Sensors. Chemical Sensors as Detectors and Indicators | 1 |
| 3.8 | Indicators for Titration Processes | 1 |
| 3.9 | Separation Methods. Nano technology in chemical sensors. | 2 |
| 4.0 | SMART MATERIALS | |
| 4.1 | Liquid crystal polymers – Organic Light Emitting Diode (OLED) – [polythiopene] – working and applications | 2 |
| 4.2 | Conductive polymers and Semi conducting polymers: principle and applications | 2 |
| 4.3 | Organic: Organic dielectric material [Polystyrene, PMMA]. | 1 |
| 4.4 | Smart screen materials: Inorganic Rare earth metals [yttrium, lanthanum, cerium] | 2 |
| 4.5 | Conductive components: Indium tin oxide [properties and applications] – touch screen [resistive and capacitive] | 1 |
| 4.6 | Magnetic storage [Iron oxide, cobalt alloy] | 1 |
| 4.7 | Optical storage [photo chromic materials] – solid storage. | 1 |
| 5.0 | CHEMINFORMATICS | |
| 5.1 | Definition – coordinate –bonds –bond length – bond angles – torsional angles – chemical structure – | 2 |
| 5.2 | Definition – conformation – representation of structural information | 2 |
| 5.3 | Linear format – SMILEYF notation – MOL format – PDB format – | 1 |
| 5.4 | Storage of structural data in a database – structural keys | 2 |
| 5.5 | Finger print -canonical structure using chemdraw | 1 |
| 5.6 | Similarity search –sub structure search - | 1 |
| 5.7 | Application of chem-informatics in drugs designing | 1 |

Course Designers

- 1.Dr.T.A.SUKANTHA – sukantha@ksrct.ac.in
- 2.Dr.K.PRABHA – prabhak@ksrct.ac.in
- 3.Dr.S.MEENACHI – meenachi@ksrct.ac.in

| 60 ME 002 | Engineering Graphics | Category | L | T | P | Credit |
|-----------|----------------------|----------|---|---|---|--------|
| | | ES | 2 | 0 | 4 | 4 |

Objectives

- To acquire various concepts of dimensioning, conventions and standards.
- To impart the graphic skills for converting pictorial views of solids in to orthographic views.
- To learn the concept in projection of solids, section of solids and development of different types of surfaces.
- To learn the concept of isometric projection.
- To learn the geometry and topology of engineered components

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Prerequisite

NIL

Course Outcomes

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

| | | | | | | | | | | | | | |
|-----|--|--|--|--|--|--|--|--|--|--|--|--|----------|
| CO1 | Demonstrate the Impact of computer technologies on graphical communication | | | | | | | | | | | | Re/Un/Ap |
| CO2 | Convert the pictorial views in to orthographic views using drafting software | | | | | | | | | | | | Re/Un/Ap |
| CO3 | Draw the projection of simple solids, true shape of sections and development of surfaces | | | | | | | | | | | | Re/Un/Ap |
| CO4 | Construct the isometric projections of objects using drafting software. | | | | | | | | | | | | Re/Un/Ap |
| CO5 | Interpret a design project illustrating engineering graphical skills. | | | | | | | | | | | | Re/Un/Ap |

Mapping with Programme Outcomes

| Cos | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 2 | 3 | | | | | | | | | | | 3 | 2 |
| CO2 | 3 | 3 | 3 | | | | | | | | | | | 3 | 2 |
| CO3 | 3 | 3 | 3 | | 3 | | | 3 | | | | | | 3 | 2 |
| CO4 | 3 | 3 | 3 | | 3 | | | 3 | | | | | | 3 | 2 |
| CO5 | 3 | 3 | 3 | | | | | | | | | | | 3 | 2 |

3- Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember | 10 | 10 | 20 |
| Understand | 20 | 20 | 30 |
| Apply | 30 | 30 | 50 |
| Analyse | 0 | 0 | 0 |
| Evaluate | 0 | 0 | 0 |
| Create | 0 | 0 | 0 |

| K.S.Rangasamy College of Technology – Autonomous R2022 | | | | | | | | |
|---|--------------|---|---|-----------|--------|---------------|----|--------|
| 60 ME 002 – Engineering Graphics | | | | | | | | |
| Common to CS, IT, EE, EC, BT, FT | | | | | | | | |
| Semester | Hours / Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | Total |
| I | 2 | 0 | 4 | 90 | 4 | 50 | 50 | 100 |
| Introduction to Computer Aided Drafting (CAD) software * Theory of CAD software – Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension) – Drawing Area (Background, Crosshairs, Coordinate System) – Dialog boxes and windows – Shortcut menus (Button Bars) – The Command Line and Status Bar – Different methods of zoom– Select and erase objects. | | | | | | | | [3+12] |
| Orthographic Projection* Theory of projection – Terminology and Methods of projection – first angle and third angle projection – Conversion of pictorial views into orthographic views | | | | | | | | [3+12] |
| Projection of Solids and Sections of Solids* Projections of simple solids: prism, pyramid, cylinder and cone (Axis parallel to one plane and perpendicular to other, axis inclined to one plane and parallel to other). Sections of simple solids: prism, pyramid, cylinder and cone in simple positions (cutting plane is inclined to one of the principal planes and perpendicular to the other) – True shape of sections | | | | | | | | [3+12] |
| Development of Surfaces* Principle of development-Methods of development: Parallel line development-Cube, Prism and Cylinder. Radial line development – Pyramid and cone | | | | | | | | [3+12] |

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| | |
|--|-----------|
| Isometric Projection* Principles of Isometric projection – Isometric scale, Isometric views, Conventions – Isometric views of lines, Planes, Simple and compound Solids – Conversion of Orthographic views in to Isometric view | [3+12] |
| Application of Engineering Graphics* Geometry and topology of engineered components: Creation of engineering models and their presentation in standard 2D blueprint form, 3D wire-frame and shaded solids – Geometric dimensioning and Tolerance – Use of solid modeling software for creating associative models – Floor plans: windows, doors, and fixtures such as water closet (WC), bath sink, shower, etc. – Applying colour coding according to building drawing practice – Drawing sectional elevation showing foundation to ceiling – Introduction to Building Information Modelling (BIM). | [3+12] |
| Total Hours | 90 |
| Text book(s): | |
| 1. Bhatt N.D., —Engineering Drawing, Charotar Publishing House Pvt. Ltd., 53 rd Edition, Gujarat, 2019. | |
| 2. Venugopal K., —Engineering Graphicsll, New Age International (P) Limited, 2014. | |
| Reference(s) | |
| 1. Shah M.B., Rana B.C., and V.K.Jadon., —Engineering Drawingll, Pearson Education, 2011. | |
| 2. Natarajan K.V., —A Text Book of Engineering Graphicsll, Dhanalakshmi Publishers, Chennai, 2014. | |
| 3. Agrawal B. & Agrawal C. M., —Engineering Graphicsll, TMH Publication, 2012. | |
| 4. Narayana, K.L. & P Kannaiyah, —Text book on Engineering Drawingll, Scitech Publishers, 2008. | |

* SDG 9 – Industry Innovation and Infrastructure

Course Contents and Lecture Schedule

| S. No. | Topic | No. of Hours |
|------------|--|--------------|
| 1.0 | Introduction to Computer Aided Drafting (CAD) software | |
| 1.1 | Theory of CAD software | 1 |
| 1.2 | Menu System, Tool bars (Standard, Object Properties, Draw, Modify and Dimension) | 2 |
| 1.3 | Drawing Area (Background, Crosshairs, Coordinate System) | 3 |
| 1.4 | Dialog boxes and windows – Shortcut menus | 3 |
| 1.5 | The Command Line and Status Bar | 1 |
| 1.6 | Different methods of zoom – Select and erase objects. | 2 |
| 2.0 | Orthographic Projection | |
| 2.1 | Introduction to orthographic projections | 2 |
| 2.2 | Planes of projection, | 2 |
| 2.3 | Projection of points | 1 |
| 2.4 | Projection of lines inclined to both planes. | 2 |
| 2.5 | Projection of planes | 2 |
| 2.6 | Projection of planes Inclined to both planes | 1 |
| 2.7 | Conversions of pictorial views to orthographic views. | 3 |
| 2.8 | Practice class for pictorial views to orthographic views. | 2 |
| 2.9 | Practice class for pictorial views to orthographic views. | 1 |
| 3.0 | Projection of Solids | |
| 3.1 | Projections of simple solids: prism | 2 |
| 3.2 | Projections of simple solids: cylinder | 3 |
| 3.3 | Projections of simple solids: pyramid | 2 |
| 3.4 | Projections of simple solids: Cone | 2 |

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| | | |
|------------|---|---|
| 3.5 | Practice class for Projection of Solids | 2 |
| 3.6 | Axis of solid inclined to both HP and VP | 5 |
| 3.7 | Section of solids for Prism, | 2 |
| 3.8 | Section of solids for Cylinder, | 2 |
| 3.9 | Section of solids for Pyramid, | 2 |
| 3.10 | Section of solids for Cone | 2 |
| 3.11 | Auxiliary Views – Draw the sectional orthographic views of geometrical solids. | 3 |
| 3.12 | Draw the sectional orthographic views of objects from industry. | 3 |
| 3.13 | Development of surfaces of Right solids Prism, | 2 |
| 3.14 | Development of surfaces of Right solids Pyramid | 2 |
| 3.15 | Development of surfaces of Right solids Cylinder and Cone | 2 |
| 4.0 | Isometric Projection and Introduction to AutoCAD | |
| 4.1 | Principles of isometric projection | 1 |
| 4.2 | Isometric scale | 2 |
| 4.3 | Isometric projections of simple solids: Prism, | 2 |
| 4.4 | Isometric projections of simple solids: Pyramid, | 2 |
| 4.5 | Isometric projections of simple solids: Cylinder | 1 |
| 4.6 | Isometric projections of simple solids: Cone | 2 |
| 4.7 | Isometric projections of frustum | 2 |
| 4.8 | Isometric projections of truncated solids | 2 |
| 4.9 | Combination of two solid objects in simple vertical positions. | 3 |
| 5.0 | Application of Engineering Graphics | |
| 5.1 | Geometry and topology of engineered components: | 2 |
| 5.2 | Creation of engineering models and their presentation in standard 2D blueprint form, | 3 |
| 5.3 | 3D wire-frame and shaded solids – Geometric dimensioning and Tolerance – Use of solid modeling software for creating associative models | 3 |
| 5.4 | Floor plans: windows, doors, and fixtures such as water closet (WC), bath sink, shower, etc. | 3 |
| 5.5 | Applying colour coding according to building drawing practice | 2 |
| 5.6 | Drawing sectional elevation showing foundation to ceiling | 2 |
| 5.7 | Introduction to Building Information Modelling (BIM). | 2 |

CourseDesigners

- Dr.K.Mohan-mohank@ksrct.ac.in

| 60 CS 001 | C PROGRAMMING | Category | L | T | P | Credit |
|-----------|---------------|----------|---|---|---|--------|
| | | ES | 3 | 0 | 0 | 3 |

Objectives

- To learn most fundamental element of the C language and to examine the execution of branching, looping statements,
- To examine the concepts of arrays, its characteristics and types and strings.
- To understand the concept of functions, pointers and the techniques of putting them to use
- To apply the knowledge of structures and unions to solve basic problems in C language
- To enhance the knowledge in file handling functions for storage and retrieval of data

Prerequisite

Passed in BoS Meeting held on 16/05/2023
Approved in Academic Council Meeting held on 03/06/2023

Nil**Course Outcomes**

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

| | | | | | | | | | | | | | |
|-----|---|--|--|--|--|--|--|--|--|--|--|--|-------|
| CO1 | Construct the fundamental building blocks of structured Programming in C | | | | | | | | | | | | Apply |
| CO2 | Implement the different operations on arrays and strings | | | | | | | | | | | | Apply |
| CO3 | Develop simple real world applications utilizing functions, recursion and pointers. | | | | | | | | | | | | Apply |
| CO4 | Demonstrate the concepts of structures, unions, user defined data types and preprocessor | | | | | | | | | | | | Apply |
| CO5 | Interpret the file concepts using proper standard library functions for a given application | | | | | | | | | | | | Apply |

Mapping with Programme Outcomes

| COs | PO 1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | | 3 | | | | 2 | 2 | | | 2 | 3 | 3 |
| CO2 | 3 | 3 | 3 | | 3 | | | | 2 | 2 | | | 2 | 3 | 3 |
| CO3 | 3 | 3 | 3 | | 3 | | | | 2 | 2 | | | 2 | 3 | 3 |
| CO4 | 3 | 3 | 3 | | 3 | | | | 2 | 2 | | | 2 | 3 | 3 |
| CO5 | 3 | 3 | 3 | | 3 | | | | 2 | 2 | | | 2 | 3 | 3 |

3- Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests | | End Semester Examination(Marks) |
|------------------|-----------------------------|----|---------------------------------|
| | 1 | 2 | |
| Remember | 10 | 10 | 20 |
| Understand | 10 | 10 | 20 |
| Apply | 40 | 40 | 60 |
| Analyse | - | - | - |
| Evaluate | - | - | - |
| Create | - | - | - |

| K.S.Rangasamy College of Technology–AutonomousR2022 | | | | | | | | |
|--|------------|---|---|-----------|--------|---------------|----|-------|
| 60 CS001– C Programming | | | | | | | | |
| Common to All Branches | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | Total |
| I | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| Basics of C, I/O, Branching and Loops* Structure of a C Program – Data types – Keywords – Variables – Type Qualifiers – Constants – Operators–expressions and precedence- Console I/O– Unformatted and Formatted Console I/O – Conditional Branching and Loops-Writing and evaluation of conditionals and consequent branching | | | | | | | | [9] |
| Arrays and Strings* Arrays: One Dimensional Arrays – Two Dimensional Arrays – Matrix Manipulation – Character arrays – Strings: String Manipulation with and without String Handling Functions. | | | | | | | | [7] |

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| | |
|---|-----------|
| Functions and Pointers* Functions: Scope of a Function – Library Functions and User defined functions – Function Prototypes – Call by value and Call by reference – Function Categorization- Arguments to main function—Recursion and application – Passing Arrays to Functions– Storage class Specifiers. | [11] |
| Introduction to Pointer Variables – The Pointer Operators – Pointer Expressions – Pointers and Arrays – Generating a Pointer to an Array – Indexing Pointers– Function and pointers – Dynamic memory allocation. | |
| Structures, Unions, Enumerations, Typedef and Preprocessors* Structures – Introduction to Structures and Initialization – Arrays of Structures- Arrays and Structures, Nested Structures – Passing Structures to Functions – Structure Pointers – Unions – Bit Fields – Enumerations –typedef –The preprocessor and commands. | [9] |
| File Handling* File: Streams –Reading and Writing Characters – Reading and Writing Strings – File System functions – File Manipulation-Sequential access – Random Access Files – Command Line arguments. | [9] |
| Total Hours | 45 |

Text Book(s):

- | | |
|----|--|
| 1. | Herbert Schildt, "The Complete Reference C", Fourth Edition, Tata McGraw Hill Edition, 2010. |
| 2. | Byron Gottfried, "Programming with C", Third Edition, McGraw Hill Education, 2014. |

Reference(s):

- | | |
|----|--|
| 1. | E.Balagurusamy, "Programming in ANSI C", Seventh Edition, Tata McGraw Hill Edition, New Delhi, 2016. |
| 2. | Brian W. Kernighan and Dennis M. Ritchie, "C Programming Language", Prentice-Hall. |
| 3. | ReemaThareja, "Computer Fundamentals and Programming in C", Second Edition, Oxford Higher Education, 2016. |
| 4. | K N King, "C Programming: A Modern Approach", Second Edition, W.W.Norton, New York, 2008. |

*SDG:4- Quality Education

Course Contents and Lecture Schedule

| S. No. | Topic | No. of Hours |
|------------|---|--------------|
| 1.0 | Basics of C, I/O, Branching and Loops | |
| 1.1 | Structure of a C Program, Keywords | 1 |
| 1.2 | Data types, Type Qualifiers | 1 |
| 1.3 | Variables and Constants | 1 |
| 1.4 | Operators-expressions and precedence | 1 |
| 1.5 | Console I/O– Unformatted and Formatted Console I/O | 1 |
| 1.6 | Conditional Branching | 1 |
| 1.7 | Iteration and loops | 2 |
| 1.8 | Writing and evaluation of conditionals and consequent branching | 1 |
| 2.0 | Arrays and Strings | |
| 2.1 | One Dimensional Array | 1 |
| 2.2 | Two-Dimensional Array and Matrix Manipulation | 1 |
| 2.3 | Character arrays and Strings Basics | 1 |
| 2.4 | String Manipulation without String Handling Functions | 2 |
| 2.5 | String Manipulation with String Handling Functions | 2 |
| 3.0 | Functions and Pointers | |

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| | | |
|------------|---|-----------|
| 3.1 | Scope of a Function – Library Functions, User defined functions and Function Prototypes | 1 |
| 3.2 | Function Call by value and Function Call by reference, Function Categorization | 2 |
| 3.3 | Arguments to main function | 1 |
| 3.4 | Recursion and application | 1 |
| 3.5 | Passing Arrays to Functions | 1 |
| 3.6 | Storage class Specifiers | 1 |
| 3.7 | Introduction to Pointer Variables – The Pointer Operators – Pointer Expressions | 1 |
| 3.8 | Pointers and Arrays – Generating a Pointer to an Array – Indexing Pointers | 1 |
| 3.9 | Function and pointers | 1 |
| 3.10 | Dynamic memory allocation | 1 |
| 4.0 | Structures, Unions, Enumerations, Typedef and Preprocessors | |
| 4.1 | Introduction to Structures and Initialization | 1 |
| 4.2 | Arrays and Structures, Arrays of Structures | 1 |
| 4.3 | Structures within Structures, Passing Structures to Functions | 2 |
| 4.4 | Structure Pointers | 1 |
| 4.5 | Unions and Bit Fields. | 1 |
| 4.6 | Enumerations –typedef | 1 |
| 4.7 | Preprocessor commands | 2 |
| 5.0 | File Handling | |
| 5.1 | File Streams –Reading and Writing Characters – Reading and Writing Strings | 2 |
| 5.2 | File System functions and File Manipulation | 2 |
| 5.3 | Sequential access | 2 |
| 5.4 | Random Access Files | 2 |
| 5.5 | Command Line arguments and files | 1 |
| | Total Hours | 45 |

Course Designers

1. Dr.P.KALADEVI-kaladevi@ksrct.ac.in

| 60 MY 001 | Environmental Studies and Climate Change (Common to all) | Category | L | T | P | Credit |
|-----------|---|----------|---|---|---|--------|
| | | MC | 2 | 0 | 0 | 0 |

Objectives

- To understand the importance of ecosystem and biodiversity.
- To analyze the impacts of pollution, control and legislation.
- To enlighten awareness and recognize the social responsibility in environmental issues.
- To enlighten the waste management.

Prerequisite

Nil

Course Outcomes

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

| | | |
|-----|--|------------|
| CO1 | Understand the impacts of pollution on climate change | Understand |
| CO2 | Enhance the awareness the methods of waste management. | Apply |
| CO3 | Examine the value of sustainable future | Evaluate |
| CO4 | Evaluate the clean and green development for environmental problem | Evaluate |
| CO5 | Analyze the role of Geo-science in environmental management | Analyze |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO 1 | 2 | 2 | | | | 2 | 3 | | | | | 2 | 2 | | |

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| | | | | | | | | | | | | | | | |
|------------------------------------|---|---|---|---|---|---|---|---|--|--|--|---|---|---|--|
| CO 2 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 2 | | | | 2 | 2 | 3 | |
| CO 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | | | | 2 | 2 | 3 | |
| CO 4 | 3 | 2 | 1 | 2 | | 2 | 2 | | | | | 2 | | | |
| CO 5 | 3 | 2 | 2 | | 3 | | 2 | | | | | 2 | 2 | 3 | |
| 3- Strong; 2-Medium; 1-Some | | | | | | | | | | | | | | | |

| Assessment Pattern | | | | | | | | | | | | | | |
|---------------------------|------------------------------------|----------|----------|-----------------------------|--|--|--|--|--|--|--|---|--|--|
| Bloom's Category | Continuous Assessment Tests | | | Terminal Examination | | | | | | | | | | |
| | 1 | 2 | 3 | | | | | | | | | | | |
| Remember | 10 | 10 | 10 | | | | | | | | | - | | |
| Understand | 20 | 20 | 20 | | | | | | | | | - | | |
| Apply | 30 | 30 | 30 | | | | | | | | | - | | |
| Analyze | 30 | 30 | 30 | | | | | | | | | - | | |
| Evaluate | - | - | - | | | | | | | | | - | | |
| Create | - | - | - | | | | | | | | | - | | |

Model Titles for Case Study

1. Environmental impacts of quarry industries in Melur Taluk.
2. A study on impacts of tanneries on ground water and soil quality in Bhavani, Erode district.
3. Effect of pharmaceutical industry on groundwater quality in oikaraipatty village, AlagarKovil.
4. Solid waste and waste water management in KSR hostel.
5. Environmental effect of Kudankulam atomic power plant.
6. Case study on effect of Sterlite industry
7. Effect of textile wastes in Tiruppur and Karur District.
8. Segregation of waste and its recycling by Pallipalayam Municipality at Nammakal
9. Effect of fire work waste on atmosphere in Sivakasi region.
10. Effect of noise pollution waste on atmosphere in Sivakasi region.

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|---|-------------------|----------|----------|------------------|---------------|-----------|----------------------|--------------|--|--|--|--|--|--|
| 60 MY 001 - Environmental Studies and Climate Change | | | | | | | | | | | | | | |
| Common to All | | | | | | | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | | Maximum Marks | | | | | | | |
| | L | T | P | | C | CA | ES | Total | | | | | | |
| I | 2 | 0 | 0 | 20 | 0 | 100 | - | - | | | | | | |

Pollution and its impact on climate change*

Pollution: Sources and impacts of air pollution – greenhouse effect- global warming- climate change - ozone layer depletion - acid rain. Carbon Footprint - Climate change on various sectors – Agriculture, forestry and ecosystem – climate change mitigation and adaptation. Action plan on climate change. IPCC, UNFCCC, Kyoto Protocol, Montreal Protocol on Climatic Changes.

Activity: Study of carbon emission nearby place or industry.

Integrated Waste Management**

Waste - Types and classification. Principles of waste management (5R approach) - Swachh Bharat Abhiyan – Commercial waste, plastic waste, domestic waste, e-waste and biomedical waste - risk management: Collection, segregation, treatment and disposal methods. Waste water treatment- ASP

Activity: Analysis and design of waste management systems, prepare a model / project -wealth from waste.

Sustainable development practices§

Sustainable development goals (SDGs) – Green computing- Carbon trading - Green building – Eco- friendly plastic – Alternate energy: Hydrogen – Bio-fuels – Solar energy – Wind – Hydroelectric power. Water scarcity- Watershed management, ground water recharge and rainwater harvesting.

Activity: Select a topic and analyze the value of sustainable development.

Environment and Agriculture: §§

Organic farming – bio-pesticides- composting, bio composting, vermi-composting, roof gardening and irrigation. Waste land reclamation. Climate resilient agriculture. Green auditing

Activity: Prepare a green auditing report on energy, water etc.

Geo-science in natural resource management

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Data base software in environment information, Digital image processing applications in forecasting, GPS, Remote Sensing and Geographical Information System (GIS), World wide web (www), Environmental information system (ENVIS).
Activity: Prepare the report using IT tool.

| | Total Hours | 20 |
|----------------------|---|----|
| Text book(s): | | |
| 1. | Anubha Kaushik , C P Kaushik. Perspectives In Environmental Studies, New Age International publishers; Sixth edition (1 January 2018) | |
| Reference(s): | | |
| 1. | G.Tyler Miller Environmental Science 14th Edition Cengage Publications, Delhi, 2013 | |
| 2. | Gilbert M.Masters and Wendell P. Ela,"Environmental Engineering And Science", Phi Learning Private Limited, 3rd Edition,2015 | |
| 3. | ErachBharucha. Textbook of Environmental Studies for Undergraduate Courses, Universities Press, 2000 | |

§§ SDG: 3 – Good Health and Well-being

**SDG: 4 – Clean Water and Sanitation

§SDG: 6 - Affordable and Clean Energy

*SDG: 13 – Climate Action

| Course Contents and Lecture Schedule | | |
|---|--|---------------------|
| S. No. | Topic | No. of hours |
| 1.0 | Pollution and its impact on climate change | |
| 1.1 | Pollution: Sources and impacts of air pollution – green house effect- Global warming- climate change - ozone layer depletion - acid rain | 2 |
| 1.2 | Climate change on various sectors: Agriculture, forestry and ecosystem. – climate change mitigation and adaptation | 1 |
| 1.3 | Action plan on climate change - IPCC, UNFCCC, Kyoto Protocol, Montreal Protocol on Climatic Changes | 1 |
| 2.0 | Integrated Waste Management | |
| 2.1 | Waste - Types and classification. Principles of waste management (5R approach) - Swachh Bharat Abhiyan | 1 |
| 2.2 | Commercial waste, plastic waste, domestic waste, e-waste and biomedical waste | 1 |
| 2.3 | Risk management: Collection, segregation, treatment and disposal methods. | 1 |
| 2.4 | Waste water treatment- ASP | 1 |
| 3.0 | Sustainable development practices | |
| 3.1 | Sustainable development goals (SDGs) – Green computing- Carbon trading - Green building – Eco- friendly plastic | 1 |
| 3.2 | Alternate energy: Hydrogen – Bio-fuels – Solar energy – Wind – Hydroelectric power | 2 |
| 3.3 | Water scarcity- Watershed management, ground water recharge and rainwater harvesting | 1 |
| 4.0 | Environment and Agriculture | |
| 4.1 | Organic farming – bio-pesticides | 1 |
| 4.2 | Composting, bio composting, vermi-composting | 1 |
| 4.3 | Roof gardening and irrigation | 1 |
| 4.4 | Waste land reclamation. Climate resilient agriculture, Green auditing | 1 |
| 5.0 | Geo-science in natural resource management | |
| 5.1 | Data base software in environment information, Digital image processing applications in forecasting | 2 |
| 5.2 | GPS, Remote Sensing and Geographical Information System (GIS) | 1 |
| 5.3 | World wide web (www), Environmental information system (ENVIS) | 1 |
| | Total | 20 |

Course Designers

- 1.Dr.T.A.SUKANTHA – sukantha@ksrct.ac.in
- 2.Dr.K.PRABHA – prabhak@ksrct.ac.in
- 3.Dr.S.MEENACHI – meenachi@ksrct.ac.in

| K. S. Rangasamy College of Technology – Autonomous R2022 |
|---|
| 60 GE 001 – Heritage of Tamils |

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| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | | Total |
|--|--|---|---|-----------|--------|---------------|----|--|--------------------|
| | L | T | P | | C | CA | ES | | |
| I | 1 | 0 | 0 | 15 | 1 | 100 | - | | 100 |
| Language and Literature | | | | | | | | | |
| Language Families in India - Dravidian Languages – Tamil as a Classical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature - Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayamars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyan and Bharathidhasan. | | | | | | | | | 3 |
| Heritage - Rock Art Paintings to Modern Art – Sculpture | | | | | | | | | |
| Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making - - Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils. | | | | | | | | | 3 |
| Folk and Martial Arts | | | | | | | | | |
| Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils. | | | | | | | | | 3 |
| Thinai Concept of Tamils | | | | | | | | | |
| Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas. | | | | | | | | | 3 |
| Contribution of Tamils to Indian National Movement and Indian Culture | | | | | | | | | |
| Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books. | | | | | | | | | 3 |
| | | | | | | | | | Total Hours |
| | | | | | | | | | 15 |
| Text Book(s): | | | | | | | | | |
| 1. | தமிழ்கவரலாறு - மக்களும்பண்பாடும் கே. கே. பிள்ளை (வெளியீடு: தமிழ்நாடுபாடநால்மற்றும்கல்வியியல்பணிகள்கழகம்). | | | | | | | | |
| 2. | கணினித்தமிழ் - முனைவர்தில. சுந்தரம். (விகடன்பிரசரம்). | | | | | | | | |
| 3. | தீழடி - வைகைநதிக்கரையில்சங்ககாலநகரநாகரீகம் (தொல்லியல்துறை வெளியீடு). | | | | | | | | |
| 4. | பொருநை - ஆற்றங்கரைநாகரீகம் (தொல்லியல்துறை வெளியீடு). | | | | | | | | |
| 5. | Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print). | | | | | | | | |
| 6. | Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies). | | | | | | | | |
| 7. | Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies). | | | | | | | | |
| 8. | The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.) | | | | | | | | |
| 9. | Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation,Tamil Nadu) | | | | | | | | |
| 10. | Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author). | | | | | | | | |
| 11. | Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu). | | | | | | | | |
| 12. | Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book. | | | | | | | | |

| 60 GE 001 | தமிழ்மரபு (அனைத்து துறைகளுக்கும் பொதுவானது) | Category | L | T | P | Credit |
|-----------|--|----------|---|---|---|--------|
| | | GE | 1 | 0 | 0 | 1 |

Passed in BoS Meeting held on 16/05/2023
Approved in Academic Council Meeting held on 03/06/2023

D.P
CHAIRMAN
BOARD OF STUDIES
Department of Information Technology
K.S.Rangasamy College of Technology
Tiruchengode - 637 245

பாடத்தின் நோக்கங்கள்:

- தமிழ் மொழியின் இலக்கணச்செறிவைக்கற்றுணர்தல்.
- தமிழ்ப்பாட்டின்நுண்களைகள்பற்றியதுமில்பார்வை.
- இந்தியக்கல்லூர்களின்பங்களிப்பைணருதல்.

முன்கூட்டியதுறைசார்அறிவு:

தேவைஇல்லை

பாடம்கற்றதின்விளைவுகள்:

பாடத்தைவெற்றிகரமாககற்றமுடித்தபின்பு, மாணவர்களால்முடியும்விளைவுகள்

| | | |
|-----|--|---------|
| CO1 | தமிழ் மொழியின் செந்தன்மையற்றும் இலக்கியம் குறித்ததெறிதல். | புரிதல் |
| CO2 | தமிழ்களின்சிற்பக்கலை, ஒவியக்கலைமற்றும் இசைக்கருவிகள் குறித்ததெளிவு. | புரிதல் |
| CO3 | தமிழ்களின்நாட்டுப்புறக்கலைகள் மற்றும் வீரவிளையாட்டுகள் குறித்ததெளிவு. | புரிதல் |
| CO4 | தமிழ்களின்தினைக்கோட்டபாடுகள், சங்ககாலவணிகம் மற்றும் சோழர்களின் வெற்றிகள் குறித்தகவல்கள். | புரிதல் |
| CO5 | இந்தியதேசிய இயக்கம், சமயமியாதையை இயக்கம் மற்றும் சித்தமருத்துவம் பற்றியபுரிதல். | புரிதல் |

Mapping with Progr

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | | | | | | | 3 | 3 | | 2 | | 3 | | | |
| CO2 | | | | | | | 3 | 3 | | 2 | | 3 | | | |
| CO3 | | | | | | | 3 | 3 | | 2 | | 3 | | | |
| CO4 | | | | | | | 3 | 3 | | 2 | | 3 | | | |
| CO5 | | | | | | | 3 | 3 | | 2 | | 3 | | | |

3- Strong; 2-Medium; 1-Low

Syllabus

| K. S. Rangasamy College of Technology – Autonomous R2022 | | | | | | | | | | |
|--|------------|---|---|-----------|--------|---------------|----|----|-----|-------|
| 60 GE 001 – தமிழ்மரபு | | | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | | | Total |
| | L | T | P | | | C | CA | ES | | |
| II | 1 | 0 | 0 | 15 | 1 | 100 | - | - | 100 | |
| மொழிமற்றும் இலக்கியம்: | | | | | | | | | | |
| இந்தியமொழிக்குடும்பங்கள் - திராவிடமொழிகள் - தமிழ்ஒருசமீக்கீர்த்தி செல்விலக்கியங்கள் - | | | | | | | | | | - |
| சங்கஇலக்கியத்தின்சமயங்கார்ப்பற்றதன்மை - சங்கஇலக்கியத்தில்பகிர்தல் அறம் - திருக்குறவில் மேலாண்மைக்கருத்துக்கள் - | | | | | | | | | | 3 |
| தமிழ்க்காப்பியக்கள் - தமிழகத்தில்சமணபெளத்தசமயங்களின்தாக்கம் - பக்திஇலக்கியம், ஆழ்வார்கள்மற்றும்நாயன்மார்கள் - | | | | | | | | | | - |
| சிற்றிலக்கியங்கள் - தமிழில்நவீனிலக்கியத்தின்வளர்ச்சி - தமிழ்இலக்கியவளர்ச்சியில்பாரதியார்மற்றும்பாரதிதாசன் ஆகியோரின்பங்களிப்படி. | | | | | | | | | | |
| மரபு - பாறைவியங்கள்முதல்நவீனிலவியங்கள்வரை-சிற்பக்கலை: | | | | | | | | | | |
| நடுகல்முதல்நவீனிசிற்பங்கள்வரை - ஜம்பென்சிலைகள் - பழங்குடியினர்மற்றும் அவர்கள்தயாரிக்கும்கைவினைப்பொருட்கள், பொம்மைகள் - தேர்செய்யும்கலை - சுடுமண்சிற்பங்கள் - நாட்டுப்புறத்தெய்வங்கள் - குமரிமுனையில்திருவள்ளுவர்சிலை - | | | | | | | | | | 3 |
| இசைக்கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழ்களின்சமூகபொருளாதாரவாழ்வில்கோவில்களின்பங்கு. | | | | | | | | | | |
| நாட்டுப்புறக்கலைகள் மற்றும் வீரவிளையாட்டுகள்: | | | | | | | | | | |
| தெருக்கத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான்கூத்து, ஓயிலாட்டம், தோல்பாவைக்கத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழ்களின்விளையாட்டுகள். | | | | | | | | | | 3 |

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| | | |
|--|--------------------|-----------|
| தமிழர்களின்தினைக்கோட்பாடுகள்: | | |
| தமிழகத்தின்தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்கஇலக்கியத்தில் அகம்மற்றும்புறக்கோட்பாடுகள் - தமிழர்கள்போற்றியஅறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்திலெழுத்தறிவும், கல்வியும் - சங்ககாலநகரங்களும்துறைமுகங்களும் சங்ககாலத்திலெற்றுமதிமற்றும் இறக்குமதி - கடல்கடந்தாடுகளில்சோழர்களின்வெற்றி. | - - - 3 | |
| இந்தியதேசியஇயக்கம்மற்றும் இந்தியபண்பாட்டிற்குத்தமிழர்களின்பங்களிப்பு: | | |
| இந்தியவிடுதலைப்போரில்தமிழர்களின்பங்கு - இந்தியாவின்பிறப்பகுதிகளில்தமிழ்ப்பண்பாட்டின்தாக்கம் - சுயமரியாதைஇயக்கம் - இந்தியமருத்துவத்தில், சித்தமருத்துவத்தின்பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ்ப்புத்தகங்களின்அச்சுவரலாறு. | - - - 3 | |
| | Total Hours | 15 |

Text Book(s):

| | |
|-----|---|
| 1. | தமிழகவரலாறு - மக்களும்பண்பாடும்கே. கே. பிள்ளை (வெளியீடு: தமிழ்நாடுபாடநூல்மற்றும்கல்வியியல்பணிகள்கழகம்). |
| 2. | கணினித்தமிழ் - முனைவர்தில. சுந்தரம். (விகடன்பிரசரம்). |
| 3. | கீழடி - வைகைநதிக்கரையில்சங்ககாலநகரநாகரீகம் (தொல்லியல்துறைவெளியீடு). |
| 4. | பொருநை - ஆற்றங்கரைநாகரீகம் (தொல்லியல்துறைவெளியீடு). |
| 5. | Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print). |
| 6. | Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies). |
| 7. | Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies). |
| 8. | The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.) |
| 9. | Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu) |
| 10. | Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author). |
| 11. | Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu). |
| 12. | Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book. |

| S.No | Topic | No. of Hours |
|------|---|--------------|
| 1.0 | Language and Literature | |
| 1.1 | Language Families in India - Dravidian Languages – Tamil as a Classical Language - | 1 |
| 1.2 | Classical Literature in Tamil – Secular Nature of Sangam Literature- Distributive Justice in Sangam Literature - Management Principles in Thirukural | 1 |
| 1.3 | Tamil Epics and Impact of Buddhism & Jainism in Tamil Land - Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidasan. | 1 |
| 2.0 | Heritage - Rock Art Paintings to Modern Art – Sculpture | |
| 2.1 | Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making | 1 |
| 2.2 | Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam | 1 |
| 2.3 | Parai, Veena, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils | 1 |
| 3.0 | Folk and Martial Arts | |
| 3.1 | Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu | 1 |
| 3.2 | Oyillattam, Leatherpuppetry, Silambattam, Valari, | 1 |
| 3.3 | Tiger dance -Sports and Games of Tamils | 1 |
| 4.0 | Thinai Concept of Tamils | |
| 4.1 | Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature | 1 |
| 4.2 | Aram Concept of Tamils - Education and Literacy during Sangam Age - | 1 |

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| | | |
|-----|--|----|
| 4.3 | Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas. | 1 |
| 5.0 | Contribution of Tamils to Indian National Movement and Indian Culture | |
| 5.1 | Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India | 1 |
| 5.2 | Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine | 1 |
| 5.3 | Inscriptions & Manuscripts – Print History of Tamil Books. | 1 |
| | Total | 15 |

| 60 ME 0P1 | Fabrication and Reverse Engineering Laboratory Common to all branches | Category | L | T | P | Credit |
|-----------|--|----------|---|---|---|--------|
| | | ES | 0 | 0 | 4 | 2 |

Objectives

- To make the students gain practical knowledge to co-relate with the theoretical studies and to acquire skills on operating the hand tools and instruments.
- To provide hands on training on Fitting, Carpentry, Sheet metal, Welding and machine
- To offer real time activity on plumbing connections in domestic applications tools.
- To provide hands on training on house hold wiring and electronic circuits.
- To provide hands on activities on dismantling, assembling of the computer internal components and peripherals.

Prerequisite

Nil

Course Outcomes

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

| | | |
|-----|--|-------|
| CO1 | Perform facing, plain turning and drilling. | Apply |
| CO2 | Make a model of fitting, carpentry, sheet metal and welding joints. | Apply |
| CO3 | Construct the water pipe line in plumbing shop. | Apply |
| CO4 | Trouble shoots the electrical and electronic circuits and realizes the importance of earthing. | Apply |
| CO5 | Identify and install computer internal components and peripherals. | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 1 | 2 | 1 | 3 | 1 | 3 | 2 | 3 | 1 | 2 | 3 | | | |
| CO2 | 3 | 3 | 3 | 1 | 3 | 2 | 1 | 2 | 3 | 3 | 1 | 3 | | | |
| CO3 | 3 | 3 | 3 | 1 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | 3 | | | |
| CO4 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 3 | 1 | 1 | 3 | | | |
| CO5 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | | | |

3- Strong; 2-Medium;1-Low

Syllabus**Performs of Power Tools**

Drilling in different Walls and Materials Fitting of Hand shower mount, Shirt hanger, Towel hanger and Pipe with clamps.

Carpentry Process

Design and Development of Wooden Model using the Carpentry Process T / Cross Joint / different joints

Sheet Metal and Filling Process

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| |
|---|
| Design and Development of Metal Model - Make a Tray Components using Sheet Metal Process and Mating of Square joint in MS Plate using the Filling Process |
| Welding Process Fabrication of Models with MS Plate using Arc Welding- Lap Joint, Butt Joint, T Joint |
| Plumbing Process Repair and Maintenances of Pipe Fitting for Home Applications Study of plumbing tools, assembly of G.I. pipes/ PVC and pipe fittings, cutting of threads in G.I. Pipes by thread cutting dies. |
| Residential house wiring Design and Excusion of Residential house wiring With and Without UPS- 1 BHK - 2 BHK. Design and fabrication of domestic LED lamps - Circuit designing (calculation of components) Electronic Circuit wiring |
| PCB fabrication – Soldering - Assembling of Audio Amplifiers- Connecting USB/Bluetooth MP3 player board - Connecting Volume controllers - Connecting bass & treble filter boards - Connecting Surround and sub-woofer filter board |
| Assembling and dismantling of Electronics Machines Iron box, Induction stove, Water heater, Mixer, Table fan, Ceiling fan |
| Study Exercises Demonstration of Centre Lathe operations Facing, Turning, and drilling and its components. Assemble and dismantle of Vacuum Cleaner / Refrigerator and its components |
| Computer Hardware Study Exercises Identify internal components of computer - Assemble and dismantle desktop computer systems |

List of Experiments**Machine Shop Exercises**

1. Facing and Turning Operations
2. Drilling Operations

Fitting Exercises

3. Filling Operations
4. Filling and Cutting Operations on MS Plates for Square joint

Carpentry Exercises

5. Planning Operations
6. Joining of Wooden piece by Dovetail Joint

Sheet Metal Exercises

7. Making of Sheet Metal of Rectangular Tray
8. Making of Sheet Metal t of Cone Shape & Scoop

Welding Exercises

11. Arc Welding of MS Plates by Lap joint , Butt joint&T-Joint

Plumbing Exercises

10. Assembly of GI pipes/PVC and Pipe Fitting
11. Cutting of Threads in GI pipes / PVC by thread Cutting Dies

Electrical Wiring Exercises

12. Wiring circuits for Filament lamps/CT using Single (One way) Switch
13. Wiring circuits for Filament lamps/CT using Stair Case (Two Way) Switch
14. Wiring Circuits for a Fluorescent lamp (Tube Light Circuit)

Electronics Exercises

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15. Current limiting resistor calculation for light emitting diode (LED).

16. Forward bias & Reverse bias of a PN junction diode.

Computer Hardware Exercise

17. Identify computer peripherals and internal components.

18. Dismantle and assemble of desktop computer systems.

Course Designers

1. Mr.S.Venkatesan – venkatesans@ksrct.ac.in

| 60 CS 0P1 | C Programming Laboratory | Category | L | T | P | Credit |
|-----------|--------------------------|----------|---|---|---|--------|
| | | ES | 0 | 0 | 4 | 2 |

Objectives

- To enable the students to apply the concepts of C to solve simple problems
- To use selection and iterative statements in C programs
- To apply the knowledge of library functions in C programming
- To implement the concepts of arrays, functions, structures and pointers in C
- To implement the file handling operations through C

Prerequisite

NIL

Course Outcomes

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

| | | |
|-----|--|-------|
| CO1 | Read, display basic information and use selection and iterative statements. | Apply |
| CO2 | Demonstrate C program to manage collection of related data. | Apply |
| CO3 | Design and Implement different ways of passing arguments to functions, Recursion and implement pointers concepts. | Apply |
| CO4 | Develop a C program to manage collection of different data using structures, Union, user-defined data types and preprocessor directives. | Apply |
| CO5 | Demonstrate C program to store and retrieve data using file concepts. | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | | 3 | | | | 2 | 2 | | | 2 | 3 | 3 |
| CO2 | 3 | 3 | 3 | | 3 | | | | 2 | 2 | | | 2 | 3 | 3 |
| CO3 | 3 | 3 | 3 | | 3 | | | | 2 | 2 | | | 2 | 3 | 3 |
| CO4 | 3 | 3 | 3 | | 3 | | | | 2 | 2 | | | 2 | 3 | 3 |
| CO5 | 3 | 3 | 3 | | 3 | | | | 2 | 2 | | | 2 | 3 | 3 |

3- Strong; 2-Medium; 1-Low

List of Experiments

1. Implementation of Simple computational problems using various formulas*.
2. Implementation of Problems involving Selection statements*.
3. Implementation of Iterative problems e.g., sum of series*.
4. Implementation of 1D Array manipulation*.
5. Implementation of 2D Array manipulation*.
6. Implementation of String operations*.
7. Implementation of Simple functions and different ways of passing arguments to functions and Recursive Functions*.
8. Implementation of Pointers*.
9. Implementation of structures and Union*.

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- 10.Implementation of Bit Fields, Typedef and Enumeration*.
- 11.Implementation of Preprocessor directives*.
- 12.Implementation of File operations*.

*SDG:4- Quality Education

Course Designers

1. Dr.P.Kaladevi - kaladevi@ksrct.ac.in

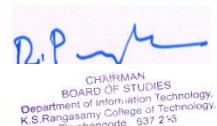
SECOND SEMESTER

| S.No. | Course Code | Name of the Course | Duration of Internal Exam | Weightage of Marks | | | Minimum Marks for Pass in End Semester Exam | |
|------------------|-------------|---|---------------------------|------------------------|----------------------|------------|---|-------|
| | | | | Continuous Assessment* | End Semester Exam ** | Max. Marks | End Semester Exam | Total |
| THEORY | | | | | | | | |
| 1. | 60 EN 002 | Professional English II | 2 | 40 | 60 | 100 | 45 | 100 |
| 2. | 60 MA 003 | Integrals, Partial Differential Equations and Laplace Transform | 2 | 40 | 60 | 100 | 45 | 100 |
| 3. | 60 EE 001 | Basic Electrical and Electronics Engineering | 2 | 40 | 60 | 100 | 45 | 100 |
| 4. | 60 PH 004 | Physics for Computer Technology | 2 | 40 | 60 | 100 | 4 5 | 100 |
| 5. | 60 CS 201 | Python Programming | 2 | 40 | 60 | 100 | 4 5 | 100 |
| 6. | 60 AB 00* | NCC/NSS/NSO/YRC/RRC/Fine Arts* | 2 | 100 | - | 100 | - | |
| PRACTICAL | | | | | | | | |
| 7. | 60 CP0P2 | Engineering Physics and Chemistry Laboratory | 2 | 60 | 40 | 100 | 2 0 | 40 |
| 8. | 60 CS 2P1 | Python Programming Laboratory | 2 | 60 | 40 | 100 | 4 5 | 100 |

* CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follows the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks.

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DR. P.
CHAIRMAN
BOARD OF STUDIES
Department of Information Technology
K.S.Rangasamy College of Technology
Tiruchengode - 637 245

| 60 EN 002 | Professional English II | Category | L | T | P | Credit |
|-----------|-------------------------|----------|---|---|---|--------|
| | | HS | 1 | 0 | 2 | 2 |

Objectives

- To help learners improve their vocabulary and enable them to use words appropriately in different academic and professional contexts.
- To help learners develop strategies that could be adopted while reading texts.
- To help learners acquire the ability to speak and write effectively in English in real life and career related situations.
- Improve listening, observational skills, and problem-solving capabilities
- Develop message generating and delivery skills

Prerequisite

Basic knowledge of reading and writing in English and should have completed Professional English I.

Course Outcomes

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

| | | |
|-----|--|---------|
| CO1 | Compare and contrast products and ideas in technical texts. | Analyze |
| CO2 | Identify cause and effects in events, industrial processes through technical texts | Analyze |
| CO3 | Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format. | Analyze |
| CO4 | Report events and the processes of technical and industrial nature. | Apply |
| CO5 | Articulate their opinions in a planned and logical manner, and draft effective resumes in context of job search. | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | | | | | | | | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |
| CO2 | | | | | | | | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |
| CO3 | | | | | | | | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |
| CO4 | | | | | | | | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| CO5 | | | | | | | | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 |
| 3- Strong;2-Medium;1-Some | | | | | | | | | | | | | | | |

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 10 | 10 | 10 |
| Apply (Ap) | 20 | 20 | 40 |
| Analyse (An) | 30 | 30 | 50 |
| Create (Cr) | 0 | 0 | 0 |

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| K.S.Rangasamy College of Technology–AutonomousR2022 | | | | | | | | |
|--|---|---|---|-----------|--------|---------------|----|-----|
| 60 EN 002- Professional English II | | | | | | | | |
| Common to All Branches | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| II | 1 | 0 | 2 | 45 | 2 | 40 | 60 | 100 |
| Making Comparisons* | | | | | | | | |
| Listening: Evaluative Listening: Advertisements, Product Descriptions, - Audio / video; filling a graphic organiser (choosing a product or service by comparison) Speaking: Marketing a product, persuasive speech techniques. Reading: Reading advertisements, user manuals and brochures. Writing: Professional emails, Email etiquette - compare and contrast essay. Language Focus: mixed tenses, prepositional phrases, same words used in different contexts and discourse markers | | | | | | | | |
| Expressing Causal Relations in Speaking and Writing* | | | | | | | | |
| Listening: Listening to longer technical talks and completing– gap filling exercises. Listening technical information from podcasts – Listening to process/event descriptions to identify cause & effects. Speaking: Describing and discussing the reasons of accidents or disasters based on news reports. Reading: longer technical texts– cause and effect essays, and letters / emails of complaint, Writing: Writing responses to complaints Language Focus: Active Passive Voice transformations, Infinitive and Gerunds – Word Formation (Noun-Verb-Adj-Adv), Adverbs. | | | | | | | | |
| Problem Solving* | | | | | | | | |
| Listening: Listening to / watching movie scenes/ documentaries depicting a technical problem and suggesting solutions. Speaking: Group Discussion (based on case studies), - techniques and Strategies. Reading: Case Studies, excerpts from literary texts, news reports etc. Writing: Letter to the Editor, Checklists, Problem solution essay / Argumentative Essay Language Focus: Error correction; If conditional sentences - Compound Words, Sentence Completion. | | | | | | | | |
| Reporting of Events and Research* | | | | | | | | |
| Listening: Listening Comprehension based on new report and documentaries – Speaking: Interviewing, presenting oral reports, Mini presentations on select topics. Reading: Newspaper articles. Writing: Recommendations, Transcoding, Accident Report, Precis writing and Summarising Language Focus: Reported Speech – Modals - Conjunctions- use of Prepositions | | | | | | | | |
| The Ability to put Ideas or Information Coherently* | | | | | | | | |
| Listening: Listening to TED Talks, Presentations, Formal job interviews, (analysis of the interview performance). Speaking: Participating in role plays, virtual interviews, making presentations with visual aids Reading: excerpts of interview with professionals Writing: Job / Internship application – Cover letter & RESumE Language Focus: Numerical Adjectives, question types: Wh/ Yes or No/ and Tags; Relative Clauses - Idioms. | | | | | | | | |
| Total Hours 45 | | | | | | | | |
| Textbook(s): | | | | | | | | |
| 1. | 'English for Engineers & Technologists' Orient Blackswan Private Ltd. Department of English, Anna University, 2020. | | | | | | | |
| 2. | Norman Lewis, 'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book', Penguin Random House India, 2020. | | | | | | | |
| Reference(s): | | | | | | | | |
| 1. | Raman. Meenakshi, Sharma. Sangeeta, 'Professional English'. Oxford university press. New Delhi. 2019. | | | | | | | |
| 2. | Arthur Brookes and Peter Grundy, 'Beginning to Write: Writing Activities for Elementary and Intermediate Learners', Cambridge University Press, New York, 2003. | | | | | | | |
| 3. | Prof. R.C. Sharma & Krishna Mohan, 'Business Correspondence and Report Writing', Tata McGraw Hill & Co. Ltd., New Delhi, 2001. | | | | | | | |
| 4. | V.N. Arora and Laxmi Chandra, 'Improve Your Writing', Oxford University Press, New Delhi, 2001. | | | | | | | |

* SDG- 04- Quality Education

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Course Contents and Lecture Schedule

| S.No. | Topic | No.of Hours |
|------------|---|-------------|
| 1.0 | Making Comparisons | |
| 1.1 | Evaluative Listening | 1 |
| 1.2 | Product Descriptions and filling a graphic organiser | 1 |
| 1.3 | Marketing a product by using persuasive techniques | 2 |
| 1.4 | Reading advertisements, user manuals and brochures | 1 |
| 1.5 | Writing professional emails | 1 |
| 1.6 | Compare and contrast essay | 1 |
| 1.7 | mixed tenses and prepositional phrases | 1 |
| 1.8 | Same words used in different contexts | 1 |
| 2.0 | Expressing Causal Relations in Speaking and Writing | |
| 2.1 | Listening to longer technical talks | 1 |
| 2.2 | Listening to process/event descriptions | 1 |
| 2.3 | Describing and discussing the reasons of accidents or disasters | 1 |
| 2.4 | Reading longer technical texts– cause and effect essays | 1 |
| 2.5 | Writing responses to complaints | 1 |
| 2.6 | Active Passive Voice transformations | 2 |
| 2.7 | Infinitive and Gerunds | 1 |
| 2.8 | Word Formation (Noun-Verb-Adj-Adv), Adverbs. | 1 |
| 3.0 | Problem Solving | |
| 3.1 | Listening to documentaries and suggesting solutions | 1 |
| 3.2 | Group Discussion (based on case studies) | 2 |
| 3.3 | Reading Case Studies, excerpts from literary texts and news reports | 1 |
| 3.4 | Letter to the Editor | 1 |
| 3.5 | Checklists | 1 |
| 3.6 | Problem solution and argumentative essays | 1 |
| 3.7 | Error correction and Sentence Completion | 1 |
| 3.8 | If conditional sentences | 1 |
| 4.0 | Reporting of Events and Research | |
| 4.1 | Listening Comprehension | 1 |
| 4.2 | Interviewing and presenting oral reports | 1 |
| 4.3 | Mini presentations on select topics | 1 |
| 4.4 | Reading newspaper articles | 1 |
| 4.5 | Recommendations | 1 |
| 4.6 | Transcoding | 1 |
| 4.7 | Precis writing and Summarising | 1 |
| 4.8 | Reported Speech, Modals | 1 |
| 4.9 | Conjunctions | 1 |
| 5.0 | The Ability to put Ideas or Information Coherently | |
| 5.1 | Listening to Formal job interviews | 1 |
| 5.2 | Role plays | 2 |

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| | | |
|-----|--|-----------|
| 5.3 | Virtual interviews | 1 |
| 5.4 | Reading Company profiles | 1 |
| 5.5 | Writing Statement of Purpose (SoPs) | 1 |
| 5.6 | Writing Résumé | 1 |
| 5.7 | Numerical Adjectives and Relative Clauses - Idioms | 1 |
| 5.8 | question types: Wh/ Yes or No/ and Tags | 1 |
| | Total | 45 |

Course Designers1. Dr.A.Palaniappan - palaniappan@ksrct.ac.in

| 60 MA 003 | Integrals, Partial Differential Equations and Laplace Transform | Category | L | T | P | Credit |
|-----------|---|----------|---|---|---|--------|
| | | BS | 3 | 1 | 0 | 4 |

Objectives

- To acquire the knowledge about multiple integrals.
- To familiarize the basic concepts of vector calculus.
- To get exposed to the fundamentals of analytic functions.
- To solve various types of partial differential equations.
- To familiarize the concepts of Laplace transform.

Prerequisite

NIL

Course Outcomes

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

| | | |
|-----|---|---------------------------------|
| CO1 | Understand the concepts of double and triple integrals. | Remember Understand Apply |
| CO2 | Understand the basic concepts of vector calculus. | Remember Understand Apply |
| CO3 | Construct the analytic functions and evaluate complex integrals. | Remember Understand Apply |
| CO4 | Compute the solution of partial differential equations using different methods. | Remember Understand Apply |
| CO5 | Apply Laplace transform techniques for solving differential equations. | Remember Understand Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | 2 | 3 | | | | | | 2 | 3 | 2 | | |
| CO2 | 3 | 3 | 2 | 2 | 3 | | | | | | 2 | 3 | 2 | | |
| CO3 | 3 | 3 | 3 | 2 | 2 | | | | | | 2 | 3 | 2 | | |
| CO4 | 3 | 3 | 3 | 3 | 2 | | | | | | 2 | 3 | 2 | | |
| CO5 | 3 | 3 | 2 | 3 | 3 | | | | | | 2 | 3 | 2 | | |

3- Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | Model Exam (Marks) | End Sem Examination (Marks) | |
|------------------|-------------------------------------|----|--------------------|-----------------------------|--|
| | 1 | 2 | | | |
| Remember (Re) | 10 | 10 | 10 | 10 | |

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| | | | | |
|-----------------|----|----|-----|-----|
| Understand (Un) | 10 | 10 | 20 | 20 |
| Apply (Ap) | 40 | 40 | 70 | 70 |
| Analyze (An) | 0 | 0 | 0 | 0 |
| Evaluate (Ev) | 0 | 0 | 0 | 0 |
| Create (Cr) | 0 | 0 | 0 | 0 |
| Total | 60 | 60 | 100 | 100 |

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|--|---|---|---|-----------|--------|---------------|----|-----------|
| 60 MA 003 - Integrals, Partial Differential Equations and Laplace | | | | | | | | |
| Common to MECH, ECE, EEE, CSE, MCT, CIVIL, IT, TXT, BT, FT | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| II | 3 | 1 | 0 | 60 | 4 | 40 | 60 | 100 |
| MULTIPLE INTEGRALS Double integration – Cartesian and polar co-ordinates – Change of order of integration – Area as double integral – Triple integration in Cartesian co-ordinates – Change of variables - Cartesian to polar co-ordinates and Cartesian to Cylindrical co-ordinates. | | | | | | | | [9] |
| VECTOR CALCULUS* Introduction - Gradient of a scalar point function –Directional derivative – Angle of intersection of two surfaces – Divergence and curl (excluding vector identities) – Solenoidal and irrotational vectors – | | | | | | | | [9] |
| ANALYTIC FUNCTIONS AND INTEGRALS Analytic function – Necessary and Sufficient conditions (statement only)-Properties – Harmonic function – Construction of an analytic function – Cauchy's Integral theorem (statement only) – Cauchy's integral formula – Classification of singularities – Application: Cauchy's residue theorem. | | | | | | | | [9] |
| PARTIAL DIFFERENTIAL EQUATIONS* Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions – Non-Linear partial differential equations of first order – Lagrange's linear equations – Application: Homogeneous Linear partial differential equations with constant coefficients. | | | | | | | | [9] |
| LAPLACE TRANSFORM Conditions for existence – Transforms of elementary functions – Basic properties - Derivatives and integrals of transforms - Initial and final value theorem – Transform of periodic functions. Inverse Laplace transform – Convolution theorem (excluding proof) – Application: Solution of second order ordinary differential equations with constant co-efficients. | | | | | | | | [9] |
| Total Hours: 45 + 15 (Tutorial) | | | | | | | | 60 |
| TextBook(s): | | | | | | | | |
| 1. | Grewal B.S, "Higher Engineering Mathematics", 44 th Edition, Khanna Publishers, Delhi, 2017. | | | | | | | |
| 2 | Kreyszig Erwin, "Advanced Engineering Mathematics", 10 th Edition, John Wiley and Sons (Asia) Limited, New Delhi, 2016. | | | | | | | |
| Reference(s): | | | | | | | | |
| 1. | Dass H.K, "Higher Engineering Mathematics", 3 rd (Revised) Edition, S.Chand & Company Ltd, New Delhi, 2014. | | | | | | | |
| 2. | Veerarajan T, "Engineering Mathematics", for Semesters I & II, 1 st Edition, Tata McGraw Hill Publishing Co., New Delhi, 2019. | | | | | | | |
| 3. | Kandasamy P, Thilagavathy K and Gunavathy K, "Engineering Mathematics - I", S.Chand & Company Ltd, New Delhi, 2017 | | | | | | | |

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| | |
|----|--|
| 4. | Bali N P and Manish Goyal, "A text book of Engineering Mathematics", 10 th Edition, Laxmi Publications (P) Ltd, 2016. |
|----|--|

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Course Contents and Lecture Schedule

| S.No | Topic | No. of Hours |
|----------|---|--------------|
| 1 | MULTIPLE INTEGRALS | |
| 1.1 | Double integration | 1 |
| 1.2 | Cartesian and polar coordinates | 1 |
| 1.3 | Change of order of integration | 1 |
| 1.4 | Area as double integral | 1 |
| 1.5 | Tutorial | 2 |
| 1.6 | Triple integration in Cartesian coordinates | 1 |
| 1.7 | Change of variables | 1 |
| 1.8 | Cartesian to polar coordinates | 1 |
| 1.9 | Cartesian to Cylindrical coordinates | 1 |
| 1.10 | Tutorial | 2 |
| 2 | VECTOR CALCULUS | |
| 2.1 | Introduction: Gradient of a scalar point function | 1 |
| 2.2 | Directional derivative | 1 |
| 2.3 | Angle of intersection of two surfaces | 1 |
| 2.4 | Divergence and curl (excluding vector identities) | 1 |
| 2.5 | Tutorial | 2 |
| 2.6 | Solenoidal and irrotational vectors | 1 |
| 2.7 | Application: Green's theorem in the plane | 1 |
| 2.8 | Gauss divergence theorem | 1 |
| 2.9 | Stokes' theorem (statement only) | 1 |
| 2.10 | Tutorial | 2 |
| 3 | ANALYTIC FUNCTIONS AND INTEGRALS | |
| 3.1 | Analytic function | 1 |
| 3.2 | Necessary and Sufficient conditions (statement only) | 1 |
| 3.3 | Properties | 1 |
| 3.4 | Harmonic function | 1 |
| 3.5 | Tutorial | 2 |
| 3.6 | Construction of an analytic function | 1 |
| 3.7 | Cauchy's Integral theorem (statement only), Cauchy's integral formula | 1 |

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| | | |
|----------|--|----|
| 3.8 | Classification of singularities | 1 |
| 3.9 | Applications : Cauchy's residue theorem. | 1 |
| 3.10 | Tutorial | 2 |
| 4 | PARTIAL DIFFERENTIAL EQUATIONS | |
| 4.1 | Formation of partial differential equations by eliminating arbitrary constants | 1 |
| 4.2 | Formation of partial differential equations by eliminating arbitrary functions | 2 |
| 4.3 | Tutorial | 2 |
| 4.4 | Non- linear partial differential equations of first order | 2 |
| 4.5 | Lagrange's linear equations | 1 |
| 4.6 | Application : Homogeneous Linear partial differential equations with constant coefficients. | 2 |
| 4.7 | Tutorial | 2 |
| 5 | LAPLACE TRANSFORM | |
| 5.1 | Conditions for existence | 1 |
| 5.2 | Transforms of elementary functions | 1 |
| 5.3 | Basic properties | 1 |
| 5.5 | Derivatives and integrals of transforms, Initial and final value theorem | 1 |
| 5.6 | Tutorial | 1 |
| 5.7 | Transform of periodic functions | 2 |
| 5.8 | Inverse Laplace transform | 1 |
| 5.9 | Convolution theorem (excluding proof) | 1 |
| 5.10 | Application: Solution of second order ordinary differential equation with constant co-efficient. | 1 |
| 5.11 | Tutorial | 2 |
| | Total | 60 |

List of MATLAB Programs:

1. Evaluating double and triple integrals.
2. Area as double integral.
3. Volume as triple integral.
4. Plotting and visualizing single variable functions.
5. Plotting and visualizing functions of two and three variables.
6. Evaluating Gradient, divergence and curl.
7. Evaluating Laplace & Inverse Laplace transforms.
8. Applying Laplace transform techniques to solve differential equations

Course Designers

1. Dr. C. Chandran cchandran@ksrct.ac.in
2. Dr. K. Prabakaranprabakaran@ksrct.ac.in

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| | | | | | | |
|------------------|---|-----------------|----------|----------|----------|---------------|
| 60 EE 001 | Basic Electrical and Electronics Engineering | Category | L | T | P | Credit |
| | | ES | 3 | 0 | 0 | 3 |

Objectives

- To familiarize the basic concept on electrical circuits and its various parameters
- To facilitate the various types of electrical machines and their uses
- To gain knowledge on Electrical safety
- To provide exposure on the functions of various semiconductor devices
- To familiarize the use of various measuring instruments

Prerequisite

NIL

Course Outcomes

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

| | | |
|-----|---|----------------------------------|
| CO1 | Apply the basic laws of electric circuits to calculate the unknown quantities. | Remember, Understand and Apply |
| CO2 | Acquire knowledge on different electrical machines and select suitable machines for industrial applications. | Remember, Understand and Analyze |
| CO3 | Recognize the significance of various components of low voltage electrical installations and create awareness on electrical safety. | Remember, Understand |
| CO4 | Realize the operation and characteristics of semiconductor devices. | Remember, Understand and Analyze |
| CO5 | Understand the operating principles of measuring instruments and choose suitable instrument for measuring the parameters. | Remember, Understand |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | - | - | 2 | - | - | - | - | 2 | 3 | - | 3 | 2 | - |
| CO2 | 3 | 3 | 1 | 1 | - | - | 2 | - | 2 | - | 2 | 1 | 3 | 2 | - |
| CO3 | 3 | 3 | - | 2 | - | 2 | - | - | - | - | 2 | 2 | 3 | 2 | - |
| CO4 | 2 | 2 | 3 | - | 2 | - | 2 | 1 | - | 2 | 1 | 3 | 3 | 2 | - |
| CO5 | 2 | 3 | 1 | 2 | - | - | 3 | 2 | - | - | 2 | 3 | 3 | 2 | - |

3- Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember | 10 | 20 | 30 |
| Understand | 20 | 25 | 30 |
| Apply | 20 | 10 | 30 |
| Analyse | 10 | 5 | 10 |
| Evaluate | 0 | 0 | 0 |
| Create | 0 | 0 | 0 |

* SDG 9 – Industry Innovation and Infrastructure

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|---|--|---|---|-------------|--------|---------------|----|------|
| 60 EE 001 - Basic Electrical and Electronics Engineering | | | | | | | | |
| Common to CSE, IT, AI&DS, AIML, MECH, MCT, BT, FT and CIVIL | | | | | | | | |
| Semester | Hours/Week | | | Total Hours | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| II | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| ELECTRICAL CIRCUITS DC Circuits: Circuit Components: Resistor, Inductor, Capacitor – Ohm's Law - Kirchhoff's Laws–Simple problems. Introduction to AC Circuits and Parameters: Waveforms, Average value and RMS Value of Sinusoidal Waveform real power, reactive power and apparent power, power factor – Steady state analysis of RLC series circuits- Simple problems. Introduction to three phase AC circuits. | | | | | | | | [10] |
| ELECTRICAL MACHINES* Construction and Working principle - Separately and Self excited DC Generators, EMF equation, Types and Applications. Working Principle of DC motors, Torque Equation, Types and Applications. Construction, Working principle and Applications of Transformer, Three phases Alternator, Synchronous motor and Three Phase Induction Motor. | | | | | | | | [10] |
| ELECTRICAL INSTALLATIONS* Domestic wiring, types of wires and cables, earthing, protective devices- switch fuse unit- Miniature Circuit Breaker-Moulded Case Circuit Breaker- Earth Leakage Circuit Breaker, Batteries and types, UPS, Safety precautions and First Aid. | | | | | | | | [9] |
| ANALOG ELECTRONICS* Introduction to Semiconductor Materials– PN Junction Diodes, Zener Diode –Characteristics and Applications – Bipolar Junction Transistor-Biasing and Configuration (NPN) - Regulated power supply unit, switched mode power supply. | | | | | | | | [8] |
| MEASUREMENTS AND INSTRUMENTATION* Functional elements of an instrument, Standards and calibration, Operating Principle, types -Moving Coil and Moving Iron meters, Operating principles and Types of Wattmeter, Energy Meter, Instrument Transformers-CT and PT, DSO- Block diagram- Data acquisition. | | | | | | | | [8] |
| Total Hours | | | | | | | | 45 |
| Text Book(s): | | | | | | | | |
| 1. | Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, McGraw Hill Education, 2020. | | | | | | | |
| 2. | A.K. Sawhney, Puneet Sawhney 'A Course in Electrical & Electronic Measurements & Instrumentation', Dhanpat Rai and Co, 2015. | | | | | | | |
| Reference(s): | | | | | | | | |
| 1. | Kothari DP and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Education, 2019. | | | | | | | |
| 2. | Albert Malvino, David Bates, 'Electronic Principles', McGraw Hill Education; 7th edition, 2017. | | | | | | | |
| 3. | Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, 2002. | | | | | | | |
| 4. | H.S. Kalsi, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010. | | | | | | | |

Course Contents and Lecture Schedule

| S. No | Topic | No. of Hours |
|------------|---|--------------|
| 1.0 | ELECTRICAL CIRCUITS | |
| 1.1 | Circuit Components: Resistor, Inductor, Capacitor | 1 |
| 1.2 | Ohm's Law - Kirchhoff's Laws | 1 |
| 1.3 | Ohm's Law - Kirchhoff's Laws - Problems | 2 |
| 1.4 | Introduction to AC Circuits and Parameters: Waveforms, Average value and RMS Value of | 2 |

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| | | |
|-----|---|---|
| | Sinusoidal Waveform | |
| 1.5 | Real power, reactive power and apparent power, power factor | 1 |
| 1.6 | Steady state analysis of RLC series circuits | 1 |
| 1.7 | RLC series circuits - Problems | 1 |

| | | |
|------------|---|----|
| 1.8 | Introduction to three phase system | 1 |
| 2.0 | ELECTRICAL MACHINES | |
| 2.1 | Construction and Working principle of DC Generator | 1 |
| 2.2 | Types and Applications of Separately and Self excited DC Generators | 1 |
| 2.3 | EMF equation of DC Generator | 1 |
| 2.4 | Working Principle of DC motors | 1 |
| 2.5 | Torque Equation | 1 |
| 2.6 | Types and Applications | 1 |
| 2.7 | Construction, Working principle and Applications of Transformer | 1 |
| 2.8 | Construction, Working principle and Applications of Three phase Alternator | 1 |
| 2.9 | Construction, Working principle and Applications of Synchronous motor | 1 |
| 2.10 | Construction, Working principle and Applications of Three Phase Induction Motor | 1 |
| 3.0 | ELECTRICAL INSTALLATIONS | |
| 3.1 | Domestic wiring, types of wires and cables | 1 |
| 3.2 | Earthing, protective devices | 2 |
| 3.3 | Switch fuse unit- Miniature Circuit Breaker | 1 |
| 3.4 | Molded Case Circuit Breaker- Earth Leakage Circuit Breaker | 1 |
| 3.5 | Batteries and types | 2 |
| 3.6 | UPS | 1 |
| 3.7 | Safety precautions and First Aid | 1 |
| 4.0 | ANALOG ELECTRONICS | |
| 4.1 | Introduction to Semiconductor Materials | 1 |
| 4.2 | Characteristics and Applications of PN Junction Diodes | 1 |
| 4.3 | Characteristics and Applications of Zener Diode | 1 |
| 4.4 | Bipolar Junction Transistor | 1 |
| 4.5 | Biassing & Configuration (NPN) | 2 |
| 4.6 | Regulated power supply unit | 1 |
| 4.7 | Switched mode power supply | 1 |
| 5.0 | MEASUREMENTS AND INSTRUMENTATION | |
| 5.1 | Functional elements of an instrument | 1 |
| 5.2 | Standards and calibration | 1 |
| 5.3 | Moving Coil meters - Operating Principle, types | 1 |
| 5.4 | Moving Iron meters - Operating Principle, types | 1 |
| 5.5 | Operating principles and Types of Wattmeter | 1 |
| 5.6 | Energy Meter | 1 |
| 5.7 | Instrument Transformers – CT& PT | 1 |
| 5.9 | DSO- Block diagram- Data acquisition | 1 |
| | Total | 45 |

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Course Designers

- 1.Mr.S.Srinivasan - srinivasan@ksrct.ac.in
- 2.Ms.R.Radhamani -radhamani@ksrct.ac.in
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- 5.Mr.T.Prabhu- prabhu@ksrct.ac.in

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| | | | | | | |
|------------------|--|-----------------|----------|----------|----------|---------------|
| 60 PH 004 | Physics for Computer Technology CS, IT, AD ,AM) | Category | L | T | P | Credit |
| | | BS | 3 | 0 | 0 | 3 |

Objectives

- To instill knowledge on physics of semiconductors, determination of charge carriers and device applications
- To enable the students to correlate the theoretical principles with application oriented studies in optoelectronic materials
- To introduce the basics of laser, optical fiber and its applications in information science
- To understand the basic concepts of magnetic materials and its applications
- To inculcate an idea of significance of nano structures, ensuing nano device applications and quantum computing

Prerequisite

Nil

Course Outcomes

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

| | | |
|-----|--|-----------------|
| CO1 | Acquire knowledge on basics of semiconductor physics and its applications in various devices. | Understand |
| CO2 | Apply the principles of LCD, photodetectors and optoelectronic devices for various engineering applications. | Apply |
| CO3 | Assess strong foundational knowledge in lasers and fiber optics. | Understand |
| CO4 | Impart knowledge on magnetic properties of materials and their applications in data storage. | Apply & Analyse |
| CO5 | Recognize the basics of quantum structures and their applications and basics of quantum computing | Understand |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 2 | 2 | | | 3 | 3 | | 2 | | 2 | | 2 | |
| CO2 | 3 | 3 | 2 | 2 | | | 3 | 3 | | 2 | | 2 | | 2 | |
| CO3 | 3 | 3 | 2 | 2 | | | 3 | 3 | | 2 | | 2 | | 2 | |
| CO4 | 3 | 3 | 2 | 2 | | | 3 | 3 | | 2 | | 2 | | 2 | |
| CO5 | 3 | 3 | 2 | 2 | | | 3 | 3 | | 2 | | 2 | 2 | 2 | |

3- Strong; 2-Medium; 1-Low

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember | 10 | 10 | 30 |
| Understand | 20 | 20 | 30 |
| Apply | 30 | 30 | 30 |
| Analyse | 0 | 0 | 10 |
| Evaluate | 0 | 0 | 0 |
| Create | 0 | 0 | 0 |

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|---|--|---|---|-------------|--------|---------------|----|------------------------------|
| 60 PH 004 - Physics for Computer Technology | | | | | | | | |
| Common to All Branches | | | | | | | | |
| Semester | Hours/Week | | | Total Hours | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| II | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| Semiconducting Materials* | | | | | | | | [9] |
| Intrinsic Semiconductors - Energy band diagram - direct and indirect band gap semiconductors - Carrier concentration in intrinsic semiconductors - extrinsic semiconductors - Carrier concentration in N-type & P-type semiconductors – Carrier transport in Semiconductor: random motion, drift, mobility and diffusion – Hall effect and devices – Ohmic contacts –Schottky diode. | | | | | | | | [9] |
| Optoelectronic Materials and Devices* | | | | | | | | [9] |
| Photoconductive materials – Light Dependent Resistor – Working of LDR – Applications of LDR – Photovoltaic materials – Solar cell – Construction and working of a solar cell – Applications of solar cells – Liquid crystals – Liquid crystal Display (LCD) – Construction and advantages of LCD – Electro optic materials – Opto electric effect - Electro-Optic Modulation. | | | | | | | | [9] |
| Photonics* | | | | | | | | [9] |
| Theory of laser - characteristics - Einstein's coefficients - population inversion - Nd-YAG laser, semiconductor laser - Applications of Lasers: Micro machining, measurement of long distances, IR Thermography, CD write devices and printers - Optical fibre- principle - types - material, mode, refractive index - Fibre loss - Expression for acceptance angle and numerical aperture. Application – Fiber Optic Communication. | | | | | | | | [9] |
| Magnetic Materials and Devices* | | | | | | | | [9] |
| Origin of magnetic moment - Bohr magneton - Classification of magnetic materials - diamagnetism – para magnetism - ferromagnetism - anti ferromagnetism - ferri magnetism - Domain theory - Hysteresis - soft and hard magnetic materials - examples and uses - Magnetic principle in computer data storage - Magnetic hard disc (Giant Magneto Resistance sensor). | | | | | | | | [9] |
| Nanotechnology and Quantum Computing* | | | | | | | | [9] |
| Introduction - Preparation of Nano materials: Top-down process: Ball Milling method - Bottom-up process: Vapour Phase Deposition method. Carbon Nano Tubes - structures, properties and preparation by electric arc method. MEMS/NEMS Devices and Applications- Quantum system for information processing - quantum states - classical bits - quantum bits - multiple qubits - quantum gates. | | | | | | | | [9] |
| | | | | | | | | Total Hours 45 |
| Text Book(s): | | | | | | | | |
| 1. | M. N. Avadhanulu, P. G. Kshirsagar, TVS Arun Murthy "A Text Book of Engineering Physics", S Chand Publications, New Delhi, 2022. | | | | | | | |
| 2 | H. K. Malik, A. K. Singh "Engineering Physics" McGraw Hill Education Private Limited, New Delhi. 2021 | | | | | | | |
| Reference(s): | | | | | | | | |
| 1. | D. R. Joshi "Engineering Physics" McGraw Hill Education Private Limited, New Delhi. 2010 | | | | | | | |
| 2. | S.O. Pillai "A Textbook Of Engineering Physics" New Age International (P) Limited, New Delhi, 2014 | | | | | | | |
| 3. | B. B. Laud " Lasers and Non-Linear Optics" New Age International Publications, New Delhi, 2015 | | | | | | | |
| 4. | Palanisamy, P.K., "Physics of Materials", Scitech Publications, Chennai. 2012 | | | | | | | |

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Course Contents and Lecture Schedule

| S. No. | Topic | No. of hours |
|------------|--|--------------|
| 1.0 | Semiconducting Materials | |
| 1.1 | Intrinsic Semiconductors | 1 |
| 1.2 | Energy band diagram -direct and indirect band gap semiconductors | 1 |
| 1.3 | Carrier concentration in intrinsic semiconductors | 1 |
| 1.4 | Extrinsic semiconductors | 1 |
| 1.5 | Carrier concentration in N-type &P-type semiconductors | 1 |
| 1.6 | Carrier transport in Semiconductor: random motion | 1 |
| 1.7 | Carrier transport in Semiconductor drift, mobility and diffusion | 1 |
| 1.8 | Hall effect and devices | 1 |
| 1.9 | Ohmic contacts–Schottky diode | 1 |
| 2.0 | Optoelectronic Materials and Devices | |

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Approved in Academic Council Meeting held on 03/06/2023



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BOARD OF STUDIES
Department of Information Technology
K.S.Rangasamy College of Technology
Tiruchengode - 637 245

| | | |
|------------|---|----|
| 2.1 | Photoconductive materials. | 1 |
| 2.2 | Light Dependent Resistor – Working of LDR – Applications of LDR | 1 |
| 2.3 | Photovoltaic materials | 1 |
| 2.4 | Solar cell – Construction and working of a solar cell | 1 |
| 2.5 | Applications of solar cells | 1 |
| 2.6 | Liquid crystals – Liquid crystal Display (LCD) | 1 |
| 2.7 | Construction and advantages of LCD | 1 |
| 2.8 | Electro optic materials – Opto electric effect | 1 |
| 2.9 | Electro-Optic Modulation | 1 |
| 3.0 | Photonics | |
| 3.1 | Theory of laser – characteristics | 1 |
| 3.2 | Einstein's coefficients-population in version | 1 |
| 3.3 | Nd-YAG laser, semiconductor laser | 1 |
| 3.4 | Applications of Lasers: Micro machining, measurement of long distances | 1 |
| 3.5 | Applications of Lasers IR Thermography, CD write devices and printers | 1 |
| 3.6 | Optical fibre-principle | 1 |
| 3.7 | Types-material, mode, refractive index-Fibre loss | 1 |
| 3.8 | Expression for acceptance angle and numerical aperture | 1 |
| 3.9 | Application –Fiber Optic Communication | 1 |
| 4.0 | Magnetic Materials and Devices | |
| 4.1 | Origin of magnetic moment | 1 |
| 4.2 | Bohrmagneton – Classification of magnetic materials | 1 |
| 4.3 | Diamagnetism - paramagnetism - | 1 |
| 4.4 | Ferromagnetism - anti ferromagnetism | 1 |
| 4.5 | Ferri magnetism - Domain theory | 1 |
| 4.6 | Domain theory -Hysteresis | 1 |
| 4.7 | Soft and hard magnetic materials - examples and uses | 1 |
| 4.8 | Magnetic principle in computer data storage | 1 |
| 4.9 | Magnetic harddisc (Giant Magneto Resistance sensor). | 1 |
| 5.0 | Nano Technology and Quantum Computing | |
| 5.1 | Introduction | 1 |
| 5.2 | Preparation of Nano materials | 1 |
| 5.3 | Top-down process: Ball Milling method | 1 |
| 5.4 | Bottom-up process: Vapour Phase Deposition method | 1 |
| 5.5 | Carbon Nano Tubes - structures, properties | 1 |
| 5.6 | Preparation by electric arc method | 1 |
| 5.7 | MEMS/NEMS Devices and Applications | 1 |
| 5.8 | Quantum system for information processing | 1 |
| 5.9 | Quantum states - classical bits - quantum bits -multiple qubits-quantum gates | 1 |
| | Total | 45 |

Course Designers

- 1.Dr. V. Vasudevan - vasudevanv@ksrct.ac.in
- 2.Mr.S. Vanchinathan - vanchinathan@ksrct.ac.in
- 3.Dr. M. Malarvizhi - malarvizhi@ksrct.ac.in

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| | | | | | | |
|------------------|---------------------------|-----------------|----------|----------|----------|---------------|
| 60 IT 001 | Python Programming | Category | L | T | P | Credit |
| | | ES | 3 | 1 | 0 | 4 |

Objectives

- To know the basics of programming in python
- To understand modules and functions
- To study files and exception handling
- To recognize the basic concepts of NumPy
- To create layouts using graphical tools

Prerequisite

Basic knowledge of mathematics and programming.

Course Outcomes

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

| | | |
|-----|--|-------|
| CO1 | Apply the basics of Python programming for problem-solving | Apply |
| CO2 | Develop programs using modules and functions | Apply |
| CO3 | Implement programs using file and exception handling | Apply |
| CO4 | Create a solution for real world problems using NumPy arrays | Apply |
| CO5 | Design layouts with GUI toolkits using Tkinter | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO2 | 3 | 2 | 3 | 2 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO3 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO4 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO5 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |

3-Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 10 | 10 | 10 |
| Understand (Un) | 20 | 10 | 20 |
| Apply (Ap) | 30 | 30 | 60 |
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 10 | 10 |

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| K.S.Rangasamy College of Technology – Autonomous R2022 | | | | | | | | |
|--|--|---|---|-----------|--------|---------------|----|-----------|
| 60 IT 001- PYTHON PROGRAMMING | | | | | | | | |
| IT | | | | | | | | |
| Semester | Hours / Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| II | 3 | 1 | 0 | 60 | 4 | 40 | 60 | 100 |
| Introduction | | | | | | | | [9] |
| Introduction to Python – Strings – List – Tuples - Dictionaries – Basic Operators – Decision Making – Loops | | | | | | | | [9] |
| Modular Design | | | | | | | | [9] |
| Modules – Python module – Namespaces – Importing modules – Loading and Execution – Program Routine – Functions – Parameter Passing - Types – Recursion | | | | | | | | [9] |
| Files and Exception Handling* | | | | | | | | [9] |
| Introduction - Data Streams - Creating own data Streams - Access Modes - Writing Data to a File - Reading Data From a File - Additional File Methods- Exceptions – Types, Handling Exceptions, User Defined Exceptions | | | | | | | | [9] |
| NumPy Basics | | | | | | | | [9] |
| NumPy Data Types – NumPy Arrays - Creating, Adding items, Removing items, Printing Items, Sorting items, Reshaping, Indexing and Slicing | | | | | | | | [9] |
| GUI Programming and Graphics** | | | | | | | | [9] |
| GUI Programming toolkits – Introduction to Tkinter – Creating GUI widgets – Resizing – Configuring widget options – Creating Layouts – Radio buttons – Check boxes – Dialog boxes – Drawing using Turtle | | | | | | | | [9] |
| Total Hours: 45 + 15(Tutorial) | | | | | | | | 60 |
| Text book(s) | | | | | | | | |
| 1. | John Paul Mueller, "Beginning Programming with Python", 2 nd Edition, Wiley India Pvt Ltd, 2014 | | | | | | | |
| 2. | Usman Malik, "Python NumPy for Beginners: NumPy Specialization for data Scientists", AI Publishing, 2021 | | | | | | | |
| Reference(s): | | | | | | | | |
| 1. | Wesley J. Chun, "Core Python Applications Programming", 3 rd Edition, Pearson Education, 2013 | | | | | | | |
| 2. | Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2 nd Edition, O'Reilly Publishers, 2016. | | | | | | | |
| 3. | Charles Dierbach, "Introduction to Computer Science using Python", 2 nd Edition, Wiley India Pvt Ltd, 2015 | | | | | | | |
| 4. | Dr. R.Nageswara Rao "Core Python Programming", DreamTech Press, 2 nd Edition, 2018 | | | | | | | |

** SDG-4 – Quality Education

* SDG-8 – Employment and decent work for all

Course Contents and Lecture Schedule

| S.No. | Topic | No.of Hours |
|-------|----------------------------|-------------|
| 1 | Introduction | |
| 1.1 | Introduction to Python | 1 |
| 1.2 | Basic Data Types | 1 |
| 1.3 | Strings | 1 |
| 1.4 | List | 1 |
| 1.5 | Tuples | 1 |
| 1.6 | Dictionaries | 1 |
| 1.7 | Basic Operators | 1 |
| 1.8 | Decision Making Statements | 1 |
| 1.9 | Looping Statements | 1 |
| 2 | Modular Design | |
| 2.1 | Modules | 1 |

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| | | |
|----------|--|-----------|
| 2.2 | Python module | 1 |
| 2.3 | Namespaces | 1 |
| 2.4 | Importing modules | 1 |
| 2.5 | Loading and Execution | 1 |
| 2.6 | Program Routine | 1 |
| 2.7 | Functions | 1 |
| 2.8 | Parameter Passing Types | 1 |
| 2.9 | Recursion | 1 |
| 3 | Files and Exception Handling | |
| 3.1 | Introduction | 1 |
| 3.2 | Data Streams | 1 |
| 3.3 | Creating own data Streams | 1 |
| 3.4 | Access Modes | 1 |
| 3.5 | Writing Data to a File, Reading Data From a File | 1 |
| 3.6 | Additional File Methods | 1 |
| 3.7 | Exceptions and Types | 1 |
| 3.8 | Handling Exceptions | 1 |
| 3.9 | User Defined Exceptions | 1 |
| 4 | NumPy Basics | |
| 4.1 | NumPy Data Types | 1 |
| 4.2 | NumPy Arrays | 1 |
| 4.3 | Creating Arrays | 1 |
| 4.4 | Adding items into Arrays | 1 |
| 4.5 | Removing items | 1 |
| 4.6 | Printing Items | 1 |
| 4.7 | Sorting items | 1 |
| 4.8 | Reshaping | 1 |
| 4.9 | Indexing and Slicing | 1 |
| 5 | GUI Programming and Graphics | |
| 5.1 | GUI Programming toolkits | 1 |
| 5.2 | Introduction to Tkinter | 1 |
| 5.3 | Creating GUI widgets | 1 |
| 5.4 | Resizing | 1 |
| 5.5 | Configuring Widget options | 1 |
| 5.6 | Creating Layouts | 1 |
| 5.7 | Radio buttons & Check boxes | 1 |
| 5.8 | Dialog boxes | 1 |
| 5.9 | Drawing using Turtle | 1 |
| | Total | 45 |

Course Designers

1. Dr.C,Nallusamy (nallusamyc@ksrct.ac.in)
2. Mr.R.T.Dinesh Kumar (dineshkumarrrt@ksrct.ac.in)

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| | | | | | | |
|------------------|--|----------|---|---|---|--------|
| 60 AB 001 | National Cadet Corps - AIR WING | Category | L | T | P | Credit |
| | | HS | 2 | 0 | 2 | 3 |

Objectives

- To designed especially for NCC Cadets
- To develop character, camaraderie, discipline, secular outlook
- To inculcate spirit of adventure, sportsman spirit
- To teach selfless service among cadets by working in teams
- To learn military subjects including weapon training and motivate them to join in tri-services

Prerequisite

Nil

Course Outcomes

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

| | | |
|-----|---|-----------|
| CO1 | Display sense of patriotism, secular values and shall be transformed into motivated youth who will carry out nation building through national unity and social cohesion | Knowledge |
| CO2 | Demonstrate the sense of discipline with smartness and have basic knowledge of weapons and their use and handling | Knowledge |
| CO3 | Illustrate various forces and moments acting on aircraft | Apply |
| CO4 | Outline the concepts of aircraft engine and rocket propulsion | Apply |
| CO5 | Design, build and fly chuck gliders/model airplanes and display static models | Apply |

Mapping with Programme Outcomes

| Mapping of Cos with POs and PSOs | | | | | | | | | | | | | | | |
|----------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CO1 | | | | | | 3 | 3 | 3 | 3 | 3 | | | | | |
| CO2 | | | | | 3 | | | | | | | | | | |
| CO3 | 3 | 2 | 1 | 1 | | | | | | | | | | | |
| CO4 | 3 | 2 | 1 | 1 | | | | | | | | | | | |
| CO5 | 3 | 2 | 1 | 1 | | | | | | | | | | | |

1-Slight, 2-Moderate, 3-Substantial

Assessment Pattern

| Bloom's Category | Continuous Assessment (Marks) | | | End Sem Examination (Marks) |
|------------------|-------------------------------|--------|---------|-----------------------------|
| | DST(20) | AM(20) | SBM(10) | |
| Knowledge (Kn) | 10 | 10 | 00 | 40 |
| Apply (Ap) | 10 | 10 | 10 | 60 |
| Analyse (An) | | | | 00 |
| Create (Cr) | | | | 00 |

DST - Drill Square Test

AM - Aero Modeling

SBM - Swachh Bharat Mission

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|--|---|---|---|-----------|--------|---------------|----|-------|
| 60 AB 001 - National Cadet Corps - AIR WING | | | | | | | | |
| Common to ALL Branches | | | | | | | | |
| Semester | Hours/Week | | | Total Hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | Total |
| II | 2 | 0 | 2 | 45 | 3 | 40 | 60 | 100 |
| Objective(s) | <ul style="list-style-type: none"> • To designed especially for NCC Cadets • To develop character, camaraderie, discipline, secular outlook | | | | | | | |

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| | |
|---|---|
| | <ul style="list-style-type: none"> • To inculcate spiritofadventure,sportsmanspirit • To teach selflessserviceamongstcadetsbyworkinginteam • To learning militarysubjectsincludingweapontraining and motivate them to join in tri-services |
| Course Outcomes | <p>At the end of the course, the student will be able to</p> <p>CO1: Display sense of patriotism, secular values and shall be transformed into motivated youth who will carry out nation building through national unity and social cohesion.</p> <p>CO2: Demonstrate the sense of discipline with smartness and have basic knowledge of weapons and their use and handling</p> <p>CO3: Illustrate various forces and moments acting on aircraft</p> <p>CO4: Outline the concepts of aircraft engine and rocket propulsion</p> <p>CO5: Design, build and fly chuck gliders/model airplanes and display static models.</p> |
| Note: The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated. | |
| NCC Organization and National Integration | NCC Organization — History of NCC- NCC Organization- NCC Training- NCC Uniform — Promotion of NCC cadets — Aim and advantages of NCC Training- NCC badges of Rank- Honors" and Awards – Incentives for NCC cadets by central and state govt. History and Organization of IAF- Indo-PakWar-1971- OperationSafedSagar.NationalIntegration-Unityindiversity-C Contributionofyouthin nationbuilding-Nationalintegrationcouncil-ImagesandSlogansonNationalIntegration. [9] |
| Drill and Weapon Training | Basic physical Training- Various exercises for fitness (with Demonstration)- Food- Hygiene and Cleanliness. Drill-Words of commands- Position and commands- Sizing and forming- Saluting- Marching- Turning on the march and wheeling- Saluting on themarch-Sidepace,Paceforwardandtotherear-Markingtime-Drillwitharms-Ceremonialdrill-Guardmounting(WITHDEMONSTRATION) [9] |
| Principles of Flight | Laws of motion- Forces acting on aircraft- Bernoulli's theorem- Stalling-Primary control surfaces- Secondary control surfaces- Aircraft recognition. [9] |
| Aero Engines | Introduction of Aero engine- Types of engine- Piston engine- Jet engines- Turboprop engines- Basic Flight Instruments- Modern trends. [9] |
| Aero Modeling | History of Aero modeling- Materials used in Aero modeling- Types of Aero models – Static Models- Gliders-Control line models- Radio Control Models- Building and Flying of Aero models. [9] |
| Total Hours | |
| 45 | |
| Text Book(s): | |
| 1. "National Cadet Corps- AConciseh and book of NCC Cadets", Ramesh Publishing House,NewDelhi,2014. | |
| Reference(s): | |
| 1. "Cadets Handbook–Common Subjects SD/SW",published by DGNCC,New Delhi. | |
| 2. "CadetsHandbook-SpecializedSubjects SD/SW",publishedbyDGNCC,NewDelhi. | |
| 3. "NCCOTA Precise", publishedbyDGNCC, NewDelhi. | |

| | |
|-----|---|
| ESE | The examination and award of marks will be done by the Ministry of Defence, Government of India which includes all K1 to K4 knowledge levels. The maximum marks for the End Semester Examination is 500 marks. It will be converted to 100 marks. |
|-----|---|

CourseDesigners

- Flt Lt V.R.SADASIVAM - sadasivam@ksrct.ac.in

| 60 AB 002 | National Cadet Corps - Army Wing | Category | L | T | P | Credit |
|-----------|----------------------------------|----------|---|---|---|--------|
| | | HS | 2 | 0 | 2 | 3 |

Objectives

- Develop character, camaraderie
- Inculcate discipline, secular outlook
- Enrich the spirit of adventure, sportsman spirit
- Ideals of selfless service amongst cadets by working in teams
- Improve qualities such as self-discipline, self-confidence, self-reliance and dignity of labour in the cadets.

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Prerequisite

NIL

Course Outcomes

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

| | | |
|-----|--|------------|
| CO1 | Display sense of patriotism, secular values and shall be transformed into motivated youth who will carry out nation building through national unity and social cohesion. | Apply |
| CO2 | Demonstrate Health Exercises, the sense of discipline, improve bearing, smartness, turn out, develop the quality of immediate and implicit obedience of orders. | Apply |
| CO3 | Basic knowledge of weapons and their use and handling. | Understand |
| CO4 | Aware about social evils and shall inculcate sense of whistle blowing against such evils and ways to eradicate such evils | Apply |
| CO5 | Acquaint, expose & provide knowledge about Army/Navy/ Air force and to acquire information about expansion of Armed Forces, service subjects and important battles | Understand |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | | | | | | 1 | | 3 | | | | |
| CO2 | | | | | | | | 2 | | | | |
| CO3 | | | | | | 1 | | 3 | | | | |
| CO4 | | | | | | | | 2 | | | | |
| CO5 | | | | | | | | 3 | | | | |

3- Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests(Marks) | | End Sem Examination(Marks) |
|------------------|------------------------------------|----|----------------------------|
| | 1 | 2 | |
| Remember | 10 | 10 | 30 |
| Understand | 20 | 20 | 30 |
| Apply | 20 | 20 | 30 |
| Analyse | 10 | 10 | 10 |
| Evaluate | 0 | 0 | 0 |
| Create | 0 | 0 | 0 |

| K.S.Rangasamy College of Technology – Autonomous R2022 | | | | | | | | |
|--|------------|---|---|-----------|--------|---------------|----|-------|
| 60 AB 002 – National Cadet Corps (Army Wing) | | | | | | | | |
| Common to all Branches | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | Total |
| II | 2 | 0 | 2 | 45 | 3 | 40 | 60 | |
| NCC Organization & National Integration NCC Organization – History of NCC- NCC Organization- NCC Training- NCC Uniform – Promotion of NCC cadets – Aim and advantages of NCC Training- NCC badges of Rank- Honors' and Awards – Incentives for NCC cadets by central and state govt. National Integration - Unity in diversity- contribution of youth in nation building- national integration council- Images and Slogans on National Integration | | | | | | | | [9] |
| Basic Physical Training & Drill Basic physical Training – various exercises for fitness (with Demonstration)-Food – Hygiene and Cleanliness. Drill- Words of commands- position and commands- sizing and forming- saluting- marching- turning on the march and wheeling- saluting on the march- side pace, pace forward and to the rear- marking time- Drill with arms- ceremonial drill- guard mounting.(WITH DEMONSTRATION). | | | | | | | | [9] |

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| | |
|--|-----------|
| Weapon Training Main Parts of a Rifle- Characteristics of .303 rifle- Characteristics of .22 rifle- loading and unloading – position and holding safety precautions – range procedure- MPI and Elevation- Group and Snap shooting- Long/Short range firing(WITH PRACTICE SESSION) - Characteristics of 5.56mm rifle- Characteristics of 7.62mm SLR- LMG- carbine machine gun – pistol. | [9] |
| Social Awareness and Community Development Aims of Social service-Various Means and ways of social services- family planning – HIV and AIDS- Cancer its causes and preventive measures- NGO and their activities- Drug trafficking- Rural development programmes - MGNREGA- SGSYJGSY-NSAP-PMGSY-Terrorism and counter terrorism- Corruption – female foeticide -dowry –child abuse-RTI Act- RTE Act- Protection of children from sexual offences act- civic sense and responsibility | [9] |
| Specialized Subject(ARMY) Basic structure of Armed Forces- Military History – War heroes- battles of Indo-Pak war- Param Vir Chakra- Career in the Defence forces- Service tests and interviews. | [9] |
| Total Hours | 45 |
| Text Book(s): | |
| 1. National Cadet Corps- A Concise handbook of NCC Cadets by Ramesh Publishing House, New Delhi, 2014. | |
| 2. Cadets Handbook- Specialized Subjects SD/SW published by DG NCC, New Delhi,2014. | |
| Reference(s): | |
| 1. "Cadets Handbook – Common Subjects SD/SW" by DG NCC, New Delhi,2019 | |
| 2. "Cadets Handbook – Specialised Subjects SD/SW" by DG NCC, New Delhi,2017 | |

Course Designer

- CT E CHANDRA KUMAR - chandrakumar@ksrct.ac.in

| 60 GE 002 | Tamils and Technology / தமிழரும் தொழில்நுட்பமும் (Common to all Branches) | Category | L | T | P | Credit |
|-----------|--|----------|---|---|---|--------|
| | | GE | 1 | 0 | 0 | 1 |

Objective

- To learn weaving, ceramic and construction technology of Tamils.
- To understand the agriculture, irrigation and manufacturing technology of Tamils.
- To realize the development of scientific Tamil and Tamil computing.

Prerequisite

NIL

Course Outcomes

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

| | | |
|-----|---|------------|
| CO1 | Understand the weaving and ceramic technology of ancient Tamil people nature. | Understand |
| CO2 | Comprehend the construction technology, building materials in sangam period and case studies. | Understand |
| CO3 | Infer the metal process, coin and beads manufacturing with relevant archeological evidence. | Understand |

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| | | |
|-----|--|------------|
| CO4 | Realize the agriculture methods, irrigation technology and pearl diving. | Understand |
| CO5 | Apply the knowledge of scientific Tamil and Tamil computing. | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | | | | | | | 3 | 3 | | 2 | | 3 |
| CO2 | | | | | | | 3 | 3 | | 2 | | 3 |
| CO3 | | | | | | | 3 | 3 | | 2 | | 3 |
| CO4 | | | | | | | 3 | 3 | | 2 | | 3 |
| CO5 | | | | | | | 3 | 3 | | 2 | | 3 |
| 3- Strong; 2-Medium; 1-Low | | | | | | | | | | | | |

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|---|---|---|---|-----------|--------|---------------|----|-----------|
| 60 GE 002 - Tamils and Technology (Common to all Branches) | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| II | 1 | 0 | 0 | 15 | 1 | 100 | - | 100 |
| Weaving and Ceramic Technology Weaving Industry during Sangam Age – Ceramic Technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries. | | | | | | | | 3 |
| Design and Construction Technology Designing and Structural construction House & Designs in household materials during Sangam Age – Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram – Sculptures and Temples of Mamallapuram – Great Temples of Cholas and other worship places – Temples of Nayaka Period - Type Study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal – Chetti Nadu Houses , Indo – Saracenic architecture at Madras during British Period. | | | | | | | | 3 |
| Manufacturing Technology Art of Ship Building – Metallurgical studies – Iron Industry – Iron smelting ,Steel -Copper and gold coins as source of history – Minting of Coins – Beads making – industries Stone beads – Glass beads – Terracotta beads – Shell beads/bone beats – Archeological evidences -Gem stone types described in Silappathikaram. | | | | | | | | 3 |
| AGRICULTURE AND IRRIGATION TECHNOLOGY Dam,Tank,Ponds,Sluice,Significance of Kumizhi Thoompu of Chola Period,Animal Husbandry – Wells designed for cattle use – Agriculture and Agro Processing – Knowledge of Sea- Fisheries – Pearl – Conche diving -Ancient Knowledge of Ocean – Knowledge Specific Society. | | | | | | | | 3 |
| SCIENTIFIC TAMIL & TAMIL COMPUTING Development of Scientific Tamil – Tamil Computing – Digitalization of Tamil Books – Development of Tamil Software – Tamil Virtual Academy- Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project. | | | | | | | | 3 |
| Total Hours | | | | | | | | 15 |
| Text Book(s): | | | | | | | | |
| 1. | தமிழக வரலாறு - மக்களும் பண்பாடும் கே. கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்). | | | | | | | |

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| | |
|-----|---|
| 2. | கணினித்தமிழ் – முனைவர் இல. சுந்தரம். (விகடன் பிரசுரம்). |
| 3. | கீழடி – வைகை நதிக்கரையில் சங்ககால நகர் நாகரீகம் (தொல்லியல் துறை வெளியீடு). |
| 4. | பொருநை - ஆற்றங்கரை நாகரீகம் (தொல்லியல் துறை வெளியீடு). |
| 5. | Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print). |
| 6. | Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies). |
| 7. | Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies). |
| 8. | The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.) |
| 9. | Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu) |
| 10. | Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author). |
| 11. | Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu). |
| 12. | Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book. |

| | | | | | | |
|------------------|--|-----------------|----------|----------|----------|---------------|
| 60 GE 002 | தமிழரும் தொழில்நுட்பமும் (அனைத்து துறைகளுக்கும் பொதுவானது) | Category | L | T | P | Credit |
| | | GE | 1 | 0 | 0 | 1 |

பாடத்தின் நோக்கங்கள்:

- தமிழர்களின் சங்ககால நெசவு, பனை வனைதல் மற்றும் கட்டிட தொழில் நுட்பம் குறித்து அறிதல்.
- தமிழர்களின் சங்ககால வேளாண்மை, நீர்ப்பாசனம் மற்றும் உற்பத்தி முறைகள் குறித்த கற்றல்.
- நவீன அறிவியல் தமிழ் மற்றும் கணித்தமிழ் குறித்த புரிதல்.

முன்கூட்டிய துறைசார் அறிவு:

தேவை இல்லை

பாடம் கற்றதின் விளைவுகள்:

பாடத்தை வெற்றிகரமாக கற்று முடித்த பின்பு, மாணவர்களால் முடியும் விளைவுகள்

| | | |
|-----|---|-------------|
| CO1 | சங்ககாலத் தமிழர்களின் நெசவு மற்றும் பானை வனைதல் தொழில்நுட்பம் குறித்த கற்றுணர்தல் | புரிதல் |
| CO2 | சங்ககாலத் தமிழர்களின் கட்டிட தொழில்நுட்பம் கட்டுமானப் பொருட்கள் மற்றும் அவற்றை விளக்கும் தளங்கள் குறித்த அறிவு. | புரிதல் |
| CO3 | சங்ககாலத் தமிழர்களின் உலோகத் தொழில், நாணயங்கள் மற்றும் மணிகள் சார்ந்த தொல்லியல் சான்றுகள் பற்றிய அறிவு. | புரிதல் |
| CO4 | சங்ககாலத் தமிழர்களின் வேளாண்மை, நீர்ப்பாசன முறைகள் மற்றும் முத்து குளித்தல் குறித்த தெளிவு. | புரிதல் |
| CO5 | நவீன அறிவியல் தமிழ் மற்றும் கணித்தமிழ் குறித்த புரிந்துகொள்ளலும் மற்றும் பயன்படுத்துதலும். | பகுப்பாய்வு |

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Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | | | | | | | 3 | 3 | | 2 | | 3 | | | |
| CO2 | | | | | | | 3 | 3 | | 2 | | 3 | | | |
| CO3 | | | | | | | 3 | 3 | | 2 | | 3 | | | |
| CO4 | | | | | | | 3 | 3 | | 2 | | 3 | | | |
| CO5 | | | | | | | 3 | 3 | | 2 | | 3 | | | |

3- Strong; 2-Medium; 1-Low

| K. S. Rangasamy College of Technology – Autonomous (R2022) | | | | | | | | | | | | | | | | |
|--|------------|---|---|-----------|--------|-----|---------------|--|--|--|--|--|--|--|-------|----|
| 60 GE 002 - தமிழ்ரும் தொழில்நுட்பமும் | | | | | | | | | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | | Maximum Marks | | | | | | | | Total | |
| | L | T | P | | C | CA | ES | | | | | | | | | |
| III | 1 | 0 | 0 | 15 | 1 | 100 | - | | | | | | | | 100 | |
| நெசவு மற்றும் பானைத் தொழில்நுட்பம்: | | | | | | | | | | | | | | | | |
| சங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியீடுகள். | | | | | | | | | | | | | | | | |
| வடிவமைப்பு மற்றும் கட்டிடத் தொழில்நுட்பம்: | | | | | | | | | | | | | | | | |
| சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமானப் பொருட்களும் நடுகல்லும் - சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோயில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் காலக் கோயில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாட்டு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ - சாரோசெனிக் கட்டிடக் கலை. | | | | | | | | | | | | | | | | |
| உற்பத்தித் தொழில் நுட்பம்: | | | | | | | | | | | | | | | | |
| கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்சாலை - இரும்பை உருக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள், கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத் துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள். | | | | | | | | | | | | | | | | |
| வேளாண்மை மற்றும் நீர்பாசனத் தொழில் நுட்பம்: | | | | | | | | | | | | | | | | |
| அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குழுமித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்கான வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மை சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன்வளம் - முத்து மற்றும் முத்துக்குளித்தல் - பெருங்கடல் குறித்த பண்டைய அறிவு - அறிவுசார் சமூகம். | | | | | | | | | | | | | | | | |
| அறிவியல் தமிழ் மற்றும் கணிதத்தமிழ் | | | | | | | | | | | | | | | | |
| அறிவியல் தமிழின் வளர்ச்சி - கணிதத்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிப்பு செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இணையக் கல்விக்கழகம் - தமிழ் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம். | | | | | | | | | | | | | | | | |
| Total Hours | | | | | | | | | | | | | | | | 15 |
| Text Book(s): | | | | | | | | | | | | | | | | |
| 1. தமிழக வரலாறு - மக்களும் பண்பாடும் கே. கே. பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்). | | | | | | | | | | | | | | | | |
| 2. கணினித்தமிழ் - முனைவர் இல. சுந்தரம். (விகடன் பிரசரம்). | | | | | | | | | | | | | | | | |

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|-----|---|
| 3. | கீழடி – வைகை நதிக்கரையில் சங்ககால நகர் நாகரீகம் (தொல்லியல் துறை வெளியீடு). |
| 4. | பொருநெந் - ஆற்றங்கரை நாகரீகம் (தொல்லியல் துறை வெளியீடு). |
| 5. | Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print). |
| 6. | Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: International Institute of Tamil Studies). |
| 7. | Historical Heritage of the Tamils (Dr.S.V.Subaramanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies). |
| 8. | The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies.) |
| 9. | Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu) |
| 10. | Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author). |
| 11. | Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu). |
| 12. | Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book. |

Course Contents and Lecture Schedule

| S.No | Topic | No. of Hours |
|------------|--|--------------|
| 1.0 | WEAVING AND CERAMIC TECHNOLOGY | |
| 1.1 | Weaving Industry during Sangam Age – Ceramic Technology | 1 |
| 1.2 | Black and Red Ware Potteries (BRW) | 1 |
| 1.3 | Graffiti on Potteries. | 1 |
| 2.0 | DESIGN AND CONSTRUCTION TECHNOLOGY | |
| 2.1 | Designing and Structural construction House & Designs in household materials during Sangam Age – Building materials and Hero stones of Sangam age | 1 |
| 2.2 | – Details of Stage Constructions in Silappathikaram – Sculptures and Temples of Mamallapuram – Great Temples of Cholas and other worship places – Temples of Nayaka Period | 1 |
| 2.3 | Type Study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal – Chetti Nadu Houses , Indo – Saracenic architecture at Madras during British Period. | 1 |
| 3.0 | MANUFACTURING TECHNOLOGY | |
| 3.1 | Art of Ship Building – Metallurgical studies – Iron Industry – Iron smelting ,Steel | 1 |
| 3.2 | Copper and gold coins as source of history – Minting of Coins – Beads making – industries Stone beads . | 1 |
| 3.3 | Glass beads – Terracotta beads – Shell beads/bone beats – Archeological evidences -Gem stone types described in Silappathikaram | 1 |
| 4.0 | AGRICULTURE AND IRRIGATION TECHNOLOGY | |
| 4.1 | Dam,Tank,Ponds,Sluice,Significance of Kumizhi Thoompu of Chola Period,Animal Husbandry– | 1 |
| 4.2 | Wells designed for cattle use – Agriculture and Agro Processing – Knowledge of Sea- Fisheries | 1 |
| 4.3 | Pearl – Conche diving -Ancient Knowledge of Ocean – Knowledge Specific Society. | 1 |
| 5.0 | SCIENTIFIC TAMIL & TAMIL COMPUTING | |
| 5.1 | Development of Scientific Tamil – Tamil Computing – Digitalization of Tamil Books. | 1 |
| 5.2 | Development of Tamil Software – Tamil Virtual Academy- | 1 |
| 5.3 | Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai Project. | 1 |
| Total | | 15 |

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| | | | | | | |
|------------------|--|----------|---|---|---|--------|
| 60 CP 0P2 | Engineering Physics and Chemistry Laboratory (CSE,IT,EEE,ECE) | Category | L | T | P | Credit |
| | | BS | 0 | 0 | 4 | 2 |

Objectives

- To infer the practical knowledge by applying the experimental methods to correlate with the Physics theory.
- To demonstrate an ability to make physical measurements and understand the limits of precision in measurements
- To analyze the behavior and characteristics of various materials for its optimum utilization
- Test the knowledge of theoretical concepts and develop the experimental skills of the learners.
- To facilitate data interpretation and expose the learners to various industrial and environmental applications

Prerequisite

Nil

Course Outcomes

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

| | | |
|-----|---|---------|
| CO1 | Analyze the properties of semiconducting materials for its potential applications | Analyze |
| CO2 | Realize the interference and diffraction phenomena by Air wedge and laser experiments | Apply |
| CO3 | Recognize the magnetic properties by experimental verification | Apply |
| CO4 | Apply different techniques of qualitative and quantitative chemical analysis to generate experimental skills and apply these skills to various analyses | Apply |
| CO5 | Explain and analyze instrumental techniques for chemical analysis | Analyze |

Mapping with Programme Outcomes(CSE & IT)

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 1 | 3 | 2 | 1 |
| CO3 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 1 | 2 |
| CO4 | 3 | 2 | 2 | 2 | 3 | 2 | 2 | - | - | - | - | 2 |
| CO5 | 3 | 2 | 2 | - | 3 | 2 | 2 | - | - | - | - | 2 |

3- Strong; 2-Medium; 1-Low

**Physics Laboratory
(CSE, IT, EEE, ECE)****List of Experiments**

1. Determination of Hall coefficient of a given semiconductor and its charge carrier density
2. V-I Characteristics of Zener diode and Solar cell
3. Air wedge - Determination of thickness of a thin sheet/wire
4. a) Laser- Determination of the wave length of the laser using grating
b) Optical fibre -Determination of numerical aperture and acceptance angle
5. Magnetic field along the axis of current carrying coil – Stewart and Gee.

Course Designers

Dr. V. Vasudevan
Mr.S. Vanchinathan
Dr. M. Malarvizhi

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**Chemistry Laboratory
(CSE, IT, EEE, ECE)**

List of Experiments

1. Estimation of HCl by pH meter.
2. Estimation of mixture of acids by conductivity meter
3. Determination of ferrous ion by Potentiometric titration.
4. Determination of corrosion by weight loss method.
5. Estimation of ferrous ion by spectrophotometer.

Case studies/Activity report

1. Activity using chemdraw software.
2. Activity report on cheminformatic structure.
3. Case study on ion selective electrodes.
4. Assembling of cell or battery.

Course Designers

1. Dr.T.A.SUKANTHA – sukantha@ksrct.ac.in
2. Dr.K.PRABHA – prabhak@ksrct.ac.in
3. Dr.B.SRIVIDHYA – srividhyab@ksrct.ac.in
4. Dr.S.MEENACHI – meenachi@ksrct.ac.in

| 60 IT 0P1 | Python Programming Laboratory | Category | L | T | P | Credit |
|-----------|-------------------------------|----------|---|---|---|--------|
| | | ES | 0 | 0 | 4 | 2 |

Objectives

- To gain basic knowledge in Python programming Language
- To understand the concept of decision-making and looping statements
- To implement functions with the aid of modules using exception handling
- To implement the concepts of NumPy Arrays
- To create layouts using graphical modules such as Tkinter and Turtle

Prerequisite

Basic knowledge of mathematics and programming.

Course Outcomes

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

| | | |
|-----|--|-------|
| CO1 | Implement the basics and data structures of Python programming | Apply |
| CO2 | Implement the concepts of decision-making and looping statements | Apply |
| CO3 | Develop programs using functions and modules with exception handling | Apply |
| CO4 | Create programs using NumPy arrays | Apply |
| CO5 | Design layouts with GUI toolkits using Tkinter | Apply |

Mapping with Programme Outcomes

| COs | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO 2 | PSO 3 |
|-----|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| CO1 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO2 | 3 | 2 | 3 | 2 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO3 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |

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| | | | | | | | | | | | | | | | |
|-----|---|---|---|---|--|--|--|--|---|---|---|---|---|---|--|
| CO4 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO5 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |

3-Strong;2-Medium;1-Some

| K.S.Rangasamy College of Technology – Autonomous R2022 | | | | | | | | | | | | | | | |
|---|--------------|---|---|--|------------|--------|----|---------------|-------|--|--|--|--|--|--|
| 60 IT 0P1–Python Programming Laboratory | | | | | | | | | | | | | | | |
| IT | | | | | | | | | | | | | | | |
| Semester | Hours / Week | | | | Total hrs. | Credit | | Maximum Marks | | | | | | | |
| | L | T | P | | | C | CA | ES | Total | | | | | | |
| II | 0 | 0 | 4 | | 60 | 2 | 60 | 40 | 100 | | | | | | |
| 1. Implement the basic concepts of Python 2. Implement List, Tuples, Dictionary, and String 3. Implement the concept of decision-making and looping statements. 4. Working with functions and modules 5. Implement File operations 6. Build a program with Exception handling* 7. Perform various NumPy operations and special functions 8. Design windows using Tkinter 9. Draw shapes and images using Turtle 10. Mini Project | | | | | | | | | | | | | | | |

* SDG- 04- Quality Education

CourseDesigners

- Dr.C,Nallusamy (nallusamyc@ksrct.ac.in)
- Mr.R.T.Dinesh Kumar (dineshkumarrrt@ksrct.ac.in)

| 60 CG 0P1 | Career Skill Development I | Category | L | T | P | Credit |
|-----------|----------------------------|----------|---|---|---|--------|
| | | CGC | 0 | 0 | 2 | 0 |

Objectives

- To help learners improve their vocabulary and to enable them to use words appropriately in different academic and professional contexts
- To help learners develop strategies that could be adopted while reading texts
- To help learners acquire the ability to speak effectively in English in real life and career related situations
- To equip students with effective speaking and listening skills in English
- To facilitate learners to enhance their writing skills with coherence and appropriate format effectively

Prerequisite

Basic knowledge of reading and writing in English.

Course Outcomes

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

| | | |
|-----|--|------------|
| CO1 | Listen and comprehend complex academic texts | Understand |
| CO2 | Read and infer the denotative and connotative meanings of technical texts | Analyze |
| CO3 | Write definitions, descriptions, narrations, and essays on various topics | Apply |
| CO4 | Speak fluently and accurately in formal and informal communicative contexts | Apply |
| CO5 | Appraise the verbal ability skills in the career development and professional contexts | Analyze |

Mapping with Programme Outcomes

Passed in BoS Meeting held on 16/05/2023

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| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | | | | | | | | 2 | 3 | 3 | 2 | 3 | | | 2 |
| CO2 | | | | | | | | 2 | 3 | 3 | 2 | 3 | | 2 | |
| CO3 | | | | | | | | 2 | 3 | 3 | 2 | 3 | 2 | | |
| CO4 | | | | | | | | 2 | 3 | 3 | 2 | 3 | | | |
| CO5 | | | | | | | | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 2 |
| 3- Strong;2-Medium;1-Some | | | | | | | | | | | | | | | |

| K.S.Rangasamy College of Technology–AutonomousR2022 | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|--|-----------|--------|-----|---------------|-------|-----|--|--|--|--|--|--|--|--|--|
| 60 CG 001 - Career Skill Development I | | | | | | | | | | | | | | | | | | | |
| Common to All Branches | | | | | | | | | | | | | | | | | | | |
| Semester | Hours/Week | | | | Total hrs | Credit | | Maximum Marks | | | | | | | | | | | |
| | L | T | P | | | C | CA | ES | Total | | | | | | | | | | |
| II | 0 | 0 | 2 | | 30 | 0 | 100 | 00 | 100 | | | | | | | | | | |
| Listening* | Listening for general information-specific details - audio / video (formal & informal) - Listen to podcasts/ TED talks/ anecdotes / stories / event narration / documentaries and interviews with celebrities - Listen to a product and process descriptions, advertisements about products or services. | | | | | | | | | [5] | | | | | | | | | |
| Speaking* | Self-Introduction; Introducing a friend; conversation - politeness strategies - Narrating personal experiences / events; Interviewing a celebrity; reporting / and summarizing of documentaries / podcasts/ interviews - Picture description; giving instruction to use the product; presenting a product - Small Talk; Mini presentations - Group discussions, debates & role plays. | | | | | | | | | [5] | | | | | | | | | |
| Reading* | Loud reading vs Silent reading, Skimming & Scanning of passages, reading brochures (technical context), social media messages relevant to technical contexts and emails - Biographies, travelogues, newspaper reports and travel & technical blogs - Advertisements, gadget reviews and user manuals - Newspaper articles and Journal reports - Editorials; and opinion blogs. | | | | | | | | | [5] | | | | | | | | | |
| Writing* | Writing letters – informal and formal – basics and format orientation - paragraph texting, short report on an event (field trip etc.) - Definitions; instructions; and product /process description - Note-making / Note-taking; recommendations; transferring information from non-verbal (charts, graphs to verbal mode) - Essay texting. | | | | | | | | | [5] | | | | | | | | | |
| Verbal Ability I* | Reading Comprehension (MCQs) – Cloze Test - Sequencing of sentences – Summarizing and paraphrase – Error Detection – Spelling Test – Sentence Improvement – Preposition. | | | | | | | | | [5] | | | | | | | | | |
| Total Hours 25 | | | | | | | | | | | | | | | | | | | |
| Reference(s): | | | | | | | | | | | | | | | | | | | |
| 1. | 'English for Engineers & Technologists' Orient Blackswan Private Ltd. Department of English, Anna University, 2020 | | | | | | | | | | | | | | | | | | |
| 2. | Norman Lewis, 'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book', Penguin Random House India, 2020 | | | | | | | | | | | | | | | | | | |
| 3. | Michael McCarthy and Felicity O Dell, 'English Vocabulary in Use: Upper Intermediate', Cambridge University Press, N.York, 2012 | | | | | | | | | | | | | | | | | | |
| 4. | Lakshmi Narayanan, 'A Course Book on Technical English' Scitech Publications (India) Pvt. Ltd. 2020 | | | | | | | | | | | | | | | | | | |

* SDG- 04- Quality Education

Course Contents and Lecture Schedule

| S.No | Topic | No. of Hours |
|------|-----------|--------------|
| 1.0 | Listening | |

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| | | |
|------------|--|-----------|
| 1.1 | Listening for general information and Specific details | 1 |
| 1.2 | Listening to podcasts, documentaries and interviews with celebrities | 1 |
| 1.3 | Narrating personal experiences | 1 |
| 1.4 | Reading relevant to technical contexts and emails | 1 |
| 1.5 | Listen to a product and process descriptions | 1 |
| 2.0 | Speaking | |
| 2.1 | Self-introduction | 1 |
| 2.2 | Summarizing of documentaries & Picture Narration | 1 |
| 2.3 | Small Talk; Mini presentations | 1 |
| 2.4 | Group discussions, debates & role plays. | 1 |
| 2.5 | Group discussions | 1 |
| 3.0 | Reading | |
| 3.1 | Loud reading vs Silent reading, Skimming & Scanning of passages | 1 |
| 3.2 | Reading social media messages relevant to technical contexts | 1 |
| 3.3 | Reading newspaper reports and travel & technical blogs | 1 |
| 3.4 | Reading advertisements, gadget reviews and user manuals | 1 |
| 3.5 | Reading newspaper articles and journal reports | 1 |
| 4.0 | Writing | |
| 4.1 | Writing letters – informal and formal | 1 |
| 4.2 | Paragraph Texting | 1 |
| 4.3 | Definitions and instructions | 1 |
| 4.4 | Note-making / Note-taking | 1 |
| 4.5 | Essay texting | 1 |
| 5.0 | Verbal Ability | |
| 5.1 | Reading Comprehension (MCQs) and Cloze Test | 1 |
| 5.2 | Sequencing of sentences | 1 |
| 5.3 | Paraphrasing and Summarizing | 1 |
| 5.4 | Error Detection and Spelling Test | 1 |
| 5.5 | Prepositions | 1 |
| | Total | 25 |

Course Designer

1. Dr.A.Palaniappan- palaniappan@ksrct.ac.in

THIRDSEMESTER

| S.No. | Course Code | Name of the Course | Duration of Internal Exam | Weightage of Marks | | | Minimum Marks for Pass in End Semester Exam | |
|---------------|-------------|---|---------------------------|------------------------|----------------------|------------|---|-------|
| | | | | Continuous Assessment* | End Semester Exam ** | Max. Marks | End Semester Exam | Total |
| THEORY | | | | | | | | |
| 1. | 60 MA 010 | Mathematical Statistics and Numerical Methods | 2 | 40 | 60 | 100 | 45 | 100 |

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| | | | | | | | | |
|------------------|-----------|---|---|----|----|-----|----|-----|
| 2. | 60 CS 003 | Data Structures | 2 | 40 | 60 | 100 | 45 | 100 |
| 3. | 60 CS 004 | Java Programming | 2 | 40 | 60 | 100 | 45 | 100 |
| 4. | 60 EC001 | Digital Logic and Microprocessor | 2 | 50 | 50 | 100 | 45 | 100 |
| 5. | 60 IT 301 | Software Engineering | 2 | 40 | 60 | 100 | 45 | 100 |
| 6. | 60 MY 002 | Universal Human Values | 2 | 40 | 60 | 100 | 45 | 100 |
| 7. | 60 GE 002 | Tamils and Technology/ தமிழரும்தொழில்நுட்பமு ம் | 1 | - | - | - | - | - |
| PRACTICAL | | | | | | | | |
| 8. | 60 CS 0P3 | Data Structures Laboratory | 2 | 60 | 40 | 100 | 45 | 100 |
| 9. | 60 CS0P4 | Java Programming Laboratory | 2 | 60 | 40 | 100 | 45 | 100 |

* CA evaluation pattern will differ from course to course and for different tests. This will have to be declared in advance to students. The department will put a process in place to ensure that the actual test paper follow the declared pattern.

** End Semester Examination will be conducted for maximum marks of 100 and subsequently be reduced to 60 marks for the award of terminal examination marks

| 60 MA 010 | MATHEMATICAL STATISTICS AND NUMERICAL METHODS | Category | L | T | P | Credit |
|-----------|--|----------|---|---|---|--------|
| | | BS | 3 | 1 | 0 | 4 |

Objective

- To learn basic concepts of descriptive statistics.
- To familiarize various methods in hypothesis testing.
- To get exposed to the fundamentals of analysis of variance.
- To get exposed to various techniques to solve equations numerically.
- To know the concepts of interpolation and numerical integration.

Prerequisite

NIL

Course Outcomes

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

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| | | |
|-----|---|-----------------------------|
| CO1 | Compute measures of central tendency, measures of dispersion and correlation coefficient. | Remember, Understand, Apply |
| CO2 | Apply Student's t-test, F-test and Chi-square test for testing the statistical hypothesis. | Remember, Understand, Apply |
| CO3 | Apply the concepts of ANOVA to test the equality of means for more than two populations. | Remember, Understand, Apply |
| CO4 | Employ various iteration techniques for solving algebraic, transcendental and system of linear equations. | Remember, Understand, Apply |
| CO5 | Apply different techniques to find the intermediate values and to evaluate Single definite integrals. | Remember, Understand, Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | 3 | 2 | | | | | | 2 | 2 | | 2 | |
| CO2 | 3 | 3 | 3 | 3 | 2 | | | | | | 2 | 2 | | 2 | |
| CO3 | 3 | 3 | 3 | 3 | 2 | | | | | | 2 | 2 | | 2 | |
| CO4 | 3 | 3 | 2 | 3 | 2 | | | | | | | 2 | | 2 | |
| CO5 | 3 | 3 | 2 | 3 | 2 | | | | | | | 2 | | 2 | |

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | Model Exam (Marks) | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|--------------------|-----------------------------|
| | 1 | 2 | | |
| Remember (Re) | 10 | 10 | 10 | 10 |
| Understand (Un) | 10 | 10 | 20 | 20 |
| Apply (Ap) | 40 | 40 | 70 | 70 |
| Analyze (An) | 0 | 0 | 0 | 0 |
| Evaluate (Ev) | 0 | 0 | 0 | 0 |
| Create (Cr) | 0 | 0 | 0 | 0 |
| Total | 60 | 60 | 100 | 100 |

K.S.Rangasamy College of Technology – Autonomous (R2022)**60 MA 010 – Mathematical Statistics and Numerical Methods****Common to CSE & IT**

| Semester | Hours / Week | | | Total Hours | Credit | Maximum Marks | | | |
|----------|--------------|---|---|-------------|--------|---------------|----|----|-------|
| | L | T | P | | | C | CA | ES | Total |
| III | 3 | 1 | 0 | 60 | 4 | 40 | 60 | 60 | 100 |

Empirical Statistics

Measures of central tendency*: Mean, Median and Mode - Measures of dispersion: Range - Quartile deviation - Standard deviation - Measures of skewness: Bowley's coefficient of skewness and Pearson's coefficient of skewness- **Karl Pearson's coefficient of correlation.***

Testing of Hypothesis*

Type I and Type II errors - Test of significance of small samples : Student's 't' test - Single mean -Difference of means - F-test - Chi-square test - Goodness of fit - Independence of attributes.

[9]

[9]

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| | |
|--|-----------|
| Design of Experiments* Analysis of variance - One way classification - Completely randomized design - Two way classification - Randomized block design - Latin square design. | [9] |
| Solution of equations and Eigen value problem Algebraic and Transcendental equations - Newton Raphson method – Regula Falsi method- Gauss elimination method – Gauss Jordan method - Iterative methods: Gauss Jacobi method – Gauss Seidel method - Eigenvalue of a matrix by Power method. | [9] |
| Interpolation and Numerical Integration Lagrange's and Newton's divided difference interpolation (unequal intervals)- Newton's forward and backward interpolation (equal intervals)** -Two point and three point Gaussian quadrature - Trapezoidal, Simpson's 1/3 and 3/8 rule (single integral). | [9] |
| Total Hours: 45 + 15(Tutorial) | 60 |

Text Book(s):

- | | |
|----|--|
| 1. | Gupta S P, "Statistical Methods", Sultan Chand & son 46 th Revised Edition, New Delhi, 2021. |
| 2 | Faires, J.D. and Burden, R., "Numerical Methods", Brookes / Cole (Thomson Publications), 4 th Edition, New Delhi, 2011. |

Reference(s):

- | | |
|----|---|
| 1. | V. K. Kapoor and S.C.Gupta, "Fundamentals of Mathematical Statistics", Sultan Chand & sons 12 th Edition, New Delhi, 2020. |
| 2. | Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, 8th Edition, Asia, 2023. |
| 3. | Grewal, B.S., and Grewal, J.S., "Numerical Methods in Engineering and Science", Khanna Publishers, 10 th Edition, New Delhi, 2015. |
| 4. | P Kandasamy, K Thilagavathy and K Gunavathi, 'Numerical Methods', S.Chand & Company Ltd, New Delhi, 3 rd Edition, 2003. |

* SDG: 4-Quality Education,

**SDG:9 Industry, Innovation, and Infrastructure

List of MATLAB Programs:

- Calculate mean, median, mode and range for discrete frequency distribution.
- Apply Student's t - test, F- test and Chi-square test to real dataset.
- Perform One-Way ANOVA.
- Visualize the iterative methods for solving linear system of equations.
- Numerical integration by Trapezoidal and Simpson's rules.

Course Contents and Lecture Schedule

| S.No. | Topic | No. of Hours | Mode of Content Delivery |
|----------|---|--------------|--------------------------|
| 1 | Empirical Statistics | | |
| 1.1 | Measures of central tendency: Mean and Median | 2 | Black Board |
| 1.2 | Measures of central tendency Mode | 1 | Black Board |
| 1.3 | Measures of dispersion: Range | 1 | Black Board |
| 1.4 | Measures of dispersion: Quartile deviation and Standard deviation | 2 | Black Board |
| 1.5 | Measures of skewness: Bowley's coefficient of skewness | 1 | Black Board |
| 1.6 | Measures of skewness: Pearson's coefficient of skewness | 1 | Black Board |
| 1.7 | Karl Pearson's coefficient of correlation. | 1 | Black Board |
| 1.8 | Tutorial | 3 | |
| 2 | Testing of Hypothesis | | |
| 2.1 | Type I and Type II errors | 1 | Black Board |

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| | | | |
|----------|---|----|---------------|
| 2.2 | Test of significance of small samples: Student's 't' test for single mean | 2 | Black Board |
| 2.3 | Test of significance of small samples: Student's 't' test for difference of means | 2 | Black Board |
| 2.4 | F- test | 1 | Black Board |
| 2.5 | Chi-square test for Goodness of fit | 1 | Flipped Class |
| 2.6 | Chi-square test for Independence of attributes | 2 | Black Board |
| 2.7 | Tutorial | 3 | |
| 3 | Design of Experiments | | |
| 3.1 | Analysis of variance: One way classification | 2 | Black Board |
| 3.2 | Completely randomized design | 1 | Black Board |
| 3.3 | Two-way classification | 2 | Flipped Class |
| 3.4 | Randomized block design | 2 | Black Board |
| 3.5 | Latin square design. | 2 | Black Board |
| 3.6 | Tutorial | 3 | |
| 4 | Solution of Linear equations and Eigen value problems | | |
| 4.1 | Algebraic and transcendental equations | 1 | Black Board |
| 4.2 | Newton Raphson method | 1 | Black Board |
| 4.3 | Regula-Falsi method | 2 | Black Board |
| 4.4 | Gauss Elimination method | 1 | Black Board |
| 4.5 | Gauss Jordan method | 1 | Black Board |
| 4.6 | Iterative methods of Gauss Jacobi and Gauss Seidel | 2 | Black Board |
| 4.7 | Eigen values of a matrix by power method | 1 | Black Board |
| 4.8 | Tutorial | 3 | |
| 5 | Interpolation and Numerical Integration | | |
| 5.1 | Lagrange's interpolation | 1 | Black Board |
| 5.2 | Newton's divided difference interpolation | 1 | Black Board |
| 5.3 | Newton's forward and backward interpolation | 2 | Black Board |
| 5.4 | Numerical integration: Two point and three point Gaussian quadratures | 1 | Black Board |
| 5.5 | Trapezoidal rule | 1 | Black Board |
| 5.6 | Simpson's 1/3 rule, | 1 | Black Board |
| 5.7 | Simpson's 3/8 rule | 2 | Black Board |
| 5.8 | Tutorial | 3 | |
| 5.9 | Total | 60 | |

Course Designer

- Dr. S.Muthukumar muthukumar@ksrct.ac.in

| 60 CS 003 | DATA STRUCTURES | Category | L | T | P | Credit |
|-----------|-----------------|----------|---|---|---|--------|
| | | BS | 3 | 0 | 0 | 3 |

Objective

- To choose the appropriate data structure for a specified application
- To design and implement abstract datatypes such as Linked List, Stack, Queue and Trees
- To Learn and implement the Hashing techniques
- To design a Priority Queue ADT and its applications
- To demonstrate various Sorting, Searching and Graph algorithms

Prerequisite

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NIL

Course Outcomes

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

| | | |
|-----|---|----------------|
| CO1 | Express the concept of linear data structures, applications and its implementations | Apply |
| CO2 | Appraise the knowledge of Trees with its operations | Apply |
| CO3 | Recognize the concept of Sorting, Searching and its types | Apply, Analyze |
| CO4 | Review various implementations and operations of Priority Queue, and Hashing Techniques | Apply |
| CO5 | Apply Shortest Path and Minimum Spanning Tree algorithms and Biconnectivity | Apply, Analyze |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 2 | 2 | 2 | | | 2 | 2 | | | 2 | 3 | 3 | |
| CO2 | 3 | 3 | 2 | 3 | 2 | | | 2 | 3 | | | 2 | 3 | 3 | |
| CO3 | 3 | 3 | 2 | 2 | 2 | 2 | | 2 | 3 | 2 | | 2 | 3 | 3 | |
| CO4 | 3 | 3 | 2 | 3 | 2 | | | 3 | 2 | 2 | | 2 | 3 | 3 | |
| CO5 | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 2 | | 2 | 3 | 3 | |
| 3- Strong;2-Medium;1-Some | | | | | | | | | | | | | | | |

Assessment Pattern

| Cognitive Levels | Continuous Assessment Tests | | Modal Exam | End Semester Examination (Marks) |
|------------------|-----------------------------|----|------------|----------------------------------|
| | 1 | 2 | | |
| Remember | 10 | 10 | 20 | 20 |
| Understand | 10 | 10 | 20 | 20 |
| Apply | 30 | 30 | 40 | 40 |
| Analyse | 10 | 10 | 20 | 20 |
| Evaluate | - | - | - | - |
| Create | - | - | - | - |

| K.S. Rangasamy College of Technology–Autonomous R2022 | | | | | | | |
|---|------------|---|-----------|--------|---------------|----|-------|
| 60 CS 003 – DATA STRUCTURES | | | | | | | |
| Common to CS, IT, AD, EE, EC | | | | | | | |
| Semester | Hours/Week | | Total hrs | Credit | Maximum Marks | | |
| | L | T | | C | CA | ES | Total |
| III | 3 | 0 | 45 | 3 | 40 | 60 | 100 |
| Lists, Stacks and Queues* Abstract Data Type (ADT) – The List ADT – The Stack ADT – The Queue ADT. | | | | | | | |
| Trees* Preliminaries – Binary Trees – The Search Tree ADT – Binary Search Trees – AVL Trees – Tree Traversals – B-Trees – B+ Trees. | | | | | | | |

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| | |
|---|------|
| Sorting and Searching* Preliminaries – Insertion Sort – Shell Sort – Heap Sort – Merge Sort – Quick Sort – External Sorting – Searching: Sequential Search - Binary Search – Hashed List Searches. | [7] |
| Hashing and Priority Queues (Heaps)* Hashing – Hash Function – Separate Chaining – Open Addressing – Rehashing – Extendible Hashing – Priority Queues (Heaps) – Mode I– Simple Implementations –Binary Heap–Applications of Priority Queues – d-Heaps. | [7] |
| Graphs* Definitions – Topological Sort – Shortest-Path Algorithms – Unweighted Shortest Paths – Dijkstra's Algorithm – Minimum Spanning Tree – Prim's Algorithm, Kruskal's Algorithm – Applications of Depth-First Search – Undirected Graphs – Biconnectivity. | [10] |
| Total Hours | 45 |

Text Book(s):

| | |
|----|---|
| 1. | M.A.Weiss, "Data Structures and Algorithm Analysis in C", Second Edition, Pearson Education Asia, 2008. |
| 2. | Y.Langsam, M.J.Augenstein and A.M.Tenenbaum, "Data Structures using C", Pearson Education Asia, 2009. |

Reference(s):

| | |
|----|---|
| 1. | Rajesh K.Sukla, "Data Structure using C & C++", Wiley India, 2012. |
| 2. | A.Tannenbaum, "Data Structure using C", Pearson Education, 2003. |
| 3. | Goodrich and Tamassia, "Data Structures and Algorithms in C++", Second Edition, John Wiley and Sons, 2011 |
| 4. | Reema Thareja, "Data Structures using C", Second Edition, Oxford Higher Education, 2014. |

* SDG:4- Quality Education

Course Contents and Lecture Schedule

| Module No. | Topic | No. of Hours |
|------------|---------------------------------|--------------|
| 1 | Lists, Stacks and Queues | |
| 1.1 | Abstract Data Type (ADT) | 2 |
| 1.2 | List ADT | 4 |
| 1.3 | Stack ADT | 3 |
| 1.4 | Queue ADT | 3 |
| 2 | Trees | |
| 2.1 | Preliminaries | 1 |
| 2.2 | Binary Trees | 1 |
| 2.3 | The Search Tree ADT | 1 |
| 2.4 | Binary Search Trees | 1 |
| 2.5 | AVL Trees | 1 |
| 2.6 | Tree Traversals | 1 |
| 2.7 | B-Trees | 2 |
| 2.8 | B+ Trees | 1 |
| 3 | Sorting and Searching | |
| 3.1 | Preliminaries, Insertion Sort | 1 |
| 3.2 | Shell Sort, Heap sort | 1 |
| 3.3 | Merge Sort, Quick sort | 1 |
| 3.4 | External Sorting | 1 |

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| | | |
|----------|--|-----------|
| 3.5 | Sequential Searching | 1 |
| 3.6 | Binary Searching | 1 |
| 3.7 | Hashed List Searches | 1 |
| 4 | Hashing and Priority Queues (Heaps) | |
| 4.1 | Hashing, Hash Function | 1 |
| 4.2 | Separate Chaining, Open Addressing | 1 |
| 4.3 | Rehashing, Extendible Hashing | 1 |
| 4.4 | Priority Queues (Heaps) | 1 |
| 4.5 | Simple Implementations, Binary Heap | 1 |
| 4.6 | Applications of Priority Queues | 1 |
| 4.7 | d –Heaps | 1 |
| 5 | Graphs | |
| 5.1 | Graph Definitions - Topological Sort | 1 |
| 5.2 | Shortest-Path Algorithms | 1 |
| 5.3 | Unweighted Shortest Paths | 1 |
| 5.4 | Dijkstra's Algorithm | 1 |
| 5.5 | Minimum Spanning Tree | 1 |
| 5.6 | Prim's Algorithm | 1 |
| 5.7 | Kruskal's Algorithm | 1 |
| 5.8 | Applications of Depth-First Search | 1 |
| 5.9 | Undirected Graphs | 1 |
| 5.10 | Biconnectivity | 1 |
| | Total Hours | 45 |

Course Designers

Ms.J.MYTHILI

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| 60 CS 004 | JAVA PROGRAMMING | Category | L | T | P | Credit |
|-----------|------------------|----------|---|---|---|--------|
| | | PC | 3 | 0 | 0 | 3 |

Objective

- To learn object oriented programming concepts
- To develop applications using java concepts
- To create programs using Java strings and IO streams
- To implement code reduction through packages and collection methods
- To build applications with JDBC technology for real world problems

Prerequisite

Basic knowledge of any programming language with ability to solve logical problems

Course Outcomes

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

| | | |
|-----|--|------------|
| CO1 | Recognize the concepts object oriented programming with simple java programs | Understand |
|-----|--|------------|

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| | | |
|-----|--|--------|
| CO2 | Implement inheritance, exception handling and multithreading concepts | Apply |
| CO3 | Develop programs using string operations and IO classes | Apply |
| CO4 | Extrapolate the code reduction through packages and collections | Apply |
| CO5 | Explore the regular expression and implement database connectivity by JDBC | Create |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 2 | 3 | 2 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO2 | 3 | 3 | 2 | 3 | 2 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 2 | 3 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO4 | 3 | 3 | 3 | 2 | 2 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO5 | 3 | 3 | 3 | 2 | 3 | | | | 2 | | | 2 | 3 | 3 | 2 |

3-Strong;2-Medium;1-Some

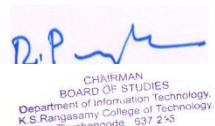
Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | Model Exam | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|------------|-----------------------------|
| | 1 | 2 | | |
| Remember (Re) | 6 | 6 | 10 | 10 |
| Understand (Un) | 4 | 4 | 10 | 10 |
| Apply (Ap) | 40 | 40 | 70 | 70 |
| Analyze (An) | 10 | 10 | 10 | 10 |
| Evaluate (Ev) | - | - | - | - |
| Create (Cr) | - | - | - | - |

| Course Outcome 1(CO1) | |
|-----------------------|---|
| 1. | Explain the object oriented programming concepts with necessary examples |
| 2. | Explore the structure the java program with an example code snippet |
| 3. | Create a java program to print the following pattern using control statements ***** *** * ***** *** * |
| Course Outcome 2(CO2) | |
| 1. | Create a try block that contains the java code for the following scenario: Declare an integer array of size 6 and store the value '30' in the 8th position of the Array. Use multiple catch statements for catching the exception that may be thrown by the try block and display the name of the exception to be caught |

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| | |
|----|--|
| 2. | Create an Interface Operations containing the method multiplication() for multiplying one integer number and one float number and create a class Arith containing method getValue() to converts the command line arguments into integer and float type and also create a class ArithOperations extending the class Arith and implementing the interface Operations |
| 3. | Explain various types of thread creation process in java with suitable example program |

Course Outcome 3(CO3)

| | |
|----|---|
| 1. | Get the string from user like 'object language'. Insert the new string 'oriented' and make the string as 'Object oriented language'. Concatenate new string 'Java is " to the modified string and print as 'Java is OBJECT ORIENTED LANGUAGE". |
| 2. | Create a file called 'sample1.txt' with the content "Java class tutorial using byte array input stream". Read the content of the file using FileReader method read() and display the content to the user. After that write the same content into file named "sample2.txt" by using FileWriter method write (). Finally check if the file 'sample2.txt' is written with content of 'sample1.txt'. If it is done then display the message "File content has been copied successfully" to the user |
| 3. | Write a java program to copy the object content into the file and retrieve the object content from the file using Object Serialization and Object De-Serialization |

Course Outcome 4 (CO4)

| | |
|----|---|
| 1. | Create a method m1(*) of class C1 in a package p1 , Create a method m2(*) of class C2 in a package p1.p2 , Create a method m3(*) of class C3 in a package p3 and also create a Demo class(which containing main() method) . Write a program to implement the above said specification. Note: * represents a message which could be get through command line arguments Sample input : method1 method2 method3 output: method1 method2 method3 |
| 2. | Create a java program for the following scenario: a. Create an array list , add four elements and display the list. b. Modify the second element and display the list. c. Remove the third element and display the list. |
| 3. | Create a TreeSet to add the following objects into the collection. 111 567 210 176 456 and display the content |

Course Outcome 5(CO5)

| | |
|----|--|
| 1. | Validate the following email Ids using regular expression and print the output as 'Valid' or 'Invalid' a. abc&ksrct.ac.in b. java@gmail.com c java_c@net |
| 2. | Create a employee database which has employee details such as employee name, employee ID, employ department and salary. Develop a java program which implements JDBC connectivity for the employee database and inserts customer record and displays the records from database |
| 3. | Design a JDBC application that retrieves the following information from the database table using SQL statement. a. Student name b. Student Reg.No b. Address c. Mail ID d. Contact No. e. College Name |

K.S.Rangasamy College of Technology–Autonomous R2022**60 CS 004 - JAVA PROGRAMMING****COMMON TO CSE & IT**

| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
|----------|------------|---|---|-----------|--------|---------------|----|----|
| | L | T | P | | | C | CA | ES |

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| III | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
|--|--|----------|----------|-----------|----------|-----------|-----------|------------|
| INTRODUCTION TO OOP AND JAVA FUNDAMENTALS: | | | | | | | | [9] |
| Object Oriented Programming - Objects and Classes, Data Abstraction, Data Encapsulation, Inheritance , Polymorphism , OOP in Java , Features of Java , The Java Environment , Java Source File Compilation, Structure of Java , Defining classes and methods in Java, constructors, final keyword, finalize method, access specifiers , static members , Data Types, Variables, Operators, Control Flow. | | | | | | | | [9] |
| JAVA CONCEPTS*: | | | | | | | | [9] |
| Arrays, Java Inheritance, Abstract class, Interfaces, Exception handling - exception hierarchy, throwing and catching exceptions, built-in exceptions, creating own exceptions, Multithreaded programming-The Java Thread Model, The Main Thread, creating a Thread, Creating multiple Threads, Thread priority, Synchronization | | | | | | | | [9] |
| STRINGS AND JAVA I/O* | | | | | | | | [9] |
| String handling with String and String Buffer classes, Input / Output Basics, Streams, The Byte Streams, The Character Streams, Reading and Writing Console, Reading and Writing Files, Object Serialization and Object De-Serialization, The keyword transient | | | | | | | | [9] |
| PACKAGES AND COLLECTION FRAMEWORK* | | | | | | | | [9] |
| Packages - Creating our own Packages, import and static import, Wrapper classes, Generic Programming , Object cloning, Introduction to Collection, The Collection Interfaces – List, Set, Map, The Collection Classes - ArrayList, LinkedList, Vector , TreeSet, HashSet, LinkedHashSet, TreeMap and HashMap, Using Iterator and ListIterator, StringTokenizer | | | | | | | | [9] |
| REGEX AND JAVA DATABASE CONNECTIVITY | | | | | | | | [9] |
| Regular Expression: Matcher Class, Pattern class and Pattern Syntax, Exception class, Regex Character Classes and Quantifiers, Metacharacters. Database Programming – Introduction, SQL queries, JDBC, Statement, Prepared Statement | | | | | | | | [9] |
| Total Hours | | | | | | | | 45 |
| Textbook(s): | | | | | | | | |
| 1. | Herbert Schildt, "Java : The complete Reference", Comprehensive coverage of the Java language, Oracle press, 12 th Edition, Tata McGraw-Hill, 2021. | | | | | | | |
| 2. | Vivian Siahaan, Rismon Hasiholan Sianipar, "Java In Practice: JDBC And Database Applications" Sparta Publishing, Kindle 1 st Edition, 2019 | | | | | | | |
| Reference(s): | | | | | | | | |
| 1. | Kathy Sierra ,Bert Bates, "Head First Java", A Brain Friendly Guide, O'Reilly, 3 rd Edition, 2022 | | | | | | | |
| 2. | Cay S.Horstmann, " Core Java Volume – I Fundamentals", 11 th Edition, 2018 | | | | | | | |
| 3. | Y.Daniel Liang, "Introduction to Java Programming", Comprehensive Version,10 th Edition, Pearson Education,2015 [JDBC only] | | | | | | | |
| 4. | Jeffrey E. F. Friedl, "Mastering Regular Expressions", 3rdEdition, O'Reilly Media, Inc.,2006 | | | | | | | |

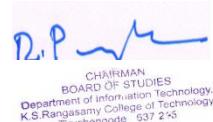
*SDG:4- Quality Education

Course Contents and Lecture Schedule

| S.No. | Topic | No. of Hours |
|--------------|---|---------------------|
| 1.0 | Introduction to OOP and Java Fundamentals | |
| 1.1 | Object Oriented Programming - Objects and Classes | 1 |
| 1.2 | Data Abstraction, Data Encapsulation | 1 |
| 1.3 | Inheritance, Polymorphism ,OOP in Java | 1 |
| 1.4 | Features of Java , The Java Environment | 1 |
| 1.5 | Java Source File Compilation, Structure of Java | 1 |
| 1.6 | Defining classes and methods in Java | 1 |
| 1.7 | Constructors, Final keyword, finalize method | 1 |

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| | | |
|------------|--|-----------|
| 1.8 | Static members, Data Types, Variables | 1 |
| 1.9 | Operators, Control Flow | 1 |
| 2.0 | Java Concepts | |
| 2.1 | Arrays | 1 |
| 2.2 | Java Inheritance | 1 |
| 2.3 | Abstract class, Interfaces | 1 |
| 2.4 | Exception handling - exception hierarchy, throwing and catching exceptions | 1 |
| 2.5 | Built-in exceptions, Creating own exceptions | 1 |
| 2.6 | Multithreaded programming-The Java Thread Model | 1 |
| 2.7 | The Main Thread, creating a Thread | 1 |
| 2.8 | Creating multiple Threads | 1 |
| 2.9 | Thread priority, Synchronization | 1 |
| 3.0 | Strings and Java I/O | |
| 3.1 | String handling with String | 1 |
| 3.2 | String handling with StringBuffer | 1 |
| 3.3 | Input / Output Basics, Streams | 1 |
| 3.4 | The Byte Streams | 1 |
| 3.5 | The Character Streams | 2 |
| 3.6 | Reading and Writing Console, Reading and Writing Files | 1 |
| 3.7 | Object Serialization and Object De-Serialization | 1 |
| 3.8 | The keyword transient | 1 |
| 4.0 | Packages And Collection Framework | |
| 4.1 | Packages | 1 |
| 4.2 | Creating our own Packages | 1 |
| 4.3 | Import and static import, Wrapper classes | 1 |
| 4.4 | Generic Programming , Object cloning | 1 |
| 4.5 | Introduction to Collection, The Collection Interfaces- List, Set, Map | 1 |
| 4.6 | The Collection Classes - ArrayList, LinkedList, Vector | 1 |
| 4.7 | TreeSet, HashSet, LinkedHashSet | 1 |
| 4.8 | TreeMap and HashMap, | 1 |
| 4.9 | Using Iterator and ListIterator, StringTokenizer | 1 |
| 5.0 | Regex and Java Database Connectivity | |
| 5.1 | Regular Expression: Matcher Class, Pattern class | 1 |
| 5.2 | Pattern Syntax, Exception class | 1 |
| 5.3 | Regex Character Classes and Quantifiers | 1 |
| 5.4 | Metacharacters | 1 |
| 5.5 | Database Programming – Introduction | 1 |
| 5.6 | SQL queries | 1 |
| 5.7 | JDBC | 1 |
| 5.8 | Statement | 1 |
| 5.9 | Prepared Statement | 1 |
| | Total | 45 |

Course Designers

- Dr.C.Nallusamy - nallusamyc@ksrct.ac.in
- Mr.S.Vadivel – vadivels@ksrct.ac.in

| 60 EC 001 | DIGITAL LOGIC AND MICROPROCESSOR | Category | L | T | P | Credit |
|-----------|----------------------------------|----------|---|---|---|--------|
| | | ES | 2 | 0 | 2 | 3 |

Objective

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- To learn Boolean algebra and simplification of Boolean functions
- To design and analyze different combinational circuits
- To study the basics of synchronous sequential logic, analyze and design sequential circuits
- To introduce the architecture and programming of 8086 microprocessors
- To perform the interfacing of peripheral devices with 8086 microprocessors

Prerequisite

Basic knowledge of Electrical and Electronics Engineering

Course Outcomes

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

| | | | | | | | | | | | | |
|-----|--|--|--|--|--|--|--|--|--|--|--|------------|
| CO1 | Simplify complex Boolean functions and design digital systems | | | | | | | | | | | Apply |
| CO2 | Design and analyze combinational logic circuits | | | | | | | | | | | Analyze |
| CO3 | Design and analyze synchronous sequential logic circuits | | | | | | | | | | | Analyze |
| CO4 | Illustrate the architecture of 8086 microprocessor | | | | | | | | | | | Understand |
| CO5 | Analyze the interfacing techniques of various peripheral devices | | | | | | | | | | | Analyze |

Mapping with Programme Outcomes

| COs | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO 2 | PSO 3 |
|-----|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| CO1 | 3 | 3 | 3 | 3 | 2 | | | | | 1 | 1 | 1 | 3 | 2 | |
| CO2 | 3 | 3 | 3 | 3 | 2 | | | | | 1 | 1 | 1 | 3 | 2 | |
| CO3 | 3 | 3 | 3 | 3 | 2 | | | | | 1 | 1 | 1 | 3 | 2 | |
| CO4 | 3 | 3 | 3 | 3 | 2 | | | | | 1 | 1 | 1 | 3 | 2 | |
| CO5 | 3 | 3 | 3 | 3 | 2 | | | | | 1 | 1 | 1 | 3 | 2 | |

3-Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | Modal Exam | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|------------|-----------------------------|
| | 1 | 2 | | |
| Remember (Re) | - | - | 10 | 10 |
| Understand (Un) | 10 | 20 | 30 | 30 |
| Apply (Ap) | 20 | 10 | 20 | 20 |
| Analyse (An) | 20 | 20 | 20 | 20 |
| Evaluate (Ev) | - | - | - | - |
| Create (Cr) | 10 | 10 | 20 | 20 |

Course Level Assessment Questions

| Course Outcome 1(CO1) | |
|-----------------------|--|
| 1. | Find the simplified Boolean function for the given function using K-map and implement it using logic gates. $F(A, B, C, D) = \sum m(0, 8, 11, 12, 15) + \sum d(1, 2, 4, 7, 10, 14)$. Give the essential prime implicants. |

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| | |
|----|--|
| 2. | Implement the function $F = B' D + A C$ using only NAND gates. |
| 3. | Given the two binary numbers $X = 1100$ and $Y = 0101$, perform the subtraction using a) $X - Y$ and b) $Y - X$ using 2's complements |

Course Outcome 2(CO2)

| | |
|----|---|
| 1. | Design a 4 bit BCD to Excess 3 code converter using the steps to design a combinational logic circuit. |
| 2. | Design a combinational circuit with three inputs x, y, z and the three outputs A, B, C . When the binary input is 0, 1, 2 or 3, the binary output is one greater than the input. When the binary input is 4, 5, 6 or 7, the binary output is one less than the input. |
| 3. | Analyze a 2 bit magnitude comparator using gates. |

Course Outcome 3(CO3)

| | |
|----|--|
| 1. | Design a counter using T flipflop with the following repeated binary sequence 0,1,2,3,4,5. |
| 2. | Design a 4 bit ring counter and identify the different states in the counter. |
| 3. | Convert a D flipflop to T flipflop. |

Course Outcome 4 (CO4)

| | |
|----|--|
| 1. | Identify the difference between the following instructions in 8086: (i) JMP and CALL (ii) PUSH and POP |
| 2. | Write an 8086 assembly language program to arrange the given numbers in descending order. [AB01H,BF0EH,00EDH,1202H,CD34H] |
| 3. | Specify the function of following signals of 8086. (i) NMI (ii) RESET (iii) AD15 – AD0 |

Course Outcome 5(CO5)

| | |
|----|--|
| 1. | Denote the I/O mode control word format for 8255. Design a control word to set port A and port B as output and port C as input port in mode 0 configuration. |
| 2. | Discuss how an A/D Converter is interfaced with 8086 microprocessor. |
| 3. | Write an assembly language program to interface DAC with that of 8086 microprocessor to generate the rectangular waveform. |

| K.S.Rangasamy College of Technology–Autonomous R2022 | | | | | | | | |
|--|------------|---|---|-----------|--------|---------------|----|-------|
| 60 EC 001 - Digital Logic and Microprocessor | | | | | | | | |
| COMMON TO CS, IT, AD | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | Total |
| III | 2 | 0 | 2 | 45 | 3 | 50 | 50 | 100 |

| | |
|--|-----|
| Digital Fundamentals Review of Number Systems –Binary codes - Boolean postulates and laws – Boolean function - Logic Gates- Universal Gates - Canonical and Standard Forms – Minterms and Maxterms – Sum of Products and Product of Sums - Simplification of Boolean Functions –Karnaugh Map | [6] |
| Combinational Circuits* Design procedure – Adders - Subtractors – Serial, Parallel adder- BCD adder - Magnitude Comparator – Multiplexer / Demultiplexer - Encoder / Decoder – Code Converters | [6] |
| Sequential Circuits* Flip flops SR, JK, T, D and Master Slave – Characteristic table and equation – Analysis of clocked sequential circuits - Ripple counters – Synchronous counters – Modulo-n counters – Registers : Shift registers - Universal shift register– Shift counters | [6] |

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| | |
|---|------|
| 8086 Microprocessor Architecture of 8086 – Execution unit – Bus Interface unit- Addressing modes – Instruction set of 8086: Data transfer Instructions – Branch Instructions - Logical Instructions - Arithmetic Instructions – Shift and rotate Instructions - Simple Assembly Language Programs of 8086 | [6] |
| Peripherals Interfacing Programmable Peripheral Interface (PPI 8255) – Programmable Interval Timer (PIT 8253) – Programmable Interrupt Controller (8259) – Keyboard & Display controller (8279) - Interfacing Serial I/O (8251)- ADC/DAC Interfacing | [6] |
| PRACTICAL EXERCISES: 1. Verification of Boolean theorems using logic gates 2. Implementation of combinational circuits using gates for arbitrary functions 3. Implementation of binary adder/subtractor circuits 4. Implementation of code converters 5. Implementation of synchronous counters 6. Implementation of basic arithmetic operations using 8086 7. Implementation of sorting and searching using 8086 8. Interfacing and programming of Programmable Peripheral Interface using 8086 | [15] |
| Total Hours | 45 |
| Textbook(s): | |
| 1. M. Morris Mano, Michael D. Ciletti, "Digital Design", 5 th Edition, Pearson Education, New Delhi, 2016. | |
| 2. Soumitra Kumar Mandal, "Microprocessors and Microcontrollers Architecture, Programming & Interfacing Using 8085, 8086 and 8051", 7 th Edition, McGraw Hill India, 2013. | |
| Reference(s): | |
| 1. Donald P.Leach and Albert Paul Malvino, Goutam Saha, "Digital Principles and Applications" , 7 th Edition, Tata McGraw-Hill, New Delhi, 2016. | |
| 2. Charles H.Roth, "Fundamentals of Logic Design", 5 th Edition, Brooks/cole, 2016. | |
| 3. Yu-Cheng Liu, Glenn A. Gibson, "Microcomputer Systems: The 8086/8088 Family- Architecture Programming and Design" , 2 nd Edition, Pearson, 2015. | |
| 4. Krishna Kant, "Microprocessors and microcontrollers Architecture , Programming and System design 8085,8086,8051,8096", PHI-Third Printing, 2010 | |

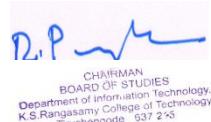
*SDG:4- Quality Education

Course Contents and Lecture Schedule

| S.No. | Topic | No. of Hours |
|--|-------|--------------|
| 1.0 Digital Fundamentals | | |
| 1.1 Review of Number Systems, Binary codes | | 1 |
| 1.2 Boolean postulates and laws, Logic Gates- Universal Gates | | 1 |
| 1.3 Canonical and Standard Forms – Minterms and Maxterms, SOP, POS | | 1 |
| 1.4 Simplification of Boolean Functions | | 1 |
| 1.5 Karnaugh Map | | 2 |
| 2.0 Combinational Circuits | | |
| 2.1 Design procedure , Adders, Serial, Parallel adder | | 1 |
| 2.2 Subtractors, BCD adder | | 1 |
| 2.3 Magnitude Comparator | | 1 |
| 2.4 Multiplexer / Demultiplexer | | 1 |
| 2.5 Encoder / Decoder | | 1 |

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| | | |
|------------|--|-----------|
| 2.6 | Code Converters | 1 |
| 3.0 | Sequential Circuits | |
| 3.1 | Flip flops SR, JK, T, D, Master Slave, Characteristic table and equation | 1 |
| 3.2 | Analysis of clocked sequential circuits | 1 |
| 3.3 | Ripple counters, Modulo-n counters | 1 |
| 3.4 | Synchronous counters | 1 |
| 3.5 | Registers, Shift registers - Universal shift register | 1 |
| 3.6 | Shift counters | 1 |
| 4.0 | 8086 Microprocessor | |
| 4.1 | Architecture of 8086 | 1 |
| 4.2 | Execution unit – Bus Interface unit | 1 |
| 4.3 | Addressing modes | 1 |
| 4.4 | Instruction set of 8086: Data transfer Instructions | 1 |
| 4.5 | Branch, Logical, Arithmetic, Shift and rotate Instructions, | 1 |
| 4.6 | Simple Assembly Language Programs of 8086 | 1 |
| 5.0 | Peripherals Interfacing | |
| 5.1 | Programmable Peripheral Interface (PPI 8255) | 1 |
| 5.2 | Programmable Interval Timer (PIT 8253) | 1 |
| 5.3 | Programmable Interrupt Controller (8259) | 1 |
| 5.4 | Keyboard & Display controller (8279) | 1 |
| 5.5 | Interfacing Serial I/O (8251) | 1 |
| 5.6 | ADC/DAC Interfacing | 1 |
| | Total | 30 |

Course Designers

1.Dr.J.Nithya- nithyaj@ksrct.ac.in

| 60 IT 301 | Software Engineering | Category | L | T | P | Credit |
|-----------|----------------------|----------|---|---|---|--------|
| | | PC | 3 | 0 | 0 | 3 |

Objective

- To gain knowledge about various software development lifecycle (SDLC) models.
- To understand fundamental concepts of requirements engineering and Analysis Modeling.
- To understand the various software design methodologies
- To learn various testing and maintenance measures
- To impart skills in the design and implementation of efficient software systems across disciplines

Prerequisite

Basic knowledge of UML Concepts.

Course Outcomes

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

| | | |
|-----|--|------------|
| CO1 | Explain the principles of the engineering processes in software development. | Understand |
| CO2 | Implement the software development processes activities from requirements to validation and verification | Apply |

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| | | | | | | | | | | | | |
|-----|--|--|--|--|--|--|--|--|--|--|--|------------|
| CO3 | Classify and specify the requirements for the software projects | | | | | | | | | | | Understand |
| CO4 | Apply benchmarking standards in process and in product. | | | | | | | | | | | Apply |
| CO5 | Use knowledge, techniques, skills and modern tools necessary for software engineering practice | | | | | | | | | | | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 2 | 2 | | 3 | 2 | | 3 | 2 | | 2 | 3 | 3 | 2 |
| CO2 | 3 | 3 | 2 | 2 | | 3 | 2 | | 3 | 2 | | 2 | 3 | 3 | 2 |
| CO3 | 3 | 3 | 2 | 2 | | 3 | 2 | | 3 | 2 | | 2 | 3 | 3 | 2 |
| CO4 | 3 | 3 | 2 | 2 | | 3 | 2 | | 3 | 2 | | 2 | 3 | 3 | 2 |
| CO5 | 3 | 3 | 2 | 2 | | 3 | 2 | | 3 | 2 | | 2 | 3 | 3 | 2 |

3-Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | Modal Exam | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|------------|-----------------------------|
| | 1 | 2 | | |
| Remember (Re) | 30 | 30 | 30 | 30 |
| Understand (Un) | 10 | 10 | 20 | 20 |
| Apply (Ap) | 20 | 20 | 20 | 20 |
| Analyse (An) | 0 | 0 | 10 | 10 |
| Evaluate (Ev) | 0 | 0 | 10 | 10 |
| Create (Cr) | 0 | 0 | 10 | 10 |

Course Level Assessment Questions

| Course Outcome 1(CO1) | |
|-----------------------|---|
| 1. | List out the framework activities are carried out in perspective process model? |
| 2. | How do you select a process model for a problem explain? |
| 3. | Can you justify the process model which is suitable for student's project? |
| Course Outcome 2(CO2) | |
| 1. | Model an use case diagram for "Banking system". |

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| | |
|----|--|
| 2. | List down the Requirement engineering tasks in detail. |
| 3. | Differentiate class based and flow oriented modeling. |

Course Outcome 3(CO3)

| | |
|----|---|
| 1. | Elaborate the fundamental principles software design. |
| 2. | List down the Design concepts with neat diagram. |
| 3. | Name the commonly used architectural styles. |

Course Outcome 4 (CO4)

| | |
|----|--|
| 1. | Give some difference between white box and black box testing |
| 2. | How many testing strategies are available in software engineering? Explain each. |
| 3. | Apply any testing strategy for online application which you prefer. |

Course Outcome 5(CO5)

| | |
|----|---|
| 1. | State software quality assurance with suitable example. |
| 2. | With proper example explain the concepts of project estimation. |
| 3. | How would you generalize the software risk management. |

| K.S.Rangasamy College of Technology–AutonomousR2022 | | | | | | | | | |
|---|------------|---|---|-----------|--------|----|----|---------------|--|
| 60 IT 301-Software Engineering | | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | | | Maximum Marks | |
| | L | T | P | | C | CA | ES | Total | |
| | III | 3 | 0 | 45 | 3 | 40 | 60 | 100 | |
| Software Process and Agile Development The nature of software - the software process - software engineering practice - software myths - A genetic process model - Perspective process models -Specialized process models- Agile process: Extreme programming - the XP process | | | | | | | | [9] | |
| Modelling Requirements Requirement engineering tasks -Requirements Elicitation – Negotiation requirements & Validation requirements- Requirement analysis- Scenario based modeling –UML Models- Flow oriented Modeling – Class based modeling – creating a behavioral model. | | | | | | | | [9] | |
| Software Design* Design concepts- Design models-architectural styles- Architectural design – Architectural mapping using data flow- Cohesion& Coupling- User Interface Design- Pattern based design: Design patterns – Architectural patterns | | | | | | | | [9] | |
| Software Testing* Software Testing Strategies – System Testing – Debugging – White Box Testing – Black Box Testing – Model Based Testing – Testing for Specialized Environments, Architectures and Applications – Testing Object-Oriented and Web Based Applications – User Interface Testing – Configuration Testing – Security Testing – Performance Testing. | | | | | | | | [9] | |

Passed in BoS Meeting held on 16/05/2023

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| | |
|---|--------------------|
| Quality & Maintenance SQA; SQA Tasks, Goals, and Metrics - Software Project Management Concepts – Process and Project Metrics – Estimation for Software Projects – Project Scheduling – Risk Management – Software Configuration Management – Software Process Improvements (SPI) – The SPI Process – Capability Machine Model Integration (CMMI) – Other SPI Frameworks. | [9] |
| | Total Hours |
| Textbook(s): | |
| 1. Roger S. Pressman., "Software Engineering: A Practitioner's Approach", 7th Edition, McGraw Hill, 2017. | |
| 2. Ian Sommerville, "Software Engineering", 9th Edition, Pearson Education Asia, 2011. | |
| Reference(s): | |
| 1. Fairely, "Software Engineering Concepts", McGraw Hill, reprint, 2014. | |
| 2. James F Peters and Witold Pedrycz, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2013. | |
| 3. Pankaj Jalote, "An Integrated Approach to Software Engineering", Springer Verlag, 6th Edition, 2000. | |
| 4. http://nptel.ac.in/ . | |

* SDG- 04- Quality Education

Course Contents and Lecture Schedule

| S.No. | Topic | No. of Hours |
|------------|---|--------------|
| 1.0 | Software Process and Agile Development | 1 |
| 1.1 | The nature of software , the software process | 1 |
| 1.2 | software engineering practice ,software myths | 1 |
| 1.3 | A generic process model | 1 |
| 1.4 | Perspective process models | 2 |
| 1.5 | Specialized process models | 2 |
| 1.6 | Agile process: Extreme programming , the XP process | 1 |
| 2.0 | Modelling Requirements | |
| 2.1 | Requirement engineering tasks | 1 |
| 2.2 | Requirements Elicitation | 1 |
| 2.3 | Negotiation requirements & Validation requirements | 1 |
| 2.4 | Requirement analysis | 1 |
| 2.5 | Scenario based modeling | 1 |
| 2.6 | UML Models | 1 |
| 2.7 | Flow oriented Modeling | 1 |
| 2.8 | Class based modeling | 1 |
| 2.9 | Creating a behavioral model | 1 |
| 3.0 | Software Design | |
| 3.1 | Design concepts | 2 |
| 3.2 | Design models | 1 |
| 3.3 | architectural styles , Architectural design | 1 |
| 3.4 | Architectural mapping using data flow | 1 |
| 3.5 | Cohesion& Coupling | 1 |
| 3.6 | User Interface Design | 1 |
| 3.7 | Pattern based design: Design patterns | 1 |
| 3.8 | Architectural patterns | 1 |
| 4.0 | Software Testing | |

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| | | |
|------------|---|-----------|
| 4.1 | Software Testing Strategies | 1 |
| 4.2 | System Testing , Debugging | 1 |
| 4.3 | White Box Testing , Black Box Testing | 1 |
| 4.4 | Model Based Testing, | 1 |
| 4.5 | Testing for Specialized Environments | 1 |
| 4.6 | Architectures and Applications | 1 |
| 4.7 | Testing Object-Oriented and Web Based Applications | 1 |
| 4.8 | User Interface Testing , Configuration Testing | 1 |
| 4.9 | Security Testing , Performance Testing | 1 |
| 5.0 | Quality & Maintenance | |
| 5.1 | SQA; SQA Tasks, Goals, and Metrics | 1 |
| 5.2 | Software Project Management Concepts | 1 |
| 5.3 | Process and Project Metrics, Estimation for Software Projects | 1 |
| 5.4 | Project Scheduling | 1 |
| 5.5 | Risk Management | 1 |
| 5.6 | Software Configuration Management | 1 |
| 5.7 | Software Process Improvements (SPI) , The SPI Process | 1 |
| 5.8 | Capability Machine Model Integration (CMMI) , Other SPI Frameworks. | 1 |
| 5.9 | Tools related recent trends in software engineering | 1 |
| | Total | 45 |

Course Designers1. Mrs.S.Geetha- geethas@ksrct.ac.in

| 60 MY 002 | Universal Human Values | Category | L | T | P | Credit |
|-----------|------------------------|----------|---|---|---|--------|
| | | MY | 3 | 0 | 0 | 3 |

Objective

- To identify the essential complementarily between 'values' and 'skills'
- To ensure core aspirations of all human beings.
- To acquire ethical human conduct, trustful and mutually fulfilling human behaviour
- To enrich interaction with Nature
- To achieve holistic perspective towards life and profession

Prerequisite

NIL

Course Outcomes

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

| | | |
|-----|--|------------|
| CO1 | Understand the significance of value inputs in formal education and start applying them in their life and profession | Understand |
| CO2 | Evaluate coexistence of the "I" with the body. | Analyze |
| CO3 | Identify and evaluate the role of harmony in family, society and universal order. | Analyze |
| CO4 | Classify and associate the holistic perception of harmony at all levels of existence and Nature | Analyze |
| CO5 | Develop appropriate human conduct and management patterns to create harmony in professional and personal lives. | Create |

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Approved in Academic Council Meeting held on 03/06/2023

Mapping with Programme Outcomes

| COs | PO 1 | PO 2 | PO 3 | PO 4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----------------------------|-------------|-------------|-------------|-------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|
| CO1 | | | | | | | | 3 | 2 | | 2 | 3 | | | |
| CO2 | | | | | | 3 | | 3 | 3 | | | 3 | | | |
| CO3 | | | | | | 3 | 3 | 3 | 3 | | | 3 | | | |
| CO4 | | | | | | 3 | 3 | 3 | 3 | | | 3 | | | |
| CO5 | | | | | | 3 | 3 | 3 | 3 | 3 | | 3 | | | |
| 3- Strong; 2-Medium; 1-Some | | | | | | | | | | | | | | | |

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests(Marks) | | | End Semester Examination(Marks) |
|-------------------------|---|----------|--------------|--|
| | 1 | 2 | Model | |
| Remember | 10 | 10 | 20 | No End Semester Examination |
| Understand | 10 | 10 | 20 | |
| Apply | 20 | 20 | 30 | |
| Analyse | 20 | 20 | 30 | |
| Evaluate | 0 | 0 | 0 | |
| Create | 0 | 0 | 0 | |

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|---|---------------------|----------|----------|------------------|---------------|----------------------|-----------|
| 60 MY 002 - Universal Human Values | | | | | | | |
| Common to all | | | | | | | |
| Semester | Hours / Week | | | Total hrs | Credit | Maximum Marks | |
| | L | T | P | | C | CA | ES |
| III | 3 | 0 | 0 | 45 | 3 | 100 | 0 |
| Introduction to value Education | | | | | | | |
| Understanding value Education-Self exploration as the process for value education-Continuous Happiness and prosperity-the basic human aspirations-right understanding-relationship and physical facility –happiness and prosperity - current scenario – method to fulfill the basic human aspirations | | | | | | | |
| Harmony in the Human Being | | | | | | | |
| Understanding Human being as the Co-Existence of the self and the Body-Distinguishing between the needs of the self and the body-the body as an instrument of the self-understanding harmony in the self-harmony of the self with the body – programme to ensure self-regulation and health | | | | | | | |
| Harmony in the Family and Society | | | | | | | |
| Harmony in the Family –the basic unit of human interaction-values in human- to - human relationship –‘Trust’ the foundation value in relationship –‘Respect’- as the right evaluation-understanding harmony in the society –vision for the universal human order. | | | | | | | |
| Harmony in the Nature/Existence | | | | | | | |
| Understanding harmony in the Nature-Interconnectedness, self-regulation and mutual fulfillment among the four orders of nature – realizing existence as co-existence at all levels –the holistic perception of harmony in existence. | | | | | | | |

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| | |
|---|--|
| Implications of the Holistic Understanding Natural Acceptance of human values- definitiveness of human conduct- a basis for humanistic education, humanistic constitution and universal human order- competence in professional ethics –holistic technologies, production systems and management models-typical case studies – strategies for transition towards value base life and profession | [9] |
| | Total Hours |
| Text Book(s): | |
| 1. | A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, G P Bagaria, 2 nd Revised Edition, Excel Books, New Delhi, 2019. ISBN 978-93-87034-47-1 |
| 2 | Teachers' Manual for A Foundation Course in Human Values and Professional Ethics, R R Gaur, R Asthana, |
| Reference(s): | |
| 1. | Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999. |
| 2. | Human Values, A.N. Tripathi, New Age International. Publishers, New Delhi, 2004. |

Course Contents and Lecture Schedule

| S.No | Topic | No. of Hours |
|----------|---|--------------|
| 1 | INTRODUCTION TO VALUE EDUCATION | |
| 1.1 | Discussion on Present Education System and Skill Based Education | 1 |
| 1.2 | Understanding Value Education | 1 |
| 1.3 | Self exploration as the process for value education | 1 |
| 1.4 | Basic Human Aspirations - Continuous Happiness and Prosperity | 1 |
| 1.5 | Basic requirements to fulfill Human Aspirations - Right understanding, Relationship and Physical facility | 1 |
| 1.6 | Transformation from Animal Consciousness to Human Consciousness | 1 |
| 1.7 | Sources of Happiness and Prosperity – Harmony and Disharmony | 1 |
| 1.8 | Current Scenario and Role of Education | 1 |
| 1.9 | Outcome of Human Education and Method to fulfill the basic human aspirations | 1 |
| 2 | HARMONY IN THE HUMAN BEING | |
| 2.1 | Understanding Human being - As Co-Existence of the self and the Body - The Needs of the Self and the Body | 1 |
| 2.2 | Understanding Human being - As Co-Existence of the self and the Body - The Activities and Response of the Self and the Body | 2 |
| 2.3 | The body as an instrument of the self | 1 |
| 2.4 | Understanding harmony in the self | 1 |
| 2.5 | Harmony of the self with the body | 2 |
| 2.6 | Programme to ensure self-regulation and health | 1 |
| 2.7 | My Participation (Value) regarding Self and my Body - Correct Appraisal of our Physical needs | 1 |
| 3 | HARMONY IN THE FAMILY AND SOCIETY | |
| 3.1 | Harmony in the Family - Understanding Values in Human Relationships | 1 |
| 3.2 | Family as the basic Unit of Human Interaction | 1 |
| 3.3 | Values in human Relationships | 1 |
| 3.4 | Trust - the foundation value in relationship | 1 |

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| | | |
|----------|--|----|
| 3.5 | Respect as the right evaluation, the Basis for Respect, Assumed Bases for Respect today | 1 |
| 3.6 | Harmony from Family to World Family: Undivided Society | 1 |
| 3.7 | Extending Relationship from family to society , Identification of the Comprehensive Human Goal | 1 |
| 3.8 | Programs needed to achieve the Comprehensive Human Goal: The Five Dimensions of Human Endeavour | 1 |
| 3.9 | Harmony from Family Order to World Family Order – Universal Human Order | 1 |
| 4 | HARMONY IN THE NATURE / EXISTENCE | |
| 4.1 | The Four Orders in Nature | 1 |
| 4.2 | Participation of Human Being in Entire Nature | 1 |
| 4.3 | Natural Characteristics - Tendency of Human Living with Animal Consciousness / The Holistic Perception of Harmony in Existence | 1 |
| 4.4 | Present day Problems | 1 |
| 4.5 | Recyclability and self-regulation in Nature | 1 |
| 4.6 | Relationship of Mutual Fulfillment | 1 |
| 4.7 | An Introduction to space, Co-existence of Units in Space | 1 |
| 4.8 | Harmony in Existence – Understanding Existence as Co- Existence | 1 |
| 4.9 | Natural Characteristic of Human Living with Human Consciousness | 1 |
| 5 | IMPLICATIONS OF THE HOLISTIC UNDERSTANDING | |
| 5.1 | Natural Acceptance of human values | 1 |
| 5.2 | Definitiveness of Ethical Human Conduct - Development of Human Consciousness | 1 |
| 5.3 | Identification of Comprehensive Human Goal | 1 |
| 5.4 | Basis for Humanistic Education and Humanistic Constitution | 1 |
| 5.5 | Ensuring Competence in professional Ethics | 1 |
| 5.6 | Issues in Professional Ethics-The Current Scenario | 1 |
| 5.7 | Holistic Technologies and Production Systems and management models -Typical Case Studies | 2 |
| 5.8 | Strategies for transition towards value based life and profession | 1 |
| | Total | 45 |

Course Designers

1. Dr.G.Vennila - vennila@ksrct.ac.in
 2. Dr.K.Raja - rajak@ksrct.ac.in

| 60 CS 0P3 | DATA STRUCTURES LABORATORY | Category | L | T | P | Credit |
|-----------|----------------------------|----------|---|---|---|--------|
| | | CS | 0 | 0 | 4 | 2 |

Objective

- To design and implement simple linear and nonlinear data structures
- To strengthen the ability to identify and apply the suitable data structure for the given real world problem
- To program for storing data as tree structure and implementation of various traversal techniques
- To implement sorting and searching techniques

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- To gain knowledge of graph applications

Prerequisite

Programming knowledge in C language

Course Outcomes

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

| | | | | | | | | | | | | |
|-----|---|--|--|--|--|--|--|--|--|--|--|-------|
| CO1 | Demonstrate the implementation of Linear Data structures and its applications | | | | | | | | | | | Apply |
| CO2 | Investigate Balanced Parenthesis and Postfix expressions with the help of Stack ADT | | | | | | | | | | | Apply |
| CO3 | Implement Non-Linear Data Structure | | | | | | | | | | | Apply |
| CO4 | Implement sorting and searching techniques | | | | | | | | | | | Apply |
| CO5 | Implement Shortest Path and Minimum Spanning Tree Algorithm | | | | | | | | | | | Apply |

Mapping with Programme Outcomes

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 2 | | | | | | 2 | | | 2 | 3 | 3 | |
| CO2 | 3 | 3 | 2 | 3 | | | | | 3 | | | 2 | 3 | 3 | |
| CO3 | 3 | 3 | 2 | 2 | 2 | | | | 3 | 2 | | 2 | 3 | 3 | |
| CO4 | 3 | 3 | 2 | 3 | 2 | | | | 3 | 2 | 2 | | 2 | 3 | 3 |
| CO5 | 3 | 3 | 2 | | 2 | 2 | 2 | 3 | 3 | 2 | | 2 | 3 | 3 | |

3- Strong; 2-Medium; 1-Low

List of Experiments

- Implementation of List Abstract Data Type (ADT)*
- Implementation of Stack ADT*
- Implementation of Queue ADT*
- Implementation of stack applications:*
 - Program for 'Balanced Parenthesis'
 - Program for 'Evaluating Postfix Expressions'
- Implementation Search Tree ADT*
- Implementation of Internal Sorting*
- Develop a program for external sorting*
- Develop a program for various Searching Techniques*
- Implementation of Shortest Path Algorithm*
- Implementation of Minimum Spanning Tree Algorithm*

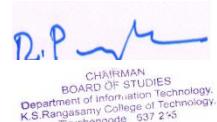
* SDG:4- Quality Education

Course Designers

- K.Poongodi - poongodik@ksrct.ac.in

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| | | | | | | |
|------------------|------------------------------------|-----------------|----------|----------|----------|---------------|
| 60 CS 0P4 | JAVA PROGRAMMING LABORATORY | Category | L | T | P | Credit |
| | | PC | 0 | 0 | 4 | 2 |

Objective

- To develop programs using java fundamental concepts
- To develop programs using basic concepts of Java
- To create programs using Java strings and IO
- To design and develop the programs using collection APIs
- To build applications with JDBC technology for real world problems

Prerequisite

Basic knowledge of any programming language with ability to solve logical problems

Course Outcomes

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

| | | |
|-----|---|-------|
| CO1 | Implement programs using object oriented concepts | Apply |
| CO2 | Develop programs with the concept of exception handling and multi-threading | Apply |
| CO3 | Design programs using String and File Operations | Apply |
| CO4 | Create applications using interfaces, packages and collections framework | Apply |
| CO5 | Implement regular expression and develop applications using JDBC | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 2 | 3 | 2 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO2 | 3 | 3 | 2 | 3 | 2 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 2 | 3 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO4 | 3 | 3 | 3 | 2 | 2 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO5 | 3 | 3 | 3 | 2 | 3 | | | | 2 | | | 2 | 3 | 3 | 2 |

3- Strong; 2-Medium; 1-Low

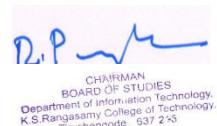
List of Experiments

1. Java Control Statements
2. Class and Objects
3. Exception Handling
4. Multithreading
5. String
6. File operations
7. Interfaces and Packages*
8. Collections
9. Regular Expression
10. JDBC

Mini project: Develop an application using the concepts of Interfaces, Packages, Exception handling and collections along with JDBC.

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Approved in Academic Council Meeting held on 03/06/2023



SDG:4- Quality Education*Course Designers**

1. Dr.C.Nallusamy - nallusamyc@ksrct.ac.in
2. Mr.S.Vadivel – vadivels@ksrct.ac.in

| 60 CG 0P2 | Career Skill Development II | Category | L | T | P | Credit |
|-----------|-----------------------------|----------|---|---|---|--------|
| | | CGC | 0 | 0 | 2 | 0 |

Objectives

- To help learners improve their vocabulary and to enable them to use words appropriately in different academic and professional contexts
- To help learners develop strategies that could be adopted while reading texts
- To help learners acquire the ability to speak effectively in English in real life and career related situations
- To equip students with effective speaking and listening skills in English
- To facilitate learners to enhance their writing skills with coherence and appropriate format effectively

Prerequisite

Basic knowledge of reading and writing in English.

Course Outcomes

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

| | | | | | | | | | | | |
|-----|--|--|--|--|--|--|--|--|--|--|------------|
| CO1 | Listen and comprehend complex academic texts | | | | | | | | | | Understand |
| CO2 | Read and infer the denotative and connotative meanings of technical texts | | | | | | | | | | Analyze |
| CO3 | Write definitions, descriptions, narrations, and essays on various topics | | | | | | | | | | Apply |
| CO4 | Speak fluently and accurately in formal and informal communicative contexts | | | | | | | | | | Apply |
| CO5 | Appraise the verbal ability skills in the career development and professional contexts | | | | | | | | | | Analyze |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | | | | | | | | 2 | 3 | 3 | 2 | 3 | 2 | | |
| CO2 | | | | | | | | 2 | 3 | 3 | 2 | 3 | | | |
| CO3 | | | | | | | | 2 | 3 | 3 | 2 | 3 | | 2 | |
| CO4 | | | | | | | | 2 | 3 | 3 | 2 | 3 | | | |
| CO5 | | | | | | | | 2 | 3 | 3 | 2 | 3 | | 2 | 2 |

3- Strong;2-Medium;1-Some

K.S.Rangasamy College of Technology–AutonomousR2022**60 CG 001 - Career Skill Development II****Common to All Branches**

| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | | |
|----------|------------|---|---|-----------|--------|---------------|----|-----|-------|
| | L | T | P | | | C | CA | ES | Total |
| III | 0 | 0 | 2 | 45 | 0 | 100 | 00 | 100 | 100 |

Listening*

Listening for general information-specific details - audio / video (formal & informal) - Listen to podcasts/ TED talks/ anecdotes / stories / event narration / documentaries and interviews with celebrities - Listen to a product and process descriptions, advertisements about products or services.

[5]

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| | |
|---|-----|
| Speaking* Self-Introduction; Introducing a friend; conversation - politeness strategies - Narrating personal experiences / events; Interviewing a celebrity; reporting / and summarizing of documentaries / podcasts/ interviews - Picture description; giving instruction to use the product; presenting a product - Small Talk; Mini presentations - Group discussions, debates & role plays. | [5] |
| Reading * Loud reading vs Silent reading, Skimming & Scanning of passages, reading brochures (technical context), social media messages relevant to technical contexts and emails - Biographies, travelogues, newspaper reports and travel & technical blogs - Advertisements, gadget reviews and user manuals - Newspaper articles and Journal reports - Editorials; and opinion blogs. | [5] |
| Writing * Writing letters – informal and formal – basics and format orientation - paragraph textng, short report on an event (field trip etc.) - Definitions; instructions; and product /process description - Note-making / Note-taking; recommendations; transferring information from non-verbal (charts, graphs to verbal mode) - Essay textng. | [5] |
| Verbal Ability I* Reading Comprehension (MCQs) – Cloze Test - Sequencing of sentences – Summarizing and paraphrase – Error Detection – Spelling Test – Sentence Improvement – Preposition. | [5] |
| Total Hours | 25 |
| Reference(s): | |
| 1. 'English for Engineers & Technologists' Orient Blackswan Private Ltd. Department of English, Anna University, 2020 | |
| 2. Norman Lewis, 'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book', Penguin Random House India, 2020 | |
| 3. Michael McCarthy and Felicity O Dell, 'English Vocabulary in Use: Upper Intermediate', Cambridge University Press, N.York, 2012 | |
| 4. Lakshmi Narayanan, 'A Course Book on Technical English' Scitech Publications (India) Pvt. Ltd. 2020 | |

* SDG- 04- Quality Education

Course Contents and Lecture Schedule

| S.No | Topic | No. of Hours |
|------------|--|--------------|
| 1.0 | Listening | |
| 1.1 | Listening for general information and Specific details | 1 |
| 1.2 | Listening to podcasts, documentaries and interviews with celebrities | 1 |
| 1.3 | Narrating personal experiences | 1 |
| 1.4 | Reading relevant to technical contexts and emails | 1 |
| 1.5 | Listen to a product and process descriptions | 1 |
| 2.0 | Speaking | |
| 2.1 | Self-introduction | 1 |
| 2.2 | Summarizing of documentaries & Picture Narration | 1 |
| 2.3 | Small Talk; Mini presentations | 1 |

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| | | |
|------------|---|-----------|
| 2.4 | Group discussions, debates & role plays. | 1 |
| 2.5 | Group discussions | 1 |
| 3.0 | Reading | |
| 3.1 | Loud reading vs Silent reading, Skimming & Scanning of passages | 1 |
| 3.2 | Reading social media messages relevant to technical contexts | 1 |
| 3.3 | Reading newspaper reports and travel & technical blogs | 1 |
| 3.4 | Reading advertisements, gadget reviews and user manuals | 1 |
| 3.5 | Reading newspaper articles and journal reports | 1 |
| 4.0 | Writing | |
| 4.1 | Writing letters – informal and formal | 1 |
| 4.2 | Paragraph Texting | 1 |
| 4.3 | Definitions and instructions | 1 |
| 4.4 | Note-making / Note-taking | 1 |
| 4.5 | Essay texting | 1 |
| 5.0 | Verbal Ability | |
| 5.1 | Reading Comprehension (MCQs) and Cloze Test | 1 |
| 5.2 | Sequencing of sentences | 1 |
| 5.3 | Paraphrasing and Summarizing | 1 |
| 5.4 | Error Detection and Spelling Test | 1 |
| 5.5 | Prepositions | 1 |
| | Total | 25 |

Course Designer1.Dr.A.Palaniappan- palaniappan@ksrct.ac.in

| 60 MA 017 | DISCRETE MATHEMATICS | Category | L | T | P | Credit |
|-----------|----------------------|----------|---|---|---|--------|
| | | BS | 3 | 1 | 0 | 4 |

Objective

- To get exposed to logical arguments and construct simple mathematical statements.
- To familiarize the basic concepts of set theory.
- To get exposed to different types of functions.
- To provide fundamental principles of combinatorial counting techniques.
- To familiarize the basic concepts of graph theory

Pre requisite

NIL

Course Outcomes

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

| | | |
|-----|---|-----------------------------------|
| CO1 | Understand the logical arguments and construct simple mathematical statements | Remember, Understand, Apply |
| CO2 | Apply the basics of set theory to the situations involving inclusion and exclusion. | Remember, Understand, Apply |

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| | | |
|-----|---|-----------------------------|
| CO3 | Understand the concepts of different types of functions. | Remember, Understand, Apply |
| CO4 | Apply permutation and combination in real time situations and solve recurrence relations. | Remember, Understand, Apply |
| CO5 | Employ the basics of graph theory in computer networks. | Remember, Understand, Apply |

Mapping with Programme Outcomes

| Cos | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 2 | 2 | 2 | | | | | | | | 3 | | 2 |
| CO2 | 3 | 3 | 2 | 2 | 2 | | | | | | | | 2 | | 2 |
| CO3 | 3 | 3 | 2 | 3 | 2 | | | | | | | | 2 | | 2 |
| CO4 | 3 | 3 | 2 | 3 | 2 | | | | | | | | 2 | | 2 |
| CO5 | 3 | 3 | 2 | 3 | 3 | | | | | | | | 3 | | 2 |

3- Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | Model Exam (Marks) | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|--------------------|-----------------------------|
| Remember (Re) | 10 | 10 | 10 | 10 |
| Understand (Un) | 20 | 20 | 30 | 30 |
| Apply (Ap) | 30 | 30 | 60 | 60 |
| Analyze (An) | 0 | 0 | 0 | 0 |
| Evaluate (Ev) | 0 | 0 | 0 | 0 |
| Create (Cr) | 0 | 0 | 0 | 0 |
| Total | 60 | 60 | 100 | 100 |

| K.S.Rangasamy College of Technology–Autonomous R2022 | | | | | | | | |
|---|------------|---|---|-----------|--------|---------------|----|-----|
| 60 MA 017 – Discrete Mathematics | | | | | | | | |
| Common to CSE & IT | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | | C | C | E |
| IV | 3 | 1 | 0 | 6 | 4 | 40 | 60 | 100 |
| MATHEMATICAL LOGIC*,** Propositional logic – Propositional equivalences- Predicates and quantifiers- Rules of inference. | | | | | | | | [9] |
| SET THEORY*,** Algebra of sets - The power set - Ordered pairs and Cartesian product - Principle of inclusion and Exclusion - Relations on sets -Types of relations and their properties - Equivalence relations - Relational matrix and the graph of relation - Operations on relations. | | | | | | | | [9] |

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| | |
|--|-----------|
| FUNCTIONS*,** Functions - Types of functions - Injective, surjective and bijective functions - Composition of functions - Inverse functions - Primitive recursive functions - Permutation functions. | [9] |
| COMBINATORICS*,** Permutations and Combinations - Pigeon hole principle – Mathematical induction - Recurrence relations - Generating functions. | [9] |
| GRAPH THEORY*,*** Graphs- Types of graphs - Matrix representation of graphs - Graph isomorphism - Walk – Path – Cycles - Eulerian graphs - Hamiltonian graphs - Planar graphs - Euler formula - Shortest path algorithm: Dijkstra's Algorithm. | [9] |
| Total Hours: 45 + 15 (Tutorial) | 60 |

Text Book(s):

1. R.P.Grimaldi, "Discrete and Combinatorial Mathematics: An Applied Introduction", 5th Edition, Pearson Education Asia, Delhi, 2014.
- 2 J.P.Tremblay and R Manohar, "Discrete Mathematical Structures with Applications to Computer Science", McGraw – Hill Education Private Limited, New Delhi, 49th reprint 2016.

Reference(s):

1. K.H.Rosen, "Discrete Mathematics and its Applications", 7th Edition, Tata McGraw Hill Pub. Co. Ltd., New Delhi, Special Indian Edition, 2011.
2. Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, "Discrete Mathematical Structures", Fourth Indian reprint, Pearson Education Pvt Ltd., New Delhi, 2003.
3. T. Veerarajan, "Discrete Mathematics with Graph Theory and Combinatorics" Fifth Reprint, Tata McGraw Hill Publishing Company Limited 2008
4. S.Lipschutz, M. Lipson and V.H. Patil, " Discrete Mathematics", Schaum's Outlines, Tata McGraw Hill Pub.Co. Ltd., New Delhi, 3rd Edition, 2010.

*SDG 4: Quality education.

**SDG 9: Promote inclusive and sustainable industrialization.

*** SDG12: Production Patterns.

List of MATLAB Programs:

1. Introduction to MATLAB.
2. Generate the truth table for mathematical logic.
3. Compute various functions for set operations like union and intersection.
4. Find the composition of functions.
5. Compute permutations and combinations.
6. Solve the problem about isomorphism of two graph

Course Contents and Lecture Schedule

| S. No | Topic | No. of Hours | Mode of content Delivery |
|-------|----------------------------|--------------|--------------------------|
| 1 | MATHEMATICAL LOGIC | | |
| 1.1 | Propositional logic | 2 | Black Board |
| 1.2 | Propositional equivalences | 2 | Black Board |
| 1.3 | Tutorial | 2 | |
| 1.4 | Rules of inference | 2 | Black Board |
| 1.5 | Predicate | 1 | Flipped Class |
| 1.6 | Quantifiers | 2 | Black Board |
| 1.7 | Tutorial | 2 | |

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| | | | |
|----------|---|----|---------------|
| 2 | SET THEORY | | |
| 2.1 | Algebra of sets | 1 | Black Board |
| 2.2 | The power set , Ordered pairs and Cartesian product | 1 | Black Board |
| 2.3 | Principle of inclusion and exclusion | 2 | Black Board |
| 2.4 | Tutorial | 2 | |
| 2.5 | Types of relations and their properties | 1 | Black Board |
| 2.6 | Equivalence relations | 2 | Black Board |
| 2.7 | Relational matrix and the graph of relation | 1 | Flipped Class |
| 2.8 | Operations on relations | 1 | Black Board |
| 3 | FUNCTIONS | | |
| 3.1 | Functions | 1 | Black Board |
| 3.2 | Types of functions | 2 | Black Board |
| 3.3 | Composition of functions | 2 | Black Board |
| 3.4 | Tutorial | 2 | |
| 3.5 | Inverse functions | 1 | Black Board |
| 3.6 | Primitive recursive functions | 2 | Black Board |
| 3.7 | Permutation functions | 1 | Flipped Class |
| 3.8 | Tutorial | 2 | |
| 4 | COMBINATORICS | | |
| 4.1 | Permutations and Combinations | 2 | Black Board |
| 4.2 | Pigeon hole principle | 1 | Flipped Class |
| 4.3 | Mathematical induction | 2 | Black Board |
| 4.4 | Recurrence relations | 2 | Black Board |
| 4.5 | Generating functions | 2 | Black Board |
| 4.6 | Tutorial | 2 | |
| 5 | GRAPH THEORY | | |
| 5.1 | Types of graphs | 1 | Flipped Class |
| 5.2 | Matrix representation of graphs | 1 | Black Board |
| 5.3 | Graph isomorphism | 2 | Black Board |
| 5.4 | Tutorial | 2 | |
| 5.5 | Eulerian graphs and Hamiltonian graphs | 1 | Black Board |
| 5.6 | Planar graphs and Euler formula | 2 | Black Board |
| 5.7 | Shortest path algorithm: Dijkstra's Algorithm | 1 | Flipped Class |
| 5.8 | Tutorial | 2 | |
| | Total | 60 | |

Course DesignerDr.K.Kiruthika—kiruthika@ksrct.ac.in

| 60 IT 002 | DESIGN AND ANALYSIS OF ALGORITHMS | Category | L | T | P | Credit |
|-----------|-----------------------------------|----------|---|---|---|--------|
| | | PC | 3 | 0 | 0 | 3 |

Objective

- To design algorithms in both the science and practice of computing.
- To choose the appropriate data structure and algorithm design method for a specified Application

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- To understand how the choice of data structures and algorithm design methods impacts the performance of programs.
- To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound.
- To solve NP-hard and NP-complete problems.

Prerequisite

Basic knowledge of Data Structures and Computer programming

Course Outcomes

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

| | | |
|-----|---|------------|
| CO1 | Classify the problem types and compare orders of growth to represent asymptotic notations | Understand |
| CO2 | Apply and inspect recursive and non-recursive algorithms by mathematical notations using sample algorithms. | Analyze |
| CO3 | Apply ‘Brute Force’ and ‘Divide and conquer’ design techniques for sorting and searching problems | Analyze |
| CO4 | Construct analogous algorithms for graph related problems. | Understand |
| CO5 | Apply ‘Backtracking’ and ‘Branch and bound’ techniques to solve NP-hard problems. | Apply |

Mapping with Programme Outcomes

| COs | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO 2 | PSO 3 |
|-----|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| CO1 | 3 | 3 | 3 | 2 | | | | | | 2 | | | 3 | 2 | |
| CO2 | 3 | 3 | 3 | 2 | | | | | | 2 | | | 3 | 2 | |
| CO3 | 3 | 3 | 3 | 2 | 3 | | | | | 2 | | | 3 | 2 | |
| CO4 | 3 | 3 | 3 | 2 | | | | | | 2 | | | 3 | 2 | |
| CO5 | 3 | 3 | 3 | 2 | 3 | | | | | 2 | | | 3 | 2 | |

3-Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | Modal Exam | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|------------|-----------------------------|
| | 1 | 2 | | |
| Remember (Re) | - | - | 10 | 10 |
| Understand (Un) | 20 | 20 | 20 | 20 |

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| | | | | |
|---------------|----|----|----|----|
| Apply (Ap) | 20 | 20 | 30 | 30 |
| Analyse (An) | 20 | 20 | 30 | 30 |
| Evaluate (Ev) | - | - | 10 | 10 |
| Create (Cr) | - | - | - | - |

Course Level Assessment Questions

| Course Outcome 1(CO1) | | | | |
|-------------------------------|--|--|--|--|
| 1. | Write a pseudo code for an algorithm for finding real roots of equation $ax^2+bx+c=0$ for arbitrary real coefficients a, b and c. | | | |
| 2. | Write an algorithm for sequential search and discuss best, average and worst efficiencies. | | | |
| 3. | From the following inequalities, indicate the ones that are incorrect. (i) $6n^2-8n=\Theta(n^2)$ (ii) $12n^2 +8 = O(n)$ (iii) $3n^23^n +n \log n = \Theta(n^23^n)$ (iv) $3n^2\log n = \Theta(n^2)$ | | | |
| Course Outcome 2(CO2) | | | | |
| 1. | Develop an algorithm to find the uniqueness of an element in a list and find the time efficiency of algorithm. | | | |
| 2. | Provide an algorithm to check whether all elements in a given array are distinct and determine its efficiency. | | | |
| 3. | Apply master's theorem for the recurrence equation $T(n)=3T(n/2)+n^2$ and denote the efficiency. | | | |
| Course Outcome 3(CO3) | | | | |
| 1. | Show the passes of selection sort to sort the list 12, 24, 8, 71, 4, 23 and 6 in ascending order and analyze its time complexity. | | | |
| 2. | Write a brute-force algorithm for counting the number of vowels in a given text and determine its efficiency. | | | |
| 3. | Analyze the largest number of key comparisons made by binary search in searching for a key in the following array: 3, 14, 27, 31, 39, 42, 55, 70, 74, 81, 85, 93 and 98. | | | |
| Course Outcome 4 (CO4) | | | | |
| 1. | Discuss the variations of decrease and conquer techniques with example. | | | |
| 2. | Consider a hash table with 11 empty slots 0 to 10. You have the set of integer items 54, 26, 93, 17, 77, and 31. Apply the “division method” to find the hash values and fit the items into the hash table. | | | |
| 3. | Define max-heap and min-heap. | | | |
| Course Outcome 5(CO5) | | | | |
| 1. | State the principle difference between dynamic programming and divide-and-conquer technique. | | | |
| 2. | Narrate the primary difference between optimal solution and feasible solution. | | | |
| 3. | Explain the procedure for tackling the 8-queen’s problem using a backtracking approach. | | | |

| |
|--|
| K.S.Rangasamy College of Technology–AutonomousR2022 |
| 60 IT 002 - Design and Analysis of Algorithms |
| Common to CS, IT |

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 Approved in Academic Council Meeting held on 03/06/2023



| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
|--|------------|---|---|-----------|--------|---------------|----|-----------------------|
| | L | T | P | | C | CA | ES | Total |
| IV | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| Basic Concepts of Algorithms | | | | | | | | [9] |
| Introduction - Fundamentals of Algorithmic Problem Solving - Important Problem types -Fundamentals of the analysis of algorithm efficiency - Analysis Framework - Asymptotic Notations and Basic Efficiency Classes - Recurrence relations: Methods for solving recurrence relations. | | | | | | | | [9] |
| Mathematical Analysis of Algorithms | | | | | | | | [9] |
| Mathematical Analysis of Non-recursive Algorithms and Examples - Mathematical Analysis of Recursive Algorithms - Example: Fibonacci numbers - Empirical Analysis of Algorithms. | | | | | | | | [9] |
| Brute Force and Divide & Conquer Techniques* | | | | | | | | [9] |
| Selection Sort and Bubble Sort - Brute-force string matching - Merge sort - Multiplication of Two n-Bit Numbers - Quick Sort - Binary Search - Binary tree Traversal and Related Properties. | | | | | | | | [9] |
| Algorithm Design Paradigm* | | | | | | | | [9] |
| Decrease and Conquer Technique: Insertion Sort - Depth first Search and Breadth First Search – Transform and Conquer Technique: Presorting - Dynamic Programming: Computing a Binomial Coefficient - Warshall's and Floyd's Algorithm - The Knapsack Problem and Memory Functions - Optimal Binary Search trees – Greedy Technique: Huffman trees. | | | | | | | | [9] |
| NP Hard and NP-Complete Problems* | | | | | | | | [9] |
| P and NP problems - NP complete problems - Backtracking: N-Queen's Problem - Hamiltonian Circuit Problem Branch and Bound Techniques: Traveling salesman problem. | | | | | | | | [9] |
| | | | | | | | | Total Hours 45 |

Textbook(s):

| | |
|----|--|
| 1. | AnanyLevitin, "Introduction to the Design and Analysis of Algorithm", 3rd Edition, Tenth Impression, Pearson Education Asia, 2017. |
| 2. | T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, "Introduction to Algorithms", 3rd Edition, PHI Pvt. Ltd., 2012. |

Reference(s):

| | |
|----|---|
| 1. | Sara Baase and Allen Van Gelder, "Computer Algorithms - Introduction to Design and Analysis", Pearson Education Asia, 2010. |
| 2. | A.V.Aho, J.E. Hopcroft and J.D.Ullman, "The Design and Analysis of Computer Algorithms", Pearson Education Asia, 2003. |
| 3. | Ellis Horowitz, SartajSahni and SanguthevarRajasekaran, "Computer Algorithms/ C++", 2nd Edition, Universities Press, 2007. |
| 4. | Anany Levitin, "Introduction to the Design & Analysis of Algorithms", 2nd Edition, Pearson Education, 2011. |

* SDG- 04- Quality Education

Course Contents and Lecture Schedule

| S.No. | Topic | No. of Hours |
|-------|--|--------------|
| 1.0 | Basic Concepts of Algorithms | |
| 1.1 | Fundamentals of Algorithmic Problem Solving | 1 |
| 1.2 | Important Problem types | 1 |
| 1.3 | Fundamentals of the analysis of algorithm efficiency | 1 |

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| | | |
|------------|--|-----------|
| 1.4 | Analysis Framework | 1 |
| 1.5 | Asymptotic Notations | 1 |
| 1.6 | Asymptotic Notations and Basic Efficiency Classes | 1 |
| 1.7 | Recurrence relations | 1 |
| 1.8 | Methods for solving recurrence relations. | 2 |
| 2.0 | Mathematical Analysis of Algorithms | |
| 2.1 | Mathematical Analysis of Non-recursive Algorithms | 2 |
| 2.2 | Non-recursive Algorithms and Examples | 2 |
| 2.3 | Mathematical Analysis of Recursive Algorithms | 2 |
| 2.4 | Fibonacci numbers | 1 |
| 2.5 | Empirical Analysis of Algorithms. | 2 |
| 3.0 | Brute Force and Divide & Conquer Techniques | |
| 3.1 | Selection Sort | 1 |
| 3.2 | Bubble Sort | 1 |
| 3.3 | Brute-force string matching | 1 |
| 3.4 | Merge sort | 1 |
| 3.5 | Multiplication of Two n-Bit Numbers | 1 |
| 3.6 | Quick Sort | 1 |
| 3.7 | Binary Search | 1 |
| 3.8 | Binary tree Traversal | 2 |
| 4.0 | Algorithm Design Paradigm | |
| 4.1 | Decrease and Conquer Technique: Insertion Sort | 1 |
| 4.2 | Depth first Search and Breadth First Search | 1 |
| 4.3 | Transform and Conquer Technique: Presorting | 1 |
| 4.4 | Dynamic Programming: Computing a Binomial Coefficient | 1 |
| 4.5 | Warshall's and Floyd's Algorithm | 1 |
| 4.6 | The Knapsack Problem and Memory Functions | 1 |
| 4.7 | Optimal Binary Search trees | 1 |
| 4.8 | Greedy Technique: Huffman trees. | 2 |
| 5.0 | NP Hard and NP-Complete Problems | |
| 5.1 | P and NP problems | 1 |
| 5.2 | NP complete problems | 1 |
| 5.3 | Backtracking: N-Queen's Problem | 2 |
| 5.4 | Hamiltonian Circuit Problem | 2 |
| 5.5 | Branch and Bound Techniques | 1 |
| 5.6 | Traveling salesman problem. | 2 |
| | Total | 45 |

Course Designers

1.Dr.C.Rajan- rajan@ksrct.ac.in

| 60 IT 401 | COMPUTER ORGANIZATION AND ARCHITECTURE | Category | L | T | P | Credit |
|-----------|--|----------|---|---|---|--------|
| | | PC | 3 | 0 | 0 | 3 |

Objective

- To understand the basic structure and operation of a computer system
- To impart the knowledge on the state of art of memory systems
- To explore the basic processing unit and I/O organization

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- To analyze the parallel processing techniques
- To examine the components involved in the design of a embedded computer system

Prerequisite

Basic knowledge of Electrical and Electronics Engineering and Digital logic and Microprocessor

Course Outcomes

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

| | | |
|-----|---|------------|
| CO1 | Identify the basic functional units of a computer system | Remember |
| CO2 | Illustrate the physical and virtual memory systems | Understand |
| CO3 | Analyze the concept of basic processing unit and I/O organization | Understand |
| CO4 | Examine the techniques applied for enhancing the performance of processor | Understand |
| CO5 | Design a complete embedded computer system | Apply |

Mapping with Programme Outcomes

| COs | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO 2 | PSO 3 |
|-----|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| CO1 | 3 | 2 | 2 | | | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | |
| CO2 | 3 | 2 | 3 | 2 | | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | |
| CO3 | 3 | 2 | 3 | 2 | | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | |
| CO4 | 3 | 2 | 3 | | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 1 |
| CO5 | 3 | 2 | 3 | | 1 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 3 | 2 |

3-Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | Modal Exam | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|------------|-----------------------------|
| | 1 | 2 | | |
| Remember (Re) | 20 | 20 | 30 | 30 |
| Understand (Un) | 30 | 20 | 30 | 30 |
| Apply (Ap) | 10 | 10 | 20 | 20 |
| Analyse (An) | - | 10 | 20 | 20 |
| Evaluate (Ev) | - | - | - | - |
| Create (Cr) | - | - | - | - |

Course Level Assessment Questions

Course Outcome 1 (CO1)

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| | |
|-------------------------------|--|
| 1. | Prioritize the nerve center of the computer and enumerate the functionalities of the functional units in the computer. |
| 2. | Discuss the implementation of subtraction operation involving signed numbers. |
| 3. | Summarize the representation of floating point numbers. |
| Course Outcome 2 (CO2) | |
| 1. | Analyze the type of memories used in cell phones, digital cameras, mp3 players and mention its advantages. |
| 2. | Discuss the type of memory cell where the information is stored as a charge on the capacitor. |
| 3. | Represent the structure and function of a static RAM cell. |
| Course Outcome 3 (CO3) | |
| 1. | Summarize the events involved in interfacing a keyboard to a processor. |
| 2. | Denote and explain how a data path is implemented in a processor. |
| 3. | Elaborate how the processor generates control signals using hardwired and micro programmed control. |
| Course Outcome 4 (CO4) | |
| 1. | Discuss how data dependencies are handled by software during pipelining. |
| 2. | Identify how a processor's ability is achieved using superscalar operation. |
| 3. | Denote the features of shared memory multiprocessors. |
| Course Outcome 5 (CO5) | |
| 1. | Discuss the different interface circuits involved in a microwave oven. |
| 2. | Analyze the role of parallel I/O interface in microcontroller. |
| 3. | Specify the importance of timer mode in embedded application. |

| K.S.Rangasamy College of Technology–AutonomousR2022 | | | | | | | | |
|--|------------|---|---|-----------|--------|---------------|----|-----|
| 60 IT 401- Computer Organization And Architecture | | | | | | | | |
| IT | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| IV | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| Basic Structure of Computers Functional units – Basic operational concepts – Memory locations and addresses – Memory operations – Instruction codes- Computer registers - Computer Instructions - Timing and Control - Instruction Cycle - Memory Reference Instructions -Instruction and instruction sequencing - Data types - Fixed point and floating point number representation (IEEE format) - Representation of signed numbers – arithmetic operation on signed numbers | | | | | | | | [9] |
| Memory System Semiconductor RAM Memories – Read only Memories – Direct Memory Access – Memory Hierarchy – Cache memories – Performance considerations – Virtual memory – Secondary storage | | | | | | | | [9] |
| Basic Processing Unit & I/O Organization* Instruction Execution – Hardware Components – Hardwired control – Micro programmed control – Bus operation – Bus arbitration – Interface circuits – Interconnection standards (PCI,SCSI,USB) – Accessing I/O devices – Interrupts | | | | | | | | [9] |

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| | | |
|-----------------------------|---|-----|
| Parallel Processing* | Pipeline Organization – Pipelining Issues – Data dependencies – Memory delays – Branch delays – Performance Evaluation – Superscalar Operation – Shared memory Multiprocessors – Cache Coherence – Parallel programming for multiprocessors | [9] |
| Embedded Systems | Embedded systems examples – Microcontroller chips for embedded applications – A simple microcontroller : Parallel and Serial I/O Interface , Counter/ Timer – Sensors and Actuators – Microcontroller families – Design Issues | [9] |
| Total Hours | 45 | |
| Textbook(s): | | |
| 1. | Carl Hamacher, ZvonkoVranesicSafwatZaky and NaraigManjikian, "Computer Organisation and Embedded Systems" , 6 th Edition, McGraw Hill International Edition, 2017. | |
| 2. | Morris Mano M, "Computer System Architecture", 3 rd Edition, Pearson Education,2017. | |
| Reference(s): | | |
| 1. | David A.Patterson and John L.Hennessy,"Computer Organisation & Design, the hardware / software interface",5 th Edition, Morgan Kaufmann,2014. | |
| 2. | William Stallings, "Computer Organisation & Architecture – Designing for Performance",9 th Edition,Pearson Education,2012. | |
| 3. | B. Govindarajulu, "Computer Architecture and Organization: Design Principles and Applications", 2nd edition, Tata McGraw-Hill, 2010. | |
| 4. | Nicholas P Carter, "Computer Architecture and Organization", 2nd edition, Schaum's Outline, Tata McGraw Hill,2010. | |

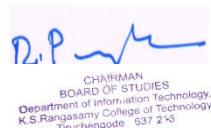
*SDG 4: Quality education.

Course Contents and Lecture Schedule

| S.No. | Topic | No. of Hours |
|--|-------|--------------|
| 1.0 Basic Structure of Computers | | |
| 1.1 Functional units | | 1 |
| 1.2 Basic operational concepts | | 1 |
| 1.3 Memory locations and addresses , Memory operations | | 1 |
| 1.4 Instruction codes, Computer registers , Computer Instructions | | 1 |
| 1.5 Timing and Control - Instruction Cycle , Memory Reference Instructions | | 1 |
| 1.6 Instruction and instruction sequencing , Data types | | 1 |
| 1.7 Fixed point and floating point number representation (IEEE format) | | 2 |
| 1.8 Representation of signed numbers, arithmetic operation on signed numbers | | 1 |
| 2.0 Memory System | | |
| 2.1 Semiconductor RAM Memories | | 1 |
| 2.2 Read only Memories | | 1 |
| 2.3 Direct Memory Access | | 1 |
| 2.4 Memory Hierarchy | | 1 |
| 2.5 Cache memories | | 2 |
| 2.6 Performance considerations | | 1 |
| 2.7 Virtual memory | | 1 |
| 2.8 Secondary storage | | 1 |
| 3.0 Basic Processing Unit & I/O Organization | | |
| 3.1 Instruction Execution , Hardware Components | | 1 |
| 3.2 Hardwired control | | 1 |

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| | | |
|--------------|--|-----------|
| 3.3 | Micro programmed control | 1 |
| 3.4 | Bus operation, Bus arbitration | 1 |
| 3.5 | Interface circuits | 1 |
| 3.6 | Interconnection standards (PCI,SCSI,USB) | 2 |
| 3.7 | Accessing I/O devices | 1 |
| 3.8 | Interrupts | 1 |
| 4.0 | Parallel Processing | |
| 4.1 | Pipeline Organization | 1 |
| 4.2 | Pipelining Issues | 1 |
| 4.3 | Data dependencies | 1 |
| 4.4 | Memory delays | 1 |
| 4.5 | Branch delays, Performance Evaluation | 1 |
| 4.6 | Superscalar Operation | 1 |
| 4.7 | Shared memory Multiprocessors | 1 |
| 4.8 | Cache Coherence | 1 |
| 4.9 | Parallel programming for multiprocessors | 1 |
| 5.0 | Embedded Systems | |
| 5.1 | Embedded systems examples | 1 |
| 5.2 | Microcontroller chips for embedded applications | 2 |
| 5.3 | A simple microcontroller : Parallel and Serial I/O Interface | 2 |
| 5.4 | Counter/ Timer | 1 |
| 5.5 | Sensors and Actuators | 1 |
| 5.6 | Microcontroller families | 1 |
| 5.7 | Design Issues | 1 |
| Total | | 45 |

Course Designers

1. Dr.J.Nithya - nithyaj@ksrct.ac.in

| 60 IT 402 | Database Management Systems | Category | L | T | P | Credit |
|-----------|-----------------------------|----------|---|---|---|--------|
| | | PC | 3 | 0 | 0 | 3 |

Objectives

- To design databases for an application domain
- To solve queries using Query languages
- To expose the fundamentals of transaction processing, recovery concepts and aware of the advanced databases.
- To gain knowledge about the Distributed databases and database security

Prerequisite

Nil

Course Outcomes

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

| | | |
|-----|---|------------|
| CO1 | Understand the concepts and features of database systems and mastering in different data models | Understand |
| CO2 | Transforming an data model into a relational database schema by effectively organizing the data using Normalization and Formulating solutions using SQL | Analyze |
| CO3 | Master the basics of query processing, optimization and fast retrieval techniques using indexing and hashing with the familiarity of transaction processing | Apply |

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| | | |
|-----|---|------------|
| CO4 | Understand the issues in concurrency control and familiarizing indifferent database architectures | Understand |
| CO5 | Analyze different ways of writing a query and justify which is the effective and efficient way | Analyze |

Mapping with Programme Outcomes

| COs | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO 2 | PSO 3 |
|-----|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| CO1 | 3 | 3 | 3 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 2 | |
| CO2 | 3 | 3 | 3 | 3 | 2 | | | | | 2 | 2 | 1 | 2 | 2 | |
| CO3 | 3 | 2 | 3 | 2 | 2 | | | | | 2 | 2 | 1 | 2 | 2 | |
| CO4 | 3 | 3 | 2 | 3 | 2 | | | | | 1 | 1 | 1 | 2 | 2 | |
| CO5 | 3 | 2 | 2 | 3 | 2 | | | | | 1 | 1 | 1 | 2 | 2 | |

3-Strong; 2-Medium; 1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | Modal Exam | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|------------|-----------------------------|
| | 1 | 2 | | |
| Remember (Re) | 10 | 10 | 10 | 10 |
| Understand (Un) | 10 | 20 | 40 | 40 |
| Apply (Ap) | 20 | 10 | 30 | 30 |
| Analyse (An) | 20 | 20 | 20 | 20 |
| Evaluate (Ev) | - | - | - | - |
| Create (Cr) | - | - | - | - |

Course Level Assessment Questions

| Course Outcome 1 (CO1) | |
|-------------------------------|---|
| 1. | Describe the components of a database system and show the connections among them. |
| 2. | Construct an ER diagram for university database and Discuss about the Concept Design with the ER Model. |
| 3. | Explain Relational Algebra, Tuple Relational Calculus, Domain Relational Calculus. |
| Course Outcome 2 (CO2) | |
| 1. | Define decomposition and how does it address redundancy and Discuss the problems that may be caused by the use of decompositions. |
| 2. | Define normalization and Explain 1NF, 2NF, 3NF Normal forms |
| 3. | Write SQL Query to find second highest salary of Employee from Employee table. |
| Course Outcome 3 (CO3) | |
| 1. | Explain ACID properties and Illustrate them through examples |
| 2. | Discuss how do you recover from Concurrent transactions |

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| | |
|----|---|
| 3. | Consider a B+-tree in which the maximum number of keys in a node is 5. Calculate the minimum number of keys in any non-root node? |
|----|---|

Course Outcome 4 (CO4)

| | |
|----|---|
| 1. | Each transaction must follow the rules of the tree protocol. Read-only transactions may lock any data item first, whereas update transactions must lock the root first. Assess on that the protocol ensures serializability and deadlock freedom. |
| 2. | Differentiate strict two phase locking protocol and rigorous two phase locking protocol |
| 3. | Assess about Serializability. How it is tested? |

Course Outcome 5 (CO5)

| | |
|----|---|
| 1. | Give the definition for Distributed Database Systems. |
| 2. | Compare homogeneous and Heterogeneous databases. |
| 3. | Discuss Data warehousing and data mining. |

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|---|------------|---|---|-----------|--------|--------------|----|-------|
| 60 IT 402- Database Management Systems | | | | | | | | |
| COMMON TO IT | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | MaximumMarks | | |
| | L | T | P | | C | CA | ES | Total |
| IV | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| Database Concepts and Data Model | | | | | | | | [9] |
| Database System: Definition, Purpose, Application, Data Abstraction, Database Architecture, Database Users, Database Administrators, Instances & Schema, Data Models Entity Relationship Model: Overview, Definitions, ER diagram, Mapping Cardinalities, Reduction to Relational Schema, Extended ER Features. Relational Model: Structure of Relational Database, Keys (Primary, Foreign, Candidate, Super). Relational Query Languages: Relational Algebra, Tuple Relational Calculus, Domain Relational Calculus. | | | | | | | | [9] |
| Database Design and Querying* | | | | | | | | [9] |
| Relational Database Design: Overview, Features, Normalization, Normal Forms (First, Second, Third, Boyce Codd), Decomposition using Functional Dependencies and Multi-Valued Dependencies. SQL: Definition, Basic Structure, Data types, Basic Operations (DDL, DML, DCL), Set Operations, Aggregate Functions, Nested Sub-queries, Join Expression, Views, Transactions, Integrity Constraints, Authorization. PL-SQL: Definition, Basic Structure, Procedures, Functions, Cursors, Triggers, Packages. | | | | | | | | [9] |
| Query Processing and Fast Retrieval* | | | | | | | | [9] |
| Query Processing: Basic Steps, Measures of Query Cost, Query Optimization, Equivalent Expression and Query Evaluation Plan. Indexing: Definition, Purpose, Types of Indexing, B Tree and B+ Tree. Hashing: Basic Concepts, Hash Function, Static and Dynamic Hashing, Comparison of Indexing and Hashing. Transaction: Overview, Transaction States, ACID properties, Implementation of ACID properties, Serializability. | | | | | | | | [9] |
| Concurrency Control and DB Architecture* | | | | | | | | [9] |
| Concurrency Control: Overview, Lock Types, Lock based Protocols, Deadlock Conditions and Handling. Recovery Systems: Failure Classification, Storage, Recovery Algorithms. Parallel Databases: Parallelism (I/O, Inter-query, Intra-query, Intra-operation, and Interoperation) Distributed Databases: Homogeneous vs Heterogeneous, Transaction System Architecture, Concurrency control. | | | | | | | | [9] |

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| | |
|--|-------------|
| Database Security: Authentication, Authorization and access control, SQL injection. | [9] |
| Advanced topics: Object oriented and object relational databases, Logical databases, Web databases, Distributed databases, Data warehousing and data mining. | |
| | Total Hours |
| | 45 |
| Textbook(s): | |
| 1. Abraham Silberschatz, Henry F. Korth and S. Sudarshan, "Database System Concepts", 7 th Edition, McGraw-Hill, 2020. | |
| 2. Ramez Elmasri and Shamkant B. Navathe, "Fundamental Database Systems", 7 th Edition, Pearson Education, 2017. | |
| Reference(s): | |
| 1. Fred R McFadden, Jeffery A. Hoffer and Mary B. Prescott, Modern Database Management, Addison Wesley, 2000. | |
| 2. Raghu Ramakrishnan, "Database Management System", Tata McGraw-Hill Publishing, 3 rd Edition, 2014. | |
| 3. Hector Garcia-Molina, Jeffrey D. Ullman and Jennifer Widom, "Database System Implementation", Pearson Education, 2003. | |
| 4. Peter Rob and Carlos Coronel, "Database System, Design, Implementation and Management", Thompson Learning Course Technology, 5 th Edition, 2003. | |

*SDG:4- Quality Education

Course Contents and Lecture Schedule

| S.No. | Topic | No. of Hours |
|--|-------|--------------|
| 1.0 Database Concepts and Data Model | | |
| 1.1 Database system, Purpose, Application, Data Abstraction | | 1 |
| 1.2 Database Architecture | | 1 |
| 1.3 Database Users, Database Administrators | | 1 |
| 1.4 Instances & Schema, Data Models Entity | | 1 |
| 1.5 Relationship Model: Overview, Definitions, ER diagram, Mapping Cardinalities | | 1 |
| 1.6 ER diagram, Mapping Cardinalities | | 1 |
| 1.7 Structure of Relational Database, Keys | | 1 |
| 1.8 Relational Query Languages: Relational Algebra, | | 1 |
| 1.9 Tuple Relational Calculus, Domain Relational Calculus | | 1 |
| 2.0 Database Design and Querying | | |
| 2.1 Relational Database Design: Overview, Features, | | 1 |
| 2.2 Normalization, Normal Forms (First, Second normal forms) | | 1 |
| 2.3 Third normal form | | 1 |
| 2.4 Boyce Codd normal form | | 1 |
| 2.5 Decomposition using Functional Dependencies and Multi-Valued Dependencies. | | 1 |
| 2.6 SQL: Definition, Basic Structure, Data types, Basic Operations (DDL, DML, DCL), | | 1 |
| 2.7 Set Operations, Aggregate Functions, Nested Sub-queries, | | 1 |
| 2.8 Join Expression, Views, Transactions, Integrity Constraints, Authorization. | | 1 |
| 2.9 PL-SQL: Definition, Basic Structure, Procedures, Functions, Cursors, Triggers, Packages. | | 1 |
| 3.0 Query Processing and Fast Retrieval | | |
| 3.1 Query Processing: Basic Steps, Measures of Query, ACID properties, Implementation of, | | 1 |
| 3.2 Query Optimization, Equivalent Expression and Query Evaluation Plan | | 1 |
| 3.3 Indexing: Definition, Purpose, | | 1 |
| 3.4 CostTypes of Indexing, B Tree and B+ Tree | | 1 |
| 3.5 Hashing: Basic Concepts, Hash Function | | 1 |
| 3.6 Static and Dynamic Hashing, Comparison of Indexing and Hashing | | 1 |

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| | | |
|------------|---|-----------|
| 3.7 | Transaction: Overview, Transaction States, | 1 |
| 3.8 | ACID properties | 1 |
| 3.9 | Serializability | 1 |
| 4.0 | Concurrency Control and DB Architecture | |
| 4.1 | Concurrency Control: Overview, Lock Types. | 1 |
| 4.2 | Lock based Protocols, Deadlock Conditions and Handling. | 1 |
| 4.3 | Recovery Systems: Failure Classification | 1 |
| 4.4 | Parallel Databases: Parallelism (I/O, Inter-query, Intra-query, Intra-operation, and Interoperation | 1 |
| 4.5 | Distributed Databases | 1 |
| 4.6 | Homogeneous vs Heterogeneous, | 1 |
| 4.7 | Transaction System Architecture | 1 |
| 4.8 | Storage, Recovery Algorithms | 1 |
| 4.9 | Concurrency Control | 1 |
| 5.0 | Database Security and Advanced topics | |
| 5.1 | Authentication, Authorization | 1 |
| 5.2 | Access control | 1 |
| 5.3 | SQL injection | 1 |
| 5.4 | Object oriented and object relational databases | 1 |
| 5.5 | Logical databases | 1 |
| 5.6 | Web databases | 1 |
| 5.7 | Distributed databases | 1 |
| 5.8 | Data warehousing | 1 |
| 5.9 | Data mining | 1 |
| | Total | 45 |

Course Designers1. Mrs.K.Mahalakshmi- mahalakshmik@ksrct.ac.in 2. Mrs.S.Keerthana – keerthanas@ksrct.ac.in

| 60 IT 403 | Web Technology | Category | L | T | P | Credit |
|-----------|----------------|----------|---|---|---|--------|
| | | ES | 1 | 0 | 4 | 3 |

Objectives

- To know various technologies are involved in basic design a web page.
- To understand the fundamentals of various style sheet are used in web pages.
- To study the fundamentals of various Scripting languages.
- To enhance the knowledge of how hierarchy of objects are used in HTML and XML.
- To explore the concepts of web applications

Prerequisite

Basic knowledge of java programming

Course Outcomes

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

| | | |
|-----|---|-------|
| CO1 | Categorize the issues in designing a web page by utilizing XHTML components | Apply |
|-----|---|-------|

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| | | |
|-----|---|-------|
| CO2 | Optimize the performance issues in style the web pages in CSS | Apply |
| CO3 | Incorporate JavaScript variables, operators and functions in web pages | Apply |
| CO4 | Create Web pages with dynamic styles and validate the HTML form data using Java Scripts | Apply |
| CO5 | Classify JSP Components and implement using Net Beans | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 2 | 2 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 |
| CO4 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 3 |

3=Strong;2=Medium;1=Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 10 | 10 | 10 |
| Understand (Un) | 20 | 10 | 20 |
| Apply (Ap) | 30 | 30 | 60 |
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 10 | 10 |

Course Level Assessment Questions

| Course Outcome 1(CO1) | |
|------------------------------|---|
| 1. | <p>Use HTML to create a document that contains the following text Database management systems (DBMSs) are computer software applications that interact with the user, other applications, and the database itself to capture and analyze data. A general-purpose DBMS is designed to allow the definition, creation, querying, update, and administration of databases. Well-known DBMSs include MySQL, PostgreSQL, Microsoft SQL Server, Oracle, SAP and IBM DB2. $\sigma Id > 3000$ or $Hobby = 'hiking'$ (<u>Person</u>) and $\sigma Id > 3000 \text{ AND } Id < 3999$ (<u>Person</u>)</p> <p>Do the following</p> <ul style="list-style-type: none"> • Use h1 for first line • Bold for second line • All DBMS displayed as superscript • Insert a horizontal line between third and fourth line |
| 2. | Create a web page which contains hyper links, audio and video. |
| 3. | Differentiate Cell padding and Cell Spacing |
| Course Outcome 2(CO2) | |
| 1. | In the external style sheet, create a class of paragraph called important. The font in important paragraphs should be bigger. Also in the external style sheet, create a class of paragraph (Consider your own paragraph) called detail. For that, make the font smaller. Create an id of paragraph called takeaway. For that, make the font-size 25px. Finally, apply the important class to the first paragraph and the detail class to the second paragraph. Apply the takeaway id to the last paragraph. Insert a normal paragraph, so that you can see the contrast in size |

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| | |
|----|---|
| 2. | ite a CSS rule that place a background image halfway down the page , tiling it horizontally. The image should remain in place when the user scrolls up or down. |
| 3. | Write CSS code (using the embedded method) to make the first paragraph centre aligned, the second paragraph left aligned with blue fore colour, and red back colour, and the third paragraph right aligned with black fore colour and transparent back-colour |

Course Outcome 3(CO3)

| | |
|----|---|
| 1. | Differentiate alert box, prompt box and confirm box. |
| 2. | Write a Javascript function named <i>minimum3</i> that returns the smallest number among the three given floating- point numbers. Use the Math.min function to implement <i>minimum3</i> . |
| 3. | Write a JavaScript program to fine the result of single player roll die game. Show the result in status bar of window. [Rule: on first roll: 7 or 11 – game won; 2,3 or 11 – game lost; for rest of value: continue to roll, if the player reached the score before getting 7 then player judged to be lost]. |

Course Outcome 4 (CO4)

| | |
|----|---|
| 1. | Design a XHTML document that displays customer feedback form. Design the document to handle events like onerror, onsubmit, onreset, onfocus and onblur. Display messages in context sensitive test area component of the web page as a responsive to various events. |
| 2. | Write a JavaScript program to flip the images by onmouseover / onmouseout event handing. |
| 3. | Write a Javascript that accepts the radius of a circle as input from the user and outputs XHTML text that displays the circle's diameter, circumference and area. Use the constant value 3.14159 for π . Use the GUI techniques. Make use of Math object functions. |

Course Outcome 5(CO5)

| | |
|----|---|
| 1. | Write a custom tag libraries in the Java Sever Pages. |
| 2. | Develop a JSP program for online book shop |
| 3. | Write short notes on the event-processing lifecycle |

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|--|--------------|---|---|-----------|--------|---------------|----|-----|
| 60 IT 403 – Web Technology | | | | | | | | |
| IT | | | | | | | | |
| Semester | Hours / Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| IV | 1 | 0 | 4 | 45 | 3 | 50 | 50 | 100 |
| Introduction to Web Programming HTML Common Tags-Lists- Tables-images-forms-frames Lab Exercise: Create a web page using HTML to create your biodata that includes personal details (Name, date of birth, Address, contact number, email id), Qualification (10th and 12th marks/grades, with school/college information),List of achievements (Create a link to at least 1 achievement), insert your photo(image). [9] | | | | | | | | |
| Cascading Style Sheets* Introduction to CSS- Layout, Normal Flow, Positioning Elements, Floating Elements, Constructing Multicolumn Layouts, Approaches to CSS Layout, Responsive Design, CSS Frameworks. Lab Exercise: Create a web page to create a form using CSS that includes tables and user interface components such as text boxes, text areas, buttons, check boxes and combo box. Create a feedback form to enable students to give their feedback regarding the teacher [9] | | | | | | | | |
| Client Side Programming* Overview of JavaScript, using JS in an HTML (Embedded, External), Data types, Control Structures, Arrays, Functions and Scopes Lab Exercise: Design a web page to include text boxes for entering 2 numbers and buttons (factorial, prime, Fibonacci, Natural Numbers). Display alert box and change the background of the text box when [9] | | | | | | | | |

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| | |
|--|-----------|
| the user focuses onto the text box. Also, Display the name of the button when the user moves over the buttons. When the button is clicked, perform the required computation and print the result in the web page | |
| JavaScript Objects Introduction-Math Objects-Date Object-Number Object-Boolean Object-Window Object- The Document Object Model (DOM), JavaScript Events- Forms Lab Exercise: Enhancement in created blogging application using JavaScript | [9] |
| Java Server Pages Introduction to Java Server Pages, JSP and Servlets, running JSP applications, Basic JSP, classes and JSP, Support for the Model-view-Controller paradigm, JSP Components, JSP related technologies. Lab Exercise: Transform the blogging application from a loose collection of various resources (servlets, HTML documents, etc.) to an integrated web application that follows the MVC paradigm | [9] |
| Total Hours: 45 | 45 |
| Text book(s) | |
| 1. Deitel & Deitel, "Internet and World Wide Web – How to Program", 4th Edition, Pearson Education Asia, 2011 | |
| 2. Jeffrey C. Jackson, "Web Technologies—A Computer Science Perspective", Pearson Education, 2006 | |
| Reference(s): | |
| 1. Robert. W. Sebesta, "Programming the World Wide Web", 8th Edition, Pearson Education, 2015. | |
| 2. Jeffrey C.Jackson, "Web Technologies--A Computer Science Perspective", Pearson Education, 2007 | |
| 3. Godbole A.S. and Kahate A., —Web Technologies, 3rd Edition, Tata McGraw-Hill, New Delhi, 2013 | |
| 4. www.w3schools.com | |

SDG:4- Quality Education*Course Contents and Lecture Schedule**

| S.No. | Topic | No.of Hours |
|-------|--|-------------|
| 1 | Introduction to Web Programming | |
| 1.1 | Structure of HTML | 1 |
| 1.2 | HTML Common Tags | 1 |
| 1.3 | Lists | 1 |
| 1.4 | Tables | 1 |
| 1.5 | Meta Elements | 1 |
| 1.6 | Span | 1 |
| 1.7 | images | 1 |
| 1.8 | forms | 1 |
| 1.9 | Frames | 1 |
| 2 | Cascading Style Sheets | |
| 2.1 | Introduction to CSS | 1 |
| 2.2 | Syntax | 1 |
| 2.3 | Layout | 1 |
| 2.4 | Normal Flow | 1 |
| 2.5 | Positioning Elements | 1 |
| 2.6 | Floating Elements | 1 |
| 2.7 | Constructing Multicolumn Layouts | 1 |
| 2.8 | Approaches to CSS Layout | 1 |

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| | | |
|----------|-----------------------------------|-----------|
| 2.9 | Responsive Design, CSS Frameworks | 1 |
| 3 | Client Side Programming | |
| 3.1 | Overview of JavaScript | 1 |
| 3.2 | using JS in an HTML | 1 |
| 3.3 | Data types | 1 |
| 3.4 | Control Structures | 1 |
| 3.5 | Arrays | 1 |
| 3.6 | Variables | 1 |
| 3.7 | Functions | 1 |
| 3.8 | Scopes | 1 |
| 3.9 | Recursion | 1 |
| 4 | JavaScript Objects | |
| 4.1 | Introduction | 1 |
| 4.2 | Math Object | 1 |
| 4.3 | Date Object | 1 |
| 4.4 | Number Object | 1 |
| 4.5 | Boolean Object | 1 |
| 4.6 | Window Object | 1 |
| 4.7 | The Document Object Model (DOM) | 1 |
| 4.8 | JavaScript Events | 1 |
| 4.9 | Forms | 1 |
| 5 | Java Server Pages | |
| 5.1 | Introduction to Java Server Pages | 1 |
| 5.2 | JSP and Servlets | 1 |
| 5.3 | Running JSP applications | 1 |
| 5.4 | Basic JSP | 1 |
| 5.5 | classes and JSP | 1 |
| 5.6 | Support for the Model | 1 |
| 5.7 | Controller paradigm | 1 |
| 5.8 | JSP Components | 1 |
| 5.9 | JSP related technologies | 1 |
| | Total | 45 |

Course Designers

1.Mr.M.Thilakraj –mthilakraj@ksrct.ac.in

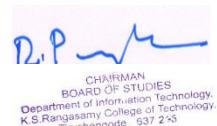
| 60 IT 4P1 | Database Management Systems Laboratory | Category | L | T | P | Credit |
|-----------|--|----------|---|---|---|--------|
| | | PC | 0 | 0 | 4 | 2 |

Objective

- To understand data definitions and data manipulation commands

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- To learn the use of nested and join queries
- To understand functions, procedures and procedural extensions of databases
- To be familiar with the use of a front end tool
- To design and implementation of typical database applications

Prerequisite

Nil

Course Outcomes

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

| | | | | | | | | | | | | | |
|-----|--|--|--|--|--|--|--|--|--|--|--|--|-------|
| CO1 | Implement the Data Definition Language commands, Data Manipulation Language, Data Control Language Commands and Transaction Control Language in RDBMS. | | | | | | | | | | | | Apply |
| CO2 | Construct Sub queries, views and joins to retrieve data from multiple tables. | | | | | | | | | | | | Apply |
| CO3 | Implement the database programming with Cursors, Triggers, Procedures and Functions in PL/SQL. | | | | | | | | | | | | Apply |
| CO4 | Design and implement applications using ODBC. | | | | | | | | | | | | Apply |
| CO5 | Create and manipulate data using My SQL and NOSQL database. | | | | | | | | | | | | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 2 | 2 | 3 | 2 | 3 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO2 | 2 | 3 | 3 | 2 | 3 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO3 | 2 | 2 | 3 | 2 | 3 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO4 | 3 | 2 | 3 | 2 | 2 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO5 | 3 | 3 | 2 | 2 | 3 | | | | 2 | | | 2 | 3 | 3 | 2 |

3- Strong; 2-Medium; 1-Low

List of Experiments

1. Data Definition Language (DDL) commands in RDBMS.
2. Data Manipulation Language (DML), Data Control Language (DCL).
3. Implementation of Sub queries.
4. Creation of views and joins.
5. Database Design using ER modeling, normalization and Implementation for any application. *
6. Date, String and Numeric functions.
7. Database Programming: Implicit and Explicit Cursors
8. Procedures and Functions.
9. Embedded SQL
10. MySQL Simple Queries and Database Connectivity
11. Mini project

*SDG:4- Quality Education

Course Designers

1. Mrs.K.Mahalakshmi- mahalakshmik@ksrct.ac.in
2. Mrs.S.Keerthana – keerthanas@ksrct.ac.in

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| 60 IT L01 | Python Programming | Category | L | T | P | Credit |
|-----------|--------------------|----------|---|---|---|--------|
| | | ES | 3 | 0 | 0 | 3 |

Objectives

- To know the basics of programming in python
- To understand modules, functions, exceptions and file handling
- To recognize the real world fact using Object Oriented concepts
- To recognize the basic concepts of Database and Network Connectivity
- To create layouts using graphical tools

Prerequisite

Basic knowledge of mathematics and programming.

Course Outcomes

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

| | | |
|-----|--|-------|
| CO1 | Apply the basics of Python programming for problem-solving | Apply |
| CO2 | Develop programs using modules, functions, exceptions and file handling | Apply |
| CO3 | Implement programs using OOPS concept | Apply |
| CO4 | Create a solution for real world problems using Database and Network connectivity. | Apply |
| CO5 | Design layouts with GUI toolkits using Tkinter and Turtle | Apply |

Mapping with Programme Outcomes

| Cos | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO2 | 3 | 2 | 3 | 2 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO3 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO4 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO5 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |

3-Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | - | - | 10 |
| Understand (Un) | 20 | 20 | 20 |
| Apply (Ap) | 20 | 20 | 30 |
| Analyse (An) | 20 | 20 | 30 |
| Evaluate (Ev) | - | - | 10 |
| Create (Cr) | - | - | - |

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| 60 IT L01 – Python Programming | | | | | | | | |
|---|---|----------|----------|------------------|---------------|----------------------|-----------|-----|
| IT | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| IV | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| Introduction Introduction to Python – Strings – List – Tuples - Dictionaries – Basic Operators - File Input and Output – Decision Making – Loops | | | | | | | | [9] |
| Modular Design and Exception Handling Modules – Python module – Namespaces – Importing modules – Loading and Execution – Program Routine – Functions – Parameter Passing - Types – Recursion –Exceptions – Types – Handling Exceptions | | | | | | | | [9] |
| Object Oriented Programming Object Oriented Programming – Class and Objects – Data Abstraction - Encapsulation – Inheritance – Polymorphism | | | | | | | | [9] |
| Database Programming and Network Programming** Introduction to database – DBM dictionaries – Relational Databases : Writing SQL statements; Defining tables; Setting up a Database – Python database APIs – Network Protocols – Socket Programming – Client Server Program – Chat Application | | | | | | | | [9] |
| GUI Programming and Graphics* GUI Programming toolkits – Introduction to Tkinter – Creating GUI widgets – Resizing – Configuring widget options – Creating Layouts – Radio buttons – Check boxes – Dialog boxes – Drawing using Turtle | | | | | | | | [9] |
| Total Hours 45 | | | | | | | | |
| Text book(s): | | | | | | | | |
| 1. | James Payne, "Beginning Python – using Python 2.6 and Python 3.1", Wiley India Pvt Ltd, 2010. | | | | | | | |
| 2. | Charles Dierbach, "Introduction to Computer Science using Python", Wiley India Pvt Ltd, 2015. | | | | | | | |
| Reference(s): | | | | | | | | |
| 1. | Wesley J. Chun, "Core Python Applications Programming", 3 rd Edition, Pearson Education, 2013. | | | | | | | |
| 2. | John Paul Mueller, "Beginning Programming with Python", Wiley India Pvt Ltd, 2014. | | | | | | | |
| 3. | Allen Downey, Jeffrey Elkner, Chris Meyers, "Learning with Python", DreamTech Press, 2015. | | | | | | | |
| 4. | Dr. R.Nageswara Rao "Core Python Programming", DreamTechPress, Second Edition, 2018 | | | | | | | |

** SDG-4 – Quality Education

* SDG-8 – Employment and decent work for all

Course Contents and Lecture Schedule

| S.No. | Topic | No.of Hours |
|--------------|------------------------|--------------------|
| 1 | Introduction | |
| 1.1 | Introduction to Python | 1 |
| 1.2 | Basic Data Types | 1 |
| 1.3 | Strings | 1 |
| 1.4 | List | 1 |
| 1.5 | Tuples | 1 |
| 1.6 | Dictionaries | 1 |

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| | | |
|----------|---|---|
| 1.7 | Basic Operators | 1 |
| 1.8 | Decision Making Statements | 1 |
| 1.9 | Looping Statements | 1 |
| 2 | Modular Design | |
| 2.1 | Modules | 1 |
| 2.2 | Python module | 1 |
| 2.3 | Namespaces | 1 |
| 2.4 | Importing modules | 1 |
| 2.5 | Loading and Execution | 1 |
| 2.6 | Program Routine, Functions | 1 |
| 2.7 | Parameter Passing, Types | 1 |
| 2.8 | Recursion, Exceptions | 1 |
| 2.9 | Types, Handling Exceptions | 1 |
| 3 | Object Oriented Programming | |
| 3.1 | Object Oriented Programming | 1 |
| 3.2 | Class | 1 |
| 3.3 | Objects | 1 |
| 3.4 | Class Types | 1 |
| 3.5 | Data Abstraction | 1 |
| 3.6 | Encapsulation | 1 |
| 3.7 | Inheritance | 1 |
| 3.8 | Inheritance types | 1 |
| 3.9 | Polymorphism | 1 |
| 4 | Database Programming and Network Programming | |
| 4.1 | Introduction to databases | 1 |
| 4.2 | DBM dictionaries | 1 |
| 4.3 | Relational Databases | 1 |
| 4.4 | Writing SQL statements, Defining tables | 1 |
| 4.5 | Setting up a Database | 1 |
| 4.6 | Python Database APIs | 1 |
| 4.7 | Network Protocols | 1 |
| 4.8 | Socket Programming | 1 |
| 4.9 | Client Server Program, Chat Application | 1 |
| 5 | GUI Programming and Graphics | |
| 5.1 | GUI Programming toolkits | 1 |
| 5.2 | Introduction to Tkinter | 1 |
| 5.3 | Creating GUI widgets | 1 |
| 5.4 | Resizing | 1 |
| 5.5 | Configuring Widget options | 1 |
| 5.6 | Creating Layouts | 1 |
| 5.7 | Radio buttons & Check boxes | 1 |
| 5.8 | Dialog boxes | 1 |
| 5.9 | Drawing using Turtle | 1 |

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| | | |
|--|--------------|-----------|
| | Total | 45 |
|--|--------------|-----------|

Course Designers

1. Dr.C,Nallusamy (nallusamyc@ksrct.ac.in)
2. Mr.R.T.Dinesh Kumar (dineshkumarrt@ksrct.ac.in)

| 60 IT L02 | Android Application Development | Category | L | T | P | Credit |
|------------------|--|-----------------|----------|----------|----------|---------------|
| | | ES | 3 | 0 | 0 | 3 |

Objectives

- To appreciate the Mobility landscape and familiarize with Mobile apps development aspects
- To design and develop mobile apps using Android as development platform with key focus on user experience design.
- To facilitate students to understand android SDK
- To gain a basic understanding of Android application development.
- To inculcate working knowledge of Android Studio development tool

Prerequisite

Basic knowledge of java programming

Course Outcomes

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

| | | |
|-----|--|-------|
| CO1 | Identify various concepts of mobile programming that make it unique from programming for other platforms | Apply |
| CO2 | Critique mobile applications on their design pros and cons | Apply |
| CO3 | Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces | Apply |
| CO4 | Develop mobile applications for the Android operating system that use basic and advanced phone features | Apply |
| CO5 | Deploy applications to the Android marketplace for distribution. | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | 2 | 2 | | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 2 | 2 | 2 | | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 |
| CO4 | 3 | 3 | 3 | 2 | 2 | 2 | | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 |
| CO5 | 3 | 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 3 |

3-Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 10 | 10 | 10 |
| Understand (Un) | 20 | 10 | 20 |
| Apply (Ap) | 30 | 30 | 60 |

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| | | | |
|---------------|----|----|----|
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 10 | 10 |

| | | | |
|-------------------------------|--|--|--|
| Course Outcome 1(CO1) | | | |
| 1. | Illustrate the android architecture with an example | | |
| 2. | Describe about the Eclipse Installation | | |
| 3. | Differentiate Eclipse Installation and android installation | | |
| Course Outcome 2(CO2) | | | |
| 1. | Infer the properties of application context | | |
| 2. | Explore the Android Manifest File and along with its performance issues | | |
| 3. | Illuminate the broadcasting intents with an example | | |
| Course Outcome 3(CO3) | | | |
| 1. | Explicate the user Interface Screen elements with an example | | |
| 2. | Explain the Designing User Interfaces with Layouts with an advantages | | |
| 3. | Illustrate the drawing and Working with Animation. | | |
| Course Outcome 4 (CO4) | | | |
| 1. | Elucidate the Publishing Android application | | |
| 2. | Explore the using Android preferences with an example | | |
| 3. | Describe the working with different types of resources | | |
| Course Outcome 5(CO5) | | | |
| 1. | Distinguish between the Managing data using Sqlite and Android Data and Storage APIs | | |
| 2. | Explain the Android Networking APIs with an example | | |
| 3. | Describe the Deploying Android Application to the World with an example | | |

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|--|------------|---|-----------|--------|---------------|----|-------|-----|
| 60 IT L02 - ANDROID APP DEVELOPMENT | | | | | | | | |
| IT | | | | | | | | |
| Semester | Hours/Week | | Total hrs | Credit | Maximum Marks | | | |
| | L | T | P | C | CA | ES | TOTAL | |
| IV | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| Introduction to Android The Android Platform, Android SDK, Eclipse Installation, Android Installation, Building you First Android application, Understanding Anatomy of Android Application, Android Manifest file. | | | | | | | | [9] |
| Android Application Design Essentials* Anatomy of an Android applications, Android terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions. | | | | | | | | [9] |

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| | |
|---|-----|
| Android User Interface Design Essentials* User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation. | [9] |
| Testing Android applications Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources. | [9] |
| Using Common Android APIs Using Android Data and Storage APIs, Managing data using Sqlite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World. | [9] |
| Total Hours | 45 |
| Text Book(s) | |
| 1. Anubhav Pradhan, Anil V. Deshpande, "Composing Mobile Apps: Learn/Explore/Apply/ Using Android", Wiley India Private Limited, 1st Edition, 2014 | |
| 2. Joseph Annuzzi Jr., Lauren Darcey, Shane Conder, "Introduction to Android Application Development: Android Essentials, Developer's Library", Addison-Wesley Professional, 4th Edition, 2013. | |
| Reference(s): | |
| 1. Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd, 2019 | |
| 2. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd, 2018 | |
| 3. Android Application Development All in one for Dummies by Barry Burd, Edition:, 2017 | |

*SDG 4-Quality Education

Course Contents and Lecture Schedule

| S.No | Topic | No .of Hours |
|------|---|--------------|
| 1.0 | Introduction to Android | |
| 1.1 | The Android Platform, | 1 |
| 1.2 | Android SDK | 1 |
| 1.3 | Eclipse Installation | 1 |
| 1.4 | Android Installation | 1 |
| 1.5 | Building you First Android application, | 2 |
| 1.6 | Understanding Anatomy of Android Application | 2 |
| 1.7 | Android Manifest file. | 1 |
| 2.0 | Android Application Design Essentials | |
| 2.1 | Anatomy of an Android applications | 1 |
| 2.2 | Android terminologies | 1 |
| 2.3 | Application Context | 1 |
| 2.4 | Activities | 1 |
| 2.5 | Services | 1 |
| 2.6 | Intents, Receiving and Broadcasting Intents | 1 |
| 2.7 | Android Manifest File and its common settings | 1 |
| 2.8 | Using Intent Filter | 1 |
| 2.9 | Permissions | 1 |
| 3.0 | Android User Interface Design Essentials | |
| 3.1 | User Interface Screen elements | 3 |
| 3.2 | Designing User Interfaces with Layout | 3 |
| 3.3 | Drawing and Working with Animation. | 3 |
| 4.0 | Testing Android applications | |
| 4.1 | Publishing Android application | 2 |
| 4.2 | Using Android preferences | 2 |

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| | | |
|-----|--|---|
| 4.3 | Managing Application resources in a hierarch | 2 |
| 4.4 | working with different types of resources | 1 |
| 5.0 | Using Common Android APIs | |
| 5.1 | Using Android Data and Storage APIs | 1 |
| 5.2 | Managing data using Sqlite, | 1 |
| 5.3 | Sharing Data between Applications with Content Providers | 1 |
| 5.4 | Using Android Networking APIs | 2 |
| 5.5 | Using Android Web APIs | 2 |
| 5.6 | Deploying Android Application to the World | 2 |

Course designers

1.Mr.M.Thilakraj –mthilakraj@ksrct.ac.in

| 60 IT L03 | Power BI | Category | L | T | P | Credit |
|-----------|----------|----------|---|---|---|--------|
| | | PC | 1 | 0 | 4 | 3 |

Objective

- Understand the concept of Power BI
- Be familiar with Microsoft Data Analytics
- Develop a Data with Power BI
- Apply Sematic Model in Power BI
- Learn some important DAX Formulas and Power BI Desktop

Prerequisite

Basic knowledge of Data Base management systems, MS Excel

Course Outcomes

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

| | | |
|-----|--|-----------------------------|
| CO1 | Understand the basics concepts of Power BI | Remember, Understand |
| CO2 | Understand the Microsoft Data Analytics | Remember, Understand |
| CO3 | Apply Model Data with Power BI | Remember, Understand, Apply |
| CO4 | Build And Modify Semantic Model in Power Bi | Remember, Understand, Apply |
| CO5 | Understand the DAX Formulas and Power BI Desktop | Remember, Understand |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO2 | 3 | 2 | 3 | 2 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |

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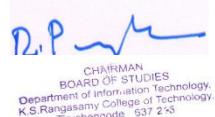
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| | | | | | | | | | | | | | | | |
|---------------------------------|---|---|---|---|--|--|--|--|---|---|---|---|---|---|--|
| CO3 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO4 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO5 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| 3-Strong;2-Medium;1-Some | | | | | | | | | | | | | | | |

| K.S. RANGASAMY COLLEGE OF TECHNOLOGY, AUTONOMOUS 2022 | | | | | | | | | | | | | | | |
|---|------------|---|---|--|-----------|--------|----|---------------|-------|--|--|--|--|--|----|
| 60 IT L03 - Power BI | | | | | | | | | | | | | | | |
| IT | | | | | | | | | | | | | | | |
| Semester | Hours/Week | | | | Total hrs | Credit | | Maximum Marks | | | | | | | |
| | L | T | P | | | C | CA | ES | Total | | | | | | |
| IV | 1 | 0 | 4 | | 45 | 3 | 50 | 50 | 100 | | | | | | |
| INTRODUCTION | | | | | | | | | | | | | | | |
| Data -Data Analysis-Microsoft EXCEL -Power BI-Business Intelligence (BI)- Power BI Desktop (Power Query, Power Pivot, Power View)- Power BI Service- Power BI Mobile Flow. | | | | | | | | | | | | | | | |
| MICROSOFT DATA ANALYTICS | | | | | | | | | | | | | | | |
| Discover data analysis-Overview of data analysis- Roles in data- Tasks of a data analyst- Building with Power BI - Use Power BI-Building blocks of Power BI- Tour and use the Power BI service. | | | | | | | | | | | | | | | |
| MODEL DATA | | | | | | | | | | | | | | | |
| Power BI Desktop models- Star schema design - Analytic queries -Configure report visuals - Power BI model framework- Power BI model fundamentals -develop an import model - develop a Direct Query model- develop a composite model -model framework. | | | | | | | | | | | | | | | |
| SEMANTIC MODEL | | | | | | | | | | | | | | | |
| Work with tables -Create a date table - Work with dimensions - Data granularity - Work with relationships and cardinality - Model data in Power BI Desktop. | | | | | | | | | | | | | | | |
| DAX FORMULAS AND POWER BI DESKTOP | | | | | | | | | | | | | | | |
| DAX formulas- DAX data types- DAX functions- DAX operators- DAX variables- Power BI I Desktop: Create simple measures- Create compound measures - Create quick measures calculated columns with measures. | | | | | | | | | | | | | | | |
| Total Hours | | | | | | | | | | | | | | | 45 |
| Text Book(s): | | | | | | | | | | | | | | | |
| 1. Mastering Power BI Paperback –by <u>Chandraish Sinha</u> (Author), 30 September 2021 | | | | | | | | | | | | | | | |
| 2. The Definitive Guide to DAX: Business intelligence for Microsoft Power BI, SQL Server Analysis Services, and Excel, 2e Paperback –by <u>Alberto Ferrari Marco Russo</u> (Author), 15 September 2020 | | | | | | | | | | | | | | | |
| Reference(s): | | | | | | | | | | | | | | | |
| 1. Microsoft Power Bi Dashboards Step by Step, 1e Paperback by <u>Errin O'Connor</u> (Author), 6 March 2020 | | | | | | | | | | | | | | | |
| 2. EXCEL & POWER BI GUIDE 2022: The Concise Step-by-Step Practical Guide to Master Everything About Microsoft Excel & Power BI for Data Modelling, Analysis, Visualization & Transformation Kindle Edition by <u>CARTY BINN</u> (Author), 17 march 2022 | | | | | | | | | | | | | | | |
| 3. Learn Power BI: Step by Step Guide to Building Your Own Reports (2022) Kindle Edition by <u>Derek Wilson</u> (Author), 7 march 2022 | | | | | | | | | | | | | | | |

Course Contents and Lecture Schedule

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| S.No. | Topic | No.of Hours |
|-------|---|-------------|
| 1 | INTRODUCTION | |
| 1.1 | Data - Data Analysis | 1 |
| 1.2 | Microsoft EXCEL | 1 |
| 1.3 | Microsoft EXCEL | 1 |
| 1.4 | Power BI | 1 |
| 1.5 | Business Intelligence (BI) | 1 |
| 1.6 | Power BI Desktop (Power Query, Power Pivot, Power View) | 1 |
| 1.7 | Power BI Desktop (Power Query, Power Pivot, Power View) | 1 |
| 1.8 | Power BI Service | 1 |
| 1.9 | Power BI Mobile Flow. | 1 |
| 2 | MICROSOFT DATA ANALYTICS | |
| 2.1 | Discover data analysis | 1 |
| 2.2 | Overview of data analysis | 1 |
| 2.3 | Roles in data | 1 |
| 2.4 | Tasks of a data analyst | 1 |
| 2.5 | Building with Power BI | 1 |
| 2.6 | Use Power BI | 1 |
| 2.7 | Building blocks of Power BI | 1 |
| 2.8 | Tour and use the Power BI service | 1 |
| 2.9 | Tour and use the Power BI service | 1 |
| 3 | MODEL DATA | |
| 3.1 | Power BI Desktop models | 1 |
| 3.2 | Star schema design | 1 |
| 3.3 | Analytic queries - Configure report visuals | 1 |
| 3.4 | Power BI model framework | 1 |
| 3.5 | Power BI model fundamentals | 1 |
| 3.6 | develop an import model | 1 |
| 3.7 | develop a Direct Query model | 1 |
| 3.8 | develop a composite model | 1 |
| 3.9 | model framework. | 1 |
| 4 | SEMANTIC MODEL | |
| 4.1 | Work with tables | 1 |
| 4.2 | Create a date table | 1 |
| 4.3 | Work with dimensions | 1 |
| 4.4 | Data granularity | 1 |
| 4.5 | Work with relationships and cardinality | 1 |
| 4.6 | Work with relationships and cardinality | 1 |
| 4.7 | Model data in Power BI Desktop. DEMO Lab Experiment | 1 |
| 4.8 | Model data in Power BI Desktop. | 1 |
| 4.9 | Model data in Power BI Desktop | 1 |
| 5 | DAX FORMULAS AND POWER BI DESKTOP | |
| 5.1 | DAX formulas | 1 |

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| | | |
|-----|--|-----------|
| 5.2 | DAX data types | 1 |
| 5.3 | DAX functions | 1 |
| 5.4 | DAX operators - DAX variables | 1 |
| 5.5 | Power BI I Desktop: Create simple measures | 1 |
| 5.6 | Create compound measures | 1 |
| 5.7 | Create compound measures | 1 |
| 5.8 | Create quick measures calculated columns | 1 |
| 5.9 | Create quick measures calculated columns | 1 |
| | Total | 45 |

K.S.RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE – 637215

(An Autonomous Institution affiliated to Anna University)

B.E. / B.Tech. Degree Programme**SCHEME OF EXAMINATIONS**

(For the candidates admitted from 2022-2023 onwards)

FIFTH SEMESTER

| Course Code | Name of the Course | Duration of Internal Exam | Weightage of Marks | | | Minimum Marks for Pass in End Semester Exam | |
|------------------|--|---------------------------|------------------------|----------------------|------------|---|-------|
| | | | Continuous Assessment* | End Semester Exam ** | Max. Marks | End Semester Exam | Total |
| THEORY | | | | | | | |
| 60 IT 501 | Operating Systems | 2 | 40 | 60 | 100 | 45 | 100 |
| 60 IT 502 | Computer Networks | 2 | 40 | 60 | 100 | 45 | 100 |
| 60 IT 503 | Embedded Systems And IOT | 2 | 40 | 60 | 100 | 45 | 100 |
| 60 IT 504 | Design Thinking | 2 | 40 | 60 | 100 | 45 | 100 |
| 60 IT E1* | Elective – I | 2 | 40 | 60 | 100 | 45 | 100 |
| 60 IT L** | Open Elective – II | 2 | 40 | 60 | 100 | 45 | 100 |
| 60 MY 003 | Start-ups and Entrepreneurship | 2 | 40 | 60 | 100 | 45 | 100 |
| PRACTICAL | | | | | | | |
| 60 IT 5P2 | Operating Systems and Open Source Laboratory | 2 | 60 | 40 | 100 | 45 | 100 |
| 60 CG 0P4 | Computer Networks Laboratory | 2 | 60 | 40 | 100 | 45 | 100 |
| 60 CG 0P4 | Career Skill Development IV | 2 | | | | | 100 |
| 60 CG 0P6 | Internship | 2 | | | | | |

| 60 IT 501 | Operating Systems | Category | L | T | P | Credit |
|-----------|-------------------|----------|---|---|---|--------|
| | | PC | 3 | 0 | 0 | 3 |

Objective

Passed in BoS Meeting held on 16/05/2023
Approved in Academic Council Meeting held on 03/06/2023

- To understand the services provided by and the design of an operating system.
- To analyze the components of an operating system have a thorough knowledge of process management.
- To understand different approaches to memory management.
- To analyze and explain the algorithms used in Virtual Memory Management.
- To discuss the algorithms used in I/O and File Management.

Prerequisite

NIL

Course Outcomes**At the end of the course, the student will be able to**

| | | |
|-----|--|------------|
| CO1 | Recognize the basics of operating systems and its components | Understand |
| CO2 | Examine the scheduling algorithms and critical section problem. | Evaluate |
| CO3 | Acquire the knowledge of Deadlock and Storage Management | Understand |
| CO4 | Outline the memory management scheme and File concept. | Understand |
| CO5 | Analyze the concept of allocation methods, directory structure and free space management | Analyze |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 2 | 2 | 2 | 2 | | | | | | | | 2 | 2 | |
| CO2 | 3 | 3 | 2 | 2 | 2 | | | | | | | | 2 | 2 | |
| CO3 | 3 | 3 | 2 | 2 | 2 | | | | | | | | 2 | 2 | |
| CO4 | 3 | 3 | 2 | 2 | 2 | | | | | | | | 2 | 2 | |
| CO5 | 3 | 2 | 2 | 2 | 2 | | | | | | | | 2 | 2 | |

3-Strong;2-Medium;1-Some

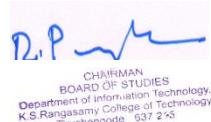
Assessment Pattern

| Bloom's Category | | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|--|-------------------------------------|----|-----------------------------|
| | | 1 | 2 | |
| Remember (Re) | | 10 | 10 | 10 |
| Understand (Un) | | 20 | 10 | 20 |
| Apply (Ap) | | 30 | 30 | 60 |
| Analyse (An) | | 00 | 00 | 00 |
| Evaluate (Ev) | | 00 | 00 | 00 |
| Create (Cr) | | 00 | 10 | 10 |

| K.S.Rangasamy College of Technology – Autonomous R2018 | | | | | | | |
|--|--------------|---|---|-----------|--------|---------------|-------|
| 60 IT 501 - Operating Systems | | | | | | | |
| IT | | | | | | | |
| Semester | Hours / Week | | | Total hrs | Credit | Maximum Marks | |
| | L | T | P | | C | CA | ES |
| | | | | | | | Total |

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| V | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
|---|---|---|---|----|---|----|----|------------------------------|
| Note: The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated. | | | | | | | | |
| BASIC CONCEPTS | | | | | | | | |
| Introduction - Operating System Structure – Operating System Operation– Protection and Security– Distributed Systems– Operating System Services – System Calls – System Programs - Process Concept – Process Scheduling – Operations on Processes – Cooperating Processes – Inter-process Communication. [9] | | | | | | | | |
| PROCESS MANAGEMENT | | | | | | | | |
| Threads – Overview – Threading issues - CPU Scheduling – Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Real Time Scheduling - The Critical-Section Problem – Synchronization Hardware – Semaphores – Classic problems of Synchronization. [9] | | | | | | | | |
| DEADLOCKS AND MEMORY MANAGEMENT* | | | | | | | | |
| Deadlocks – System Model – Deadlock Characterization – Methods for handling Deadlocks -Deadlock Prevention – Deadlock avoidance – Deadlock detection – Recovery from Deadlocks – Main Memory– Storage Management – Swapping – Contiguous Memory allocation – Paging – Segmentation – Structure of page table. [9] | | | | | | | | |
| VIRTUAL MEMORY AND FILE SYSTEM* | | | | | | | | |
| Virtual Memory – Demand Paging – Process creation – Page Replacement – Allocation of frames – Thrashing – File System Interface – File Concept – Access Methods – Directory Structure – File System Mounting – File Sharing – Protection. [9] | | | | | | | | |
| I/O SYSTEMS * | | | | | | | | |
| File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free Space Management. Kernel I/O Subsystems - Disk Structure – Disk Scheduling – Disk Management – Swap Space Management. [9] | | | | | | | | |
| | | | | | | | | Total Hours 45 |
| Text book(s): | | | | | | | | |
| 1. | Abraham Silberschatz, Peter Baer Galvin and Greg Gagne, “Operating System Concepts”, 10 th Edition, John Wiley & Sons (ASIA) Pvt. Ltd, 2018. | | | | | | | |
| 2. | William Stallings, “Operating Systems: Internals and Design Principles”, 9 th Edition, 2017. | | | | | | | |
| Reference(s) : | | | | | | | | |
| 1. | Harvey M. Deitel, “Operating Systems”, 3 rd Edition, Pearson Education Pvt. Ltd, 2007. | | | | | | | |
| 2. | Andrew S. Tanenbaum, “Modern Operating Systems”, 4 th Edition, Prentice Hall of India Pvt. Ltd, 2016. | | | | | | | |
| 3. | Pramod Chandra P. Bhatt, “An Introduction to Operating Systems, Concepts and Practice”,4 th Edition, PHI,2014. | | | | | | | |
| 4. | Milan Milenkovic, “Operating systems: Concepts and design”, McGraw-Hill; 2 nd edition,1992. | | | | | | | |

* SDG 4 – Quality Education

| S.No. | Topic | No.of Hours |
|-------|---|-------------|
| 1 | BASIC CONCEPTS | |
| 1.1 | Introduction | 1 |
| 1.2 | Operating System Structure - Operating System Operation | 1 |
| 1.3 | Protection and Security | 1 |
| 1.4 | Distributed Systems | 1 |

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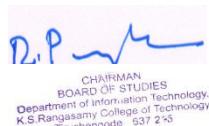
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| | | |
|----------|---|-----------|
| 1.5 | Operating System Services | 1 |
| 1.6 | System Calls – System Programs | 1 |
| 1.7 | Process Concept - Process Scheduling | 1 |
| 1.8 | Operations on Processes – Cooperating Processes | 1 |
| 1.9 | Inter-process Communication | 1 |
| 2 | PROCESS MANAGEMENT | |
| 2.1 | Threads – Overview – Threading issues | 1 |
| 2.2 | CPU Scheduling – Basic Concepts | 1 |
| 2.3 | Scheduling Criteria – Scheduling Algorithms | 1 |
| 2.4 | Multiple-Processor Scheduling | 1 |
| 2.5 | Real Time Scheduling | 1 |
| 2.6 | The Critical-Section Problem | 1 |
| 2.7 | Synchronization Hardware | 1 |
| 2.8 | Semaphores | 1 |
| 2.9 | Classic problems of Synchronization | 1 |
| 3 | DEADLOCKS AND MEMORY MANAGEMENT | |
| 3.1 | Deadlocks – System Model | 1 |
| 3.2 | Deadlock Characterization | 1 |
| 3.3 | Methods for handling Deadlocks | 1 |
| 3.4 | Deadlock Prevention – Deadlock avoidance | 1 |
| 3.5 | Deadlock detection – Recovery from Deadlocks | 1 |
| 3.6 | Main Memory–Storage Management | 1 |
| 3.7 | Swapping – Contiguous Memory allocation | 1 |
| 3.8 | Paging – Segmentation – Structure of page table | 1 |
| 4 | VIRTUAL MEMORY AND FILE SYSTEM | |
| 4.1 | Virtual Memory – Demand Paging | 1 |
| 4.2 | Process creation – Page Replacement | 1 |
| 4.3 | Allocation of frames | 1 |
| 4.4 | Thrashing – File System Interface | 1 |
| 4.5 | File Concept – Access Methods | 1 |
| 4.6 | Directory Structure | 1 |
| 4.7 | File System Mounting | 2 |
| 4.8 | File Sharing – Protection | 1 |
| 5 | I/O SYSTEMS | |
| 5.1 | File System Structure | 2 |
| 5.2 | File System Implementation | 1 |
| 5.3 | Directory Implementation – Allocation Methods | 1 |
| 5.4 | Free Space Management | 1 |
| 5.5 | Kernel I/O Subsystems - Disk Structure | 1 |
| 5.6 | Disk Scheduling | 1 |
| 5.7 | Disk Management | 1 |
| 5.8 | Swap Space Management | 1 |
| | Total | 45 |

Course Designers

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| 60 IT 502 | Computer Networks | Category | L | T | P | Credit |
|-----------|-------------------|----------|---|---|---|--------|
| | | PC | 3 | 0 | 0 | 3 |

Objective

- To provide insight about networks, topologies, and the key concepts
- To understand the principles, key protocols, design issues, and significance of each layers in OSI and TCP/IP
- To learn the functions of network layer and routing protocols
- To explore the concepts of congestion control and quality of services
- To learn the working principles of application layer protocols

Prerequisite

Basic knowledge of mathematics and programming.

Course Outcomes

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

| | | |
|-----|--|----|
| CO1 | Acquire Knowledge about basic network theory and layered communication architectures | Un |
| CO2 | Recognize the different error control techniques in data link layer | Re |
| CO3 | Attain solutions to various problems in network addressing and routing | Ap |
| CO4 | Explore the concepts of congestion control and flow control techniques | Un |
| CO5 | Attain extensive knowledge on principles of application layer protocols. | Un |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|--------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 2 | 2 | 2 | 2 | | | | | | | | 3 | 3 | |
| CO2 | 3 | 3 | 2 | 2 | 2 | | | | | | | | 3 | 3 | |
| CO3 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 3 | 3 | |
| CO4 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 3 | 3 | |
| CO5 | 3 | 2 | 2 | 2 | 2 | | | | | | | | 3 | 3 | |
| 3-Strong;2-Medium;1-Some | | | | | | | | | | | | | | | |

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 10 | 10 | 10 |
| Understand (Un) | 20 | 10 | 20 |
| Apply (Ap) | 30 | 30 | 60 |
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 10 | 10 |

Course Level Assessment Questions

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| |
|---|
| Course Outcome 1(CO1) |
| 1. Specify the fundamental characteristics of data communication system. |
| 2. Differentiate TCP and UDP protocol |
| 3. Write the difference between router and switch. |
| Course Outcome 2(CO2) |
| 1. Specify the different types of encoding techniques. |
| 2. Narrate the different types of parity check with an example. |
| 3. Mention the types of frames in HDLC. |
| Course Outcome 3(CO3) |
| 1. Differentiate subnetting and supernetting. |
| 2. Find the net id, host id and class for the given IP addresses. a) 117. 34. 3. 8 b) 132.57. 8. 6 |
| 3. Mention the different types of standard Ethernet frame. |
| Course Outcome 4 (CO4) |
| 1. Give the flow control characteristics to improve QoS |
| 2. Give the max and min size of UDP datagram. Justify your answer. |
| 3. Write the difference between Go-Back-N ARQ and Selective repeat ARQ. |
| Course Outcome 5(CO5) |
| 1. Justify how IMAP is better than POP3 protocol. |
| 2. Distinguish between a fully qualified domain name and a partially qualified domain name. |
| 3. Enumerate the working principle of SNMP protocol with neat diagram. |

Course Designers

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| K.S.Rangasamy College of Technology, Autonomous 2022 | | | | | | | | |
|--|------------|---|---|-----------|--------|---------------|-------|-----|
| 60 IT 502 - Computer Networks | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| V | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| Introduction and Physical Layer ** Introduction -Networks - Network Types – TCP/IP Protocol Suite - OSI Model – Digital-to-Digital conversion -Transmission Media | | | | | | | [9] | |
| Data Link Layer * Error Detection and Correction – Introduction –Cyclic Codes – CRC-C checksum - Data Link Control –DLC services –Data link layer protocols –HDLC – Wired LANs Ethernet (802.3)– Standard Ethernet - Wireless LANs - 802.11 | | | | | | | [9] | |
| Network Layer ** Network layer services –Circuit Switching - Packet Switching – Network layer performance- IPV4 Addresses–Address Space – IPV4 addressing types - IPV6 Addressing- IPV6 Protocol –IPv4 vs IPV6 – Unicast Routing - Distance Vector Routing – Link State Routing-OSPF – Multicast Routing – DVMRP | | | | | | | [9] | |
| Transport Layer ** Introduction -Transport Layer Protocols - User Datagram Protocol – Transmission Control Protocol – TCP Services-Features – Segment - TCP Connection -TCP congestion control – SCTP-Data Compression - Quality of services (QOS) | | | | | | | [9] | |
| Application Layer * World Wide Web and HTTP - FTP- Electronic Mail: SMTP, POP3, IMAP, MIME – Domain Name System –SNMP | | | | | | | [9] | |

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| | | Total Hours | 45 |
|----------------------|---|-------------|----|
| Text Book(s): | | | |
| • | Behrouz A. Forouzan, "Data communication and Networking", 6th Edition, Tata McGraw Hill, 2022. | | |
| • | James F. Kurose, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet" 8th Edition, Pearson Education, 2021. | | |
| Reference(s): | | | |
| • | Behrouz A. Forouzan, "TCP/IP Protocol Suite", 4th Edition, Tata McGraw Hill, 2015. | | |
| • | Andrew S. Tanenbaum, "Computer Networks", 4th Edition, PHI, 2003. | | |
| | Larry L.Peterson and Bruce S. Davie, "Computer Networks, A Systems Approach", 4th Edition, The Morgan Kaufman Series in Networking, 2007. | | |

*SDG 4 – Quality Education

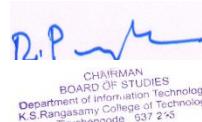
**SDG 9 – Industry, Innovation and Infrastructure

Course Contents and Lecture Schedule

| S.No. | Topic | No.of Hours |
|----------|--|-------------|
| 1 | Introduction and Physical Layer | |
| 1.1 | Introduction | 1 |
| 1.2 | Networks | 1 |
| 1.3 | Network Types | 1 |
| 1.4 | TCP/IP Protocol Suite | 2 |
| 1.5 | OSI Model | 2 |
| 1.6 | Digital-to-Digital conversion | 1 |
| 1.7 | Transmission Media | 1 |
| 2 | Data Link Layer | |
| 2.1 | Error Detection | 1 |
| 2.2 | Error Correction | 1 |
| 2.3 | Cyclic Codes – CRC | 1 |
| 2.4 | Checksum | 1 |
| 2.5 | Data Link Control, Services | 1 |
| 2.6 | Data link layer protocols –HDLC | 1 |
| 2.7 | Wired LANs Ethernet (802.3) | 1 |
| 2.8 | Standard Ethernet | 1 |
| 2.9 | Wireless LANs - 802.11 | 1 |
| 3 | Network Layer | |
| 3.1 | Network layer services | 1 |
| 3.2 | Circuit Switching - Packet Switching | 1 |
| 3.3 | Network layer performance | 1 |
| 3.4 | IPV4 Addresses–Address Space – IPV4 addressing types | 1 |
| 3.5 | IPv6 Addressing- IPv6 Protocol –IPv4 vs IPv6 | 1 |
| 3.6 | Unicast Routing - Distance Vector Routing | 1 |
| 3.7 | Link State Routing | 1 |
| 3.8 | OSPF | 1 |
| 3.9 | Multicast Routing – DVMRP | 1 |
| 4 | Transport Layer | |
| 4.1 | Introduction -Transport Layer Protocols | 1 |
| 4.2 | User Datagram Protocol | 1 |
| 4.3 | Transmission Control Protocol | 1 |
| 4.4 | TCP Services, Features | 1 |
| 4.5 | Segment - TCP Connection | 1 |
| 4.6 | TCP congestion control | 1 |
| 4.7 | SCTP | 1 |

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| | | |
|----------|---------------------------|-----------|
| 4.8 | Data Compression | 1 |
| 4.9 | Quality of services (QOS) | 1 |
| 5 | Application Layer | |
| 5.1 | World Wide Web and HTTP | 1 |
| 5.2 | FTP | 1 |
| 5.3 | Electronic Mail Protocols | 1 |
| s5.4 | SMTP | 1 |
| 5.5 | POP3 | 1 |
| 5.6 | IMAP | 1 |
| 5.7 | MIME | 1 |
| 5.8 | Domain Name System | 1 |
| 5.9 | SNMP | 1 |
| | Total | 45 |

| 60 IT 503 | Embedded Systems And IOT | Category | L | T | P | Credit |
|-----------|--------------------------|----------|---|---|---|--------|
| | | PE | 3 | 0 | 0 | 3 |

Objective

- To get familiarized with the embedded hardware architecture
- To understand the basics of RTOS and the attributes of various communication protocols.
- To build knowledge on Embedded C programming and realize the concept of peripheral interfacing.
- To get introduced with the concept of IoT and architecture of IoT systems
- To acquire knowledge over IoT implementation tools and the core elements of IoT

Prerequisite

Basic knowledge of web technology.

Course Outcomes

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

| | | |
|-----|---|------------|
| CO1 | Acquire knowledge about distributed components techniques and callbacks | Apply |
| CO2 | Analyze threads, Java Beans with its events and properties and archive files | Analyze |
| CO3 | Develop CORBA component technology with its implementation | Analyze |
| CO4 | Classify .net based component technologies for client server connection | Understand |
| CO5 | Examine the concept of distributed component framework with its development tools | Analyze |

Mapping with Programme Outcomes

| COs | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO 2 | PSO 3 |
|-----|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| CO1 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 3 | 3 | 2 |

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| | | | | | | | | | | | | | | | |
|--------------------------|---|---|---|---|---|--|--|--|--|--|--|--|---|---|---|
| CO2 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 3 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 3 | 3 | 2 |
| CO4 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 3 | 3 | 2 |
| CO5 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 3 | 3 | 2 |
| 3-Strong;2-Medium;1-Some | | | | | | | | | | | | | | | |

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 10 | 10 | 10 |
| Understand (Un) | 20 | 10 | 20 |
| Apply (Ap) | 30 | 30 | 60 |
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 10 | 10 |

K.S.Rangasamy College of Technology – Autonomous R2022**60 IT 503 / Embedded Systems And IOT****IT**

| Semester | Hours / Week | | | Total hrs | Credit | Maximum Marks | | |
|----------|--------------|---|---|-----------|--------|---------------|----|-------|
| | L | T | P | | C | CA | ES | Total |
| V | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |

Note: The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.

EMBEDDED HARDWARE ARCHITECTURE

CISC Architecture:- Introduction to MCS51 Family - **8051 Microcontroller*** - Architecture - Timers - Interrupts - Serial Data Communication - RISC Architecture:- overview of PIC 16F87x family - [9] PIC16F877A - Architecture - Timers - Interrupts - Serial ports - Introduction to ARM - LPC4088 Architecture

EMBEDDED C PROGRAMMING

Memory And I/O Devices Interfacing – Programming Embedded Systems in C – Need For RTOS – [9] Multiple Tasks and Processes – Context Switching – Priority Based Scheduling Policies.

IOT AND ARDUINO PROGRAMMING

Introduction to the Concept of IoT Devices – IoT Devices Versus Computers – IoT Configurations – Basic Components – Introduction to Arduino – Types of Arduino – Arduino Toolchain – Arduino Programming Structure – Sketches – Pins – Input/Output From Pins Using Sketches – Introduction to Arduino Shields – Integration of Sensors and Actuators with Arduino.

IOT COMMUNICATION AND OPEN PLATFORMS**

IoT Communication Models and APIs – IoT Communication Protocols – Bluetooth – WiFi – ZigBee – GPS – GSM modules – Open Platform (like Raspberry Pi) – Architecture – Programming – Interfacing – Accessing GPIO Pins – Sending and Receiving Signals Using GPIO Pins – Connecting to the Cloud.

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APPLICATIONS DEVELOPMENT**

Complete Design of Embedded Systems – Development of IoT Applications – Home Automation – [9]
Smart Agriculture – Smart Cities – Smart Healthcare.

Total Hours 45

Text book(s):

| | |
|----|---|
| 1. | Muhammed Ali Mazidi, Janice Gillispie Mazidi, Rolin D. McKinlay, "The 8051 Microcontroller and Embedded Systems", Pearson Education, Second Edition, 2014 |
| 2. | Robert Barton, Patrick Grossetete, David Hanes, Jerome Henry, Gonzalo Salgueiro, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the |

Reference(s):

| | |
|----|---|
| 1. | Michael J. Pont, "Embedded C", Pearson Education, 2007 |
| 2. | Wayne Wolf, "Computers as Components: Principles of Embedded Computer System Design", Elsevier, 2006. |
| 3. | Andrew N Sloss, D. Symes, C. Wright, "Arm System Developer's Guide", Morgan Kauffman/ Elsevier, 2006. |
| 4 | Arshdeep Bahga, Vijay Madisetti, "Internet of Things – A hands-on approach", Universities Press, 2015 |

* SDG 9 - Industry, Innovation and Infrastructure

** SDG 11 - Sustainable Cities and Communities

Course Contents and Lecture Schedule

| S.No. | Topic | No.of Hours |
|----------|--|-------------|
| 1 | EMBEDDED HARDWARE ARCHITECTURE | |
| 1.1 | CISC Architecture :- Introduction to MCS51 Family | 1 |
| 1.2 | 8051 Microcontroller | 1 |
| 1.3 | Architecture | 1 |
| 1.4 | Timers - Interrupts | 1 |
| 1.5 | Serial Data Communication | 1 |
| 1.6 | RISC Architecture :- overview of PIC 16F87x family | 1 |
| 1.7 | PIC16F877A - Architecture | 1 |
| 1.8 | Timers – Interrupts- Serial ports | 1 |
| 1.9 | Introduction to ARM - LPC4088 Architecture | 1 |
| 2 | EMBEDDED C PROGRAMMING | |
| 2.1 | Memory And I/O Devices Interfacing | 2 |
| 2.2 | Programming Embedded Systems in C | 2 |
| 2.3 | Need For RTOS | 1 |
| 2.4 | Multiple Tasks and Processes | 2 |
| 2.5 | Context Switching | 1 |
| 2.6 | Priority Based Scheduling Policies | 1 |
| 3 | IOT AND ARDUINO PROGRAMMING | |
| 3.1 | Introduction to the Concept of IoT Devices | 1 |
| 3.2 | IoT Devices Versus Computers | 1 |
| 3.3 | IoT Configurations | 1 |
| 3.4 | Basic Components | 1 |

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| | | |
|----------|---|---|
| 3.5 | Introduction to Arduino - Types of Arduino | 1 |
| 3.6 | Arduino Toolchain - Arduino Programming Structure | 1 |
| 3.7 | Sketches – Pins - Input/Output From Pins Using Sketches | 1 |
| 3.8 | Introduction to Arduino Shields | 1 |
| 3.9 | Integration of Sensors and Actuators with Arduino | 1 |
| 4 | IOT COMMUNICATION AND OPEN PLATFORMS | |
| 4.1 | IoT Communication Models and APIs | 1 |
| 4.2 | IoT Communication Protocols | 1 |
| 4.3 | Bluetooth – WiFi – ZigBee | 1 |
| 4.4 | GPS – GSM modules | 1 |
| 4.5 | Open Platform (like Raspberry Pi) | 1 |
| 4.6 | Architecture – Programming - Interfacing | 1 |
| 4.7 | Accessing GPIO Pins | 1 |
| 4.8 | Sending and Receiving Signals Using GPIO Pins | 1 |
| 4.9 | Connecting to the Cloud | 1 |
| 5 | APPLICATIONS DEVELOPMENT | |
| 5.1 | Complete Design of Embedded Systems | 1 |
| 5.2 | Development of IoT Applications | 2 |
| 5.3 | Home Automation | 2 |
| 5.4 | Smart Agriculture | 1 |
| 5.5 | Smart Cities | 1 |
| 5.6 | Smart Healthcare. | 2 |

Course Designers

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| 60 IT 504 | Design Thinking | Category | L | T | P | Credit |
|-----------|-----------------|----------|---|---|---|--------|
| | | PE | 3 | 1 | 0 | 4 |

Objective

- To learn design thinking concepts and principles.
- To design thinking methods in every stage of the problem.
- To learn the different phases of design thinking.
- To learn the application of design thinking for the IT industry
- To apply various methods in design thinking to different problems.

Prerequisite

Basic knowledge of mathematics and programming.

Course Outcomes

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

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| | | |
|-----|---|---------|
| CO1 | Apply design thinking for product development | Apply |
| CO2 | Use design thinking tools | Apply |
| CO3 | Identify need for products and disruption | Apply |
| CO4 | Design innovative products | Analyze |
| CO5 | Apply design thinking to improve on existing products in IT | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | | 3 | 2 | 3 |
| CO2 | 3 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | 3 | 3 | | | 2 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 2 | 3 | 3 | 2 | 3 | | | | | 3 | 3 | 3 |
| CO4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | 3 | | | | 2 | 2 | 2 |
| CO5 | 3 | 3 | 3 | 3 | 3 | | 3 | | | | | | 3 | 3 | 2 |

3-Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 10 | 10 | 10 |
| Understand (Un) | 20 | 10 | 20 |
| Apply (Ap) | 30 | 30 | 60 |
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 10 | 10 |

Course Level Assessment Questions

| Course Outcome 1(CO1) | |
|-----------------------|---|
| 1. | Discuss about the how to plan a design project. |
| 2. | Briefly explain about the process of design thinking. |
| 3. | Explain the ten tools of design thinking. |
| Course Outcome 2(CO2) | |
| 1. | Explain the description of the customer needs. |
| 2. | Briefly discuss about the empathetic design. |

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| | |
|-------------------------------|--|
| 3. | Briefly about the problem classification of understanding of the problem. |
| Course Outcome 3(CO3) | |
| 1. | Explain about visualization and presentation techniques. |
| 2. | Learn startup Vs Design thinking. Which method should you be using? |
| 3. | Discuss about the creativity in design thinking. |
| Course Outcome 4 (CO4) | |
| 1. | Explain about the test phase. |
| 2. | Briefly discuss about the desirability testing. |
| 3. | Explain the agility for design thinking. |
| Course Outcome 5(CO5) | |
| 1. | How do organization use design thinking? |
| 2. | How can design thinking be applied to different industries challenged and business sector? |
| 3. | Discuss about the design activism. |

| K.S.Rangasamy College of Technology – Autonomous R2022 | | | | | | | | | |
|--|--|------------|---|-----------|--------|---------------|----|-------|-----|
| 60 IT 504 – Design Thinking | | | | | | | | | |
| Information Technology | | | | | | | | | |
| Semester | | Hours/Week | | Total hrs | Credit | Maximum Marks | | | |
| Semester | | L | T | P | Credit | CA | ES | TOTAL | |
| V | | 3 | 1 | 0 | 60 | 4 | 40 | 60 | 100 |
| INTRODUCTION TO DESIGN THINKING * | | | | | | | | | |
| Introduction to Design Thinking – Importance of Design Thinking – History of Design Thinking- Why Design? - Four Questions, Ten Tools - Principles of Design Thinking - The process of Design Thinking - How to plan a Design Thinking project. | | | | | | | | 9 | |
| UNDERSTAND, OBSERVE AND DEFINE THE PROBLEM | | | | | | | | | |
| Search field determination - Problem clarification - Understanding of the problem – Problem analysis - Reformulation of the problem - Observation Phase - Empathetic design - Tips for observing - Methods for Empathetic Design - Point-of-View Phase - Characterization of the target group - Description of customer needs. | | | | | | | | 9 | |
| IDEATION AND PROTOTYPING ** | | | | | | | | | |
| Ideate Phase - The creative process and creative principles - Creativity techniques - Evaluation of ideas - Prototype Phase – Lean Startup Method for Prototype Development - Visualization and presentation techniques. | | | | | | | | 9 | |
| DESIGN THINKING FOR STRATEGIC INNOVATION *** | | | | | | | | | |
| Innovation Management-Changing Management Paradigms-Design Thinking related to Science and art-Design Thinking in Business-Linking Design Thinking Solution to Business Challenges | | | | | | | | 9 | |
| DEVOPS | | | | | | | | | |
| Introduction to DevOps – Devops vs Agile – DevOps Principles and Life Cycle – Introduction to CI / CD & DevOps Tools- Version Control – Build Automation – Configuration Management – Containerization – Continuous Deployment – Continuous Integration – Continuous Testing – Continuous Monitoring. | | | | | | | | 9 | |
| Total Hours: 45 + 15(Tutorial) | | | | | | | | 60 | |

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| Text Book(s) | |
|----------------------|---|
| 3. | MaurícioVianna, YsmarVianna, Brenda Lucena and Beatriz Russo," Design thinking : Business innovation", MJV Technologies and innovation press, 2011. |
| 4. | Design Thinking: Integrating Innovation, Customer Experience, and Brand Value by Thomas Lockwood (Editor) Published February 16th 2010 by Allworth Press. |
| 5. | KalloriVikram, —Introduction to DevOps, 1 st Edition, KalloriVikram Publication, 2016. |
| Reference(s): | |
| 4. | Jaokim Verona, —Practical DevOps, 2 nd Edition, Packt. Publication, 2018. |
| 5. | Stephen Fleming, Pravin, —DevOps Handbook: Introduction of DevOps Resource Management—,1st Edition, Createspace Independent Pub. , 2010. |
| 6. | Len Bass, Ingo Weber, Liming Zhu, G., —DevOps: A Software Architect's Perspective, 1st Edition, Addison- Wesley Professional, 2015. |
| 7. | Alistair Cockburn, "Agile Software Development", 2nd ed, Pearson Education, 2007. |
| 8. | http://www.creativityatwork.com/design-thinking-strategy-for-innovation/ |

* SDG-4 – Quality Education

* * SDG-8 – Employment and decent work for all

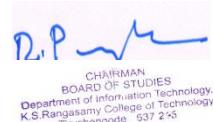
* * * SDG-9 – Industrialization and foster innovation

Course Contents and Lecture Schedule

| S.No. | Topic | No.of Hours |
|----------|--|-------------|
| 1 | INTRODUCTION TO DESIGN THINKING | |
| 1.1 | Introduction to Design Thinking | 1 |
| 1.2 | Importance of Design Thinking | 1 |
| 1.3 | History of Design Thinking | 1 |
| 1.4 | Why Design? - Four Questions | 1 |
| 1.5 | Ten Tools | 1 |
| 1.6 | Principles of Design Thinking | 2 |
| 1.7 | The process of Design Thinking | 1 |
| 1.8 | How to plan a Design Thinking project. | 1 |
| 2 | UNDERSTAND, OBSERVE AND DEFINE THE PROBLEM | |
| 2.1 | Search field determination | 1 |
| 2.2 | Problem clarification - Understanding of the problem | 1 |
| 2.3 | Problem analysis - Reformulation of the problem | 1 |
| 2.4 | Observation Phase - Empathetic design | 1 |
| 2.5 | Tips for observing | 1 |
| 2.6 | Methods for Empathetic Design | 1 |
| 2.7 | Point-of-View Phase | 1 |
| 2.8 | Characterization of the target group | 1 |
| 2.9 | Description of customer needs | 1 |
| 3 | IDEATION AND PROTOTYPING | |

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| | | |
|----------|---|----|
| 3.1 | Ideate Phase | 1 |
| 3.2 | The creative process and creative principles | 1 |
| 3.3 | Creativity techniques | 1 |
| 3.4 | Evaluation of ideas | 2 |
| 3.5 | Prototype Phase | 1 |
| 3.6 | Lean Startup Method for Prototype Development | 2 |
| 3.7 | Visualization and presentation techniques. | 1 |
| 4 | DESIGN THINKING FOR STRATEGIC INNOVATION | |
| 4.1 | Innovation Management | 2 |
| 4.2 | Changing Management Paradigms | 1 |
| 4.3 | Design Thinking related to Science and art | 2 |
| 4.4 | Design Thinking in Business | 2 |
| 4.5 | Linking Design Thinking Solution to Business Challenges | 2 |
| 5 | DEVOPS | |
| 5.1 | Introduction to DevOps | 1 |
| 5.2 | DevOps vs Agile | 1 |
| 5.3 | DevOps Principles and Life Cycle | 1 |
| 5.4 | Introduction to CI / CD & DevOps Tools | 1 |
| 5.5 | Version Control – Build Automation | 1 |
| 5.6 | Configuration Management – Containerization | 1 |
| 5.7 | Continuous Deployment – Continuous Integration | 1 |
| 5.8 | Continuous Testing | 1 |
| 5.9 | Continuous Monitoring | 1 |
| | Total | 45 |

Course Designers

Mr.R.Arunkumar – rarunkumar@ksrct.ac.in

| 60 IT E11 | C# and .NET Framework | Category | L | T | P | Credit |
|-----------|-----------------------|----------|---|---|---|--------|
| | | ES | 3 | 0 | 0 | 3 |

Objective

- To learn basic programming in C#
- To know the object oriented aspects of C#

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- To be aware of Windows application development in .NET
- To update and enhance skills in writing Web based applications and ADO.NET
- To learn CLR and the .NET Framework

Prerequisite

Basic knowledge of any programming language

Course Outcomes

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

| | | |
|-----|--|------------|
| CO1 | Analyze the basic structure of a C# application | Understand |
| CO2 | Develop C# programs which makes use of inheritance, polymorphism, interfaces and handle exceptions | Apply |
| CO3 | Design windows application and access data with ADO.NET | Apply |
| CO4 | Apply the knowledge of data binding to create Web forms and obtain knowledge of Web services | Apply |
| CO5 | Discuss about assemblies, versioning and explore the activities of marshalling and Remoting | Create |

Mapping with Programme Outcomes

| COs | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO 2 | PSO 3 |
|-----|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| CO1 | 3 | 3 | 3 | 3 | 3 | | | | 2 | 2 | | | 3 | 3 | 2 |
| CO2 | 3 | 3 | 3 | 3 | 3 | | | | 2 | 2 | | | 3 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 2 | 2 | | | | 2 | 3 | 3 | | 3 | 3 | 2 |
| CO4 | 3 | 3 | 3 | 2 | 2 | | | | 2 | 3 | 3 | | 3 | 3 | 2 |
| CO5 | 3 | 3 | 3 | 2 | 2 | | | | 2 | 3 | 3 | | 3 | 3 | 2 |

3-Strong;2-Medium;1-Some

Assessment Pattern

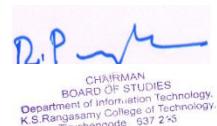
| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 6 | 6 | 10 |
| Understand (Un) | 4 | 4 | 10 |
| Apply (Ap) | 30 | 30 | 50 |
| Analyze (An) | 10 | 10 | 10 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 10 | 10 | 20 |

Course Level Assessment Questions

| Course Outcome 1(CO1) | |
|-----------------------|---|
| 1. | List and explain the various types of operators and expressions available in C# with necessary examples |

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| | |
|----|--|
| 2. | Explore the structure the C# program with an example code snippet |
| 3. | Create a program using C# to print the following pattern using control statements 5 4 3 2 1 5 4 3 2 5 4 3 5 4 5 |

Course Outcome 2(CO2)

| | |
|----|---|
| 1. | Enumerate and explain the types of inheritance in C# with suitable code snippet |
| 2. | Explain the concept of polymorphism in C # with relevant code snippet |
| 3. | Create a try block that contains the C# code for the following scenario: Declare an integer array of size 6 and store the value '30' in the 8th position of the Array. Use multiple catch statements for catching the exception that may be thrown by the try block and display the name of the exception to be caught |

Course Outcome 3(CO3)

| | |
|----|---|
| 1. | Design a simple windows form in .Net for examination registration process with necessary controls |
| 2. | Explain ADO.NET object model with suitable diagram. |
| 3. | Create a .Net program to Implement database connectivity using data controls |

Course Outcome 4 (CO4)

| | |
|----|--|
| 1. | Create a new web form to collect the following details from the student for college database maintenance Name : Reg.No.: Year: Section: Department: College Name; Contact No.: Mail ID: Place a submit button along with necessary controls |
| 2. | Analyze the importance of Web Service Development Language(WSDL) in generating the proxy class of the Web Service |
| 3. | Explore the step-by-step process of returning a dataset from a web services |

Course Outcome 5(CO5)

| | |
|----|--|
| 1. | What is a .Net Assembly? Describe the types of assemblies in .NET |
| 2. | Discuss the different ways of obtaining a type reference in reflection |
| 3. | Narrate the concept of marshalling in .Net. Explain the types of marshalling |

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60 IT E11– C# and .NET Framework

IT

| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
|----------|------------|---|---|-----------|--------|---------------|----|-------|
| | L | T | P | | | CA | ES | Total |

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CHAIRMAN
BOARD OF STUDIES
Department of Information Technology
K.S. Rangasamy College of Technology
Tiruchengode - 637 245

| V | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
|---|---|---|---|----|---|----|-------------|-----------|
| Introduction to C# * | | | | | | | | [9] |
| Introducing to C# , Overview of C#, Literals, Variables and Data Types, Operators and Expressions, Branching and Looping , Methods , Arrays ,Strings , Structures and Enumerations, boxing and unboxing. | | | | | | | | |
| Lab Exercise: Develop simple application using C# | | | | | | | | |
| Object Oriented Aspects of C# * | | | | | | | | [9] |
| Class, Objects, Constructors and its types, Inheritance, Properties, Indexers, Index overloading, polymorphism, Sealed class and methods, Interface, Abstract class, Operator overloading, Delegates, Events, Errors and exception, Threading, | | | | | | | | |
| Lab Exercise: Implement inheritance and Operator overloading using C# | | | | | | | | |
| Window Based Application Development on .NET * | | | | | | | | [9] |
| Understanding .NET - Building Windows Applications - Creating a Simple Windows Forms, Creating a Windows Forms Application, XML Documentation Comments. Accessing Data with ADO.NET, Relational Databases and SQL, ADO .NET Object Model, Using OLE DB Managed Providers and Working with Data- Bound Controls. | | | | | | | | |
| Lab Exercise: Implement database connectivity using data controls | | | | | | | | |
| Web Based Application Development on .NET * | | | | | | | | [9] |
| Understanding Web Forms - Creating a Web Forms - Adding Controls - Data Binding, Web Services - SOAP, WSDL and Discovery - Building a Web Service - Passing datasets, returning datasets from web services, Creating the Proxy - Session and Cache management. | | | | | | | | |
| Lab Exercise: Create web forms and adding controls | | | | | | | | |
| The CLR and the .NET Framework * | | | | | | | | [9] |
| Assemblies, Versioning, Attributes, Reflection, Viewing meta data, Type discovery, Reflection on type, Marshalling, Remoting, Security in .NET | | | | | | | | |
| Lab Exercise: Deployment using CLR | | | | | | | | |
| | | | | | | | Total Hours | 45 |

Textbook(s):

1. Mark.J.Price," C# 11 and .NET 7 – Modern Cross-Platform Development", 7th Edition, Packt Publishing, 2022
2. Mark Reed , "C#: The Ultimate Beginners Guide to Learn C# Programming Step-by-Step (Computer Programming)", Kindle Edition,2021

Reference(s):

1. "C# in Depth: Fourth Edition Paperback ", Manning Publisher, 4th Edition,2019
2. Harsh Bhasin, —Programming in C#, Oxford University Press, 2014.
3. Christian Nagel et al. "Professional C# 2012 with .NET 4.5", Wiley India,2012
4. Herbert Schildt, "The Complete Reference: C# 4.0", Tata Mc Graw Hill,2012.

* SDG – 9 (INDUSTRY, INNOVATION AND INFRASTRUCTURE)

Course Contents and Lecture Schedule

| S.No. | Topic | No. of Hours |
|------------|---|--------------|
| 1.0 | Introduction to C# | |
| 1.1 | Introducing C# | 1 |
| 1.2 | Overview of C# - Literals, Variables and Data Types | 1 |
| 1.3 | Operators and Expressions | 1 |
| 1.4 | Branching and Looping | 1 |
| 1.5 | Methods | 1 |
| 1.6 | Strings | 1 |
| 1.7 | Structures and Enumerations | 2 |
| 1.8 | Boxing and unboxing | 1 |
| 2.0 | Object Oriented Aspects of C# | |
| 2.1 | Class, Objects | 1 |

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| | | |
|------------|--|-----------|
| 2.2 | Constructors and its types | 1 |
| 2.3 | Inheritance, properties | 1 |
| 2.4 | Indexers, index overloading | 1 |
| 2.5 | Polymorphism, sealed class and methods | 2 |
| 2.6 | Operator overloading, delegates, events | 1 |
| 2.7 | Errors and exception | 1 |
| 2.8 | Threading | 1 |
| 3.0 | Window Based Application Development on .NET | |
| 3.1 | Understanding .NET - Building Windows Applications | 1 |
| 3.2 | Creating a Simple Windows Forms | 1 |
| 3.3 | Creating a Windows Forms Application | 1 |
| 3.4 | XML Documentation Comments | 1 |
| 3.5 | Accessing Data with ADO.NET | 1 |
| 3.6 | Relational Databases and SQL | 1 |
| 3.7 | ADO .NET Object Model | 1 |
| 3.8 | Using OLE DB Managed Providers and Working with Data | 1 |
| 3.9 | Bound Controls | |
| 4.0 | Web Based Application Development on .NET | |
| 4.1 | Understanding Web Forms - Creating a Web Forms | 1 |
| 4.2 | Adding Controls | 1 |
| 4.3 | Data Binding | 1 |
| 4.4 | Web Services - SOAP | 1 |
| 4.5 | WSDL and Discovery - Building a Web Service | 2 |
| 4.6 | Passing datasets- returning datasets from web services | 1 |
| 4.7 | Creating the Proxy | 1 |
| 4.8 | Session and Cache management | 1 |
| 5.0 | The CLR and the .NET Framework | |
| 5.1 | Assemblies, Versioning | 1 |
| 5.2 | Attributes, reflection | 2 |
| 5.3 | Viewing meta data | 1 |
| 5.4 | Type discovery | 1 |
| 5.5 | Reflection on type | 1 |
| 5.6 | Marshalling | 1 |
| 5.7 | Remoting | 1 |
| 5.8 | Security in .NET | 1 |
| | Total | 45 |

Course Designers

1.Dr.C.Nallusamy- nallusamyc@ksrct.ac.in

| 60 IT E12 | Open Source Software | Category | L | T | P | Credit |
|-----------|----------------------|----------|---|---|---|--------|
| | | PC | 3 | 0 | 0 | 3 |

Objective

- Understand the concept of HTML 5, JAVA Script and CSS
- Be familiar with participating in a Linux
- Open-Source Database: MYSQL
- Learn programming language like Ruby
- Learn some important PHP

Prerequisite

Passed in BoS Meeting held on 16/05/2023
 Approved in Academic Council Meeting held on 03/06/2023

Basic knowledge of Open Source Software and PHP

Course Outcomes

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

| | | |
|-----|---|-------|
| CO1 | Introduction to HTML 5, Java Script, PHP and CSS | Apply |
| CO2 | Gather information about Free and Open Source Software projects from software releases and from sites on the internet | Apply |
| CO3 | Build and modify one or more Free and Open-Source Software packages | Apply |
| CO4 | Use a version control system | Apply |
| CO5 | Apply Contribute software to and interact with PHP. | Apply |

Mapping with Programme Outcomes

| Cos | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO2 | 3 | 2 | 3 | 2 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO3 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO4 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO5 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |

3-Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 10 | 10 | 10 |
| Understand (Un) | 20 | 10 | 20 |
| Apply (Ap) | 30 | 30 | 60 |
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 10 | 10 |

Course Level Assessment Questions

| Course Outcome 1(CO1) | |
|-----------------------|--|
| 1 | Describe about Request and Response Procedure? |
| 2 | Illustrate the uses of types of HTML? |
| 3 | Explain about Java Script with an example program? |

Course Outcome 2(CO2)

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| | |
|-------------------------------|---|
| 1 | Compare Booting Linux and other operating systems? |
| 2 | Retate X Windows System Configuration? |
| 3 | Compare Backup and Restore Procedures? |
| Course Outcome 3(CO3) | |
| 1 | Describe about show Databases and Table in MYSQL? |
| 2 | Illustrate the Describe Table? |
| 3 | Illustrate the Loading and Dumping a Database? |
| Course Outcome 4 (CO4) | |
| 1 | Compare Version Control Systems like Git or equivalent? |
| 2 | Illustrate the Bug Tracking Systems |
| 3 | Relate Package Management Systems? |
| Course Outcome 5(CO5) | |
| 1 | Illustrate PHP Scripting |
| 2 | Retate Operations and Expressions? |
| 3 | Describe the Expressions Control? |

| K.S.Rangasamy College of Technology, Autonomous 2022 | | | | | | | | |
|--|---|---|---|-----------|--------|---------------|----|-------|
| 60 IT E12 - Open-Source Software | | | | | | | | |
| Information Technology | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| V | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| Introduction Open Source, Free Software, Free Software vs. Open-Source software, Public Domain Software, FOSS does not mean no cost. History: BSD, The Free Software Foundation and the GNU Project. | | | | | | | | [9] |
| Methodologies * Open Source History, Initiatives, Principle and methodologies. Philosophy: Software Freedom, Open Source Development Model Licenses and Patents: What Is A License Important FOSS Licenses (Apache, BSD, GPL, LGPL), Copyrights and Copyleft, Patents Economics of FOSS: Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization. | | | | | | | | [9] |
| Overview of MongoDB * MongoDB Operators, Database Commands, Database, Collection, CRUD: Documents, MongoDB Shell, MongoDB Cloud, MongoDB Tools, Connectivity | | | | | | | | [9] |
| Node JS ** Introduction to Node JS, Setup Dev Environment, Node Package Manager, Creating Web server, File System, Debugging Node JS Application, Events, Express.JS, Serving Static Resources, Database connectivity. | | | | | | | | [9] |
| RUST Programming ** Introduction to Rust Programming, Comprehensive Rust, Rust for JavaScript/TypeScript Developers, Rust for C# Developers, Rust for Python Developers, Desktop Apps with Rust and Tauri, Web APIs with Rust and ActixWeb, Web Apps with Rust and Leptos, Memory Safe Programming with Rust. | | | | | | | | [9] |
| Total Hours | | | | | | | | 45 |
| Text Book(s): | | | | | | | | |
| | Linux in a Nutshell: A Desktop Quick Reference 6th Edition, Kindle Edition, 2022 | | | | | | | |
| 2. | Linux: The Complete Reference, Sixth Edition (English, Paperback, Petersen Richard) | | | | | | | |

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| | |
|----------------------|---|
| | Paperback – 1 July 2017 |
| Reference(s): | |
| 1. | Learning PHP, MySQL, Java Script, CSS and HTML5 , Robin Nixon, O'Reilly Publications, 3rd Edition, 2014. |
| 2. | Open Source Software, P.Rizwan Ahmed, Margham Publication, Chennai, 2015 |
| 3. | Steven Holzner, —HTML Black Book , Dreamtech Press &Paraglyph Press Publishers, 2007 Publishers, 2007 |

* SDG: 4 - Quality Education

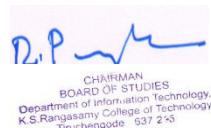
**SDG 9 – Industry, Innovation and Infrastructure

Course Contents and Lecture Schedule

| S.No. | Topic | No.of Hours |
|-------|---|-------------|
| 1 | INTRODUCTION TO HTML 5, JAVA SCRIPT, PHP AND CSS | |
| 1.1 | Introduction to Dynamic Web content | 1 |
| 1.2 | HTTP and HTML | 1 |
| 1.3 | Request and Response Procedure | 1 |
| 1.4 | The Benefits of PHP, JAVA Script | 1 |
| 1.5 | CSS, and HTML5 | 1 |
| 1.6 | Introduction to HTML5 | 1 |
| 1.7 | The Canvas -The HTML5 Canvas | 1 |
| 1.8 | HTML5 Audio and Video- Introduction to CSS | 1 |
| 1.9 | CSS Rules-Style Types- CSS Selectors- CSS Colors | 1 |
| 2 | LINUX | |
| 2.1 | Linux Installation and Hardware Configuration | 1 |
| 2.2 | Boot Process-The Linux Loader (LILO) | 1 |
| 2.3 | Dual-Booting Linux and other Operating System | 1 |
| 2.4 | Boot-Time Kernel Options | 1 |
| 2.5 | X Windows System Configuration | 1 |
| 2.6 | System Administration | 1 |
| 2.7 | Backup and Restore Procedures | 1 |
| 2.8 | Regularization | 1 |
| 2.9 | Strategies for keeping a Secure Server. | 1 |
| 3 | MYSQL | |
| 3.1 | Introduction to MY SQL | 1 |
| 3.2 | The USE command | 1 |
| 3.3 | Create Database and Tables | 1 |
| 3.4 | Describe Table | 1 |
| 3.5 | Select, Insert, Update | 1 |
| 3.6 | Delete statement | 1 |
| 3.7 | Some Administrative detail | 1 |
| 3.8 | Table Joins | 1 |
| 3.9 | Loading and Dumping a Database | 1 |
| 4 | PROGRAMMING TOOLS AND TECHNIQUES | |
| 4.1 | Usage of design Tools like Argo UML | 1 |
| 4.2 | Usage of design Tools like Argo equivalent | 1 |

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| | | |
|----------|------------------------------|-----------|
| 4.3 | Version Control | 1 |
| 4.4 | Bug Tracking Systems | 1 |
| 4.5 | Bug Tracking Systems | 1 |
| 4.6 | Package Management Systems | 1 |
| 4.7 | Package Management Systems | 1 |
| 4.8 | Package Management Systems | 1 |
| 4.9 | Package Management Systems | 1 |
| 5 | PHP | |
| 5.1 | PHP Introduction | 1 |
| 5.2 | PHP Introduction | 1 |
| 5.3 | PHP Scripting-Primitives | 1 |
| 5.4 | Operations and Expressions | 1 |
| 5.5 | PHP Variables-Operations | 1 |
| 5.6 | Expressions Control | 1 |
| 5.7 | statement-Array | 1 |
| 5.8 | Functions.Control | 1 |
| 5.9 | statement – Array – Function | 1 |
| | Total | 45 |

Course Designers

1. Mr.S.Arulmurugan – arulmurugans@ksrct.ac.in

| 60 IT E13 | Mathematical Foundations of Data Science | Category | L | T | P | Credit |
|-----------|---|-----------------|----------|----------|----------|---------------|
| | | PC | 3 | 0 | 0 | 3 |

Objectives

- To introduce the basics of data science
- To enrich the skills in linear algebra models
- To understand the concepts of fitting of curves and regression
- To expose the knowledge optimization techniques in advanced fields.
- To impart the knowledge in data science methods

Prerequisite

Nil

Course Outcomes

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

| | | |
|-----|---|----------|
| CO1 | Analyze the concepts of linear algebra in data science problems. | Remember |
| CO2 | Apply the properties, eigen values and eigen vectors based on linear algebra. | Apply |
| CO3 | Solve the real time applications using regression analysis and estimation. | Apply |
| CO4 | Compare the optimization techniques to solve the machine learning | Apply |
| CO5 | Apply the data science concepts as advanced models. | Apply |

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Mapping with Programme Outcomes

| COs | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO 2 | PSO 3 |
|-----|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| CO1 | 2 | 2 | 2 | 2 | 2 | 2 | | | | 1 | 1 | 1 | 3 | 2 | |
| CO2 | 3 | 2 | 3 | 3 | 1 | 2 | | | | 1 | 1 | 1 | 3 | 2 | |
| CO3 | 3 | 2 | 1 | 1 | 3 | 2 | | | | 1 | 1 | 1 | 3 | 2 | |
| CO4 | 3 | 3 | 2 | 3 | 1 | 2 | | | | 1 | 1 | 1 | 3 | 2 | |
| CO5 | 3 | 3 | 2 | 3 | 1 | 2 | | | | 1 | 1 | 1 | 3 | 2 | |

3-Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 00 | 00 | 00 |
| Understand (Un) | 20 | 20 | 20 |
| Apply (Ap) | 40 | 40 | 80 |
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 00 | 00 |

Course Level Assessment Questions

| Course Outcome 1(CO1) | |
|-------------------------------|--|
| 1. | Define linear dependent set and independent set of a vector space. |
| 2. | Discuss various singular cases in the system of linear equations in three dimensions |
| 3. | Consider two linearly independent vectors $a_1, a_2 \in R^3$. Consider a set W that contains all points of the form $\beta_1 a_1 + \beta_2 a_2 + 3$. Is W a subspace? If yes, what is the dimension of the subspace. |
| Course Outcome 2(CO2) | |
| 1. | Discuss the tests available to test the positive definiteness of a matrix |
| 2. | Write down the condition for minimum of the function $ax^2 + 2bxy + cy^2$ |
| 3. | Write out the transition matrix for the Markov chain (X_0, X_1, \dots) . Calculate its stationary distribution. |
| Course Outcome 3(CO3) | |
| 1. | The probability that the life of a bulb for working 10 years is 0.05. Find the probability that out of 6 bulbs (i) At least one , (ii) greater than four and (iii) none work for 10 years. |
| 2. | Explore the various steps involved in data science process and suitable diagrams and examples. |
| 3. | Demonstrate the different types of variables used in data analysis with an example for each. |
| Course Outcome 4 (CO4) | |
| 1. | Discuss about supervised and unsupervised reinforcement learning algorithms |
| 2. | Write the important objectives of machine learning and explain different perspectives in machine learning |
| 3. | Illustrate the role of word vectors in advancing NLP involving deep learning |
| Course Outcome 5(CO5) | |
| 1. | Explain the differences between supervised and unsupervised machine |

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| | |
|----|---|
| | learning algorithms. List some advantages and disadvantages of this count-based test, compared to a test based on linear regression |
| 2. | Write this as a linear model, and identify the feature vectors |
| 3. | Explain how to compute the maximum likelihood estimators of α s, β s, and σ . In your answer, you should explain the relationship between the least squares method and maximum likelihood estimation. |

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|---|------------|---|---|-----------|--------|----|---------------|-------|
| 60 IT E13 – Mathematical Foundations of Data Science | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | | Maximum Marks | |
| | L | T | P | | C | CA | ES | Total |
| V | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| BASICS OF DATA SCIENCE AND PROBLEMS | | | | | | | [9] | |
| Introduction to Data science - Typology of problems-Importance of linear algebra-Linear algebra applications- statistics and optimization from a data science perspective- Structured thinking for solving data science problems. | | | | | | | [9] | |
| LINEAR ALGEBRA AND MATRICES * | | | | | | | [9] | |
| Linear Algebra - Matrices and their properties (determinants, traces, rank, nullity, etc.)- Eigenvalues and eigenvectors- Matrix Factorizations - Inner products - Distance measures – Projections - Notion of hyperplanes - half-planes. | | | | | | | [9] | |
| PROBABILITY AND STATISTICS | | | | | | | [9] | |
| Probability - Statistics and Random Processes - Probability theory and axioms - Random variables - Probability distributions and density functions (univariate and multivariate)- Expectations and moments - Covariance and correlation - Statistics and sampling distributions -Hypothesis testing of means, proportions, variances and correlations - Confidence (statistical) intervals - Correlation functions. | | | | | | | [9] | |
| OPTIMIZATION VIEW OF MACHINE LEARNING * | | | | | | | [9] | |
| Unconstrained optimization- Necessary and sufficiency conditions for optima- Gradient descent methods- Constrained optimization, KKT conditions- Introduction to non-gradient techniques-Introduction to least squares optimization- Optimization view of machine learning - Importance of Optimization in Machine Learning. | | | | | | | [9] | |
| INTRODUCTION TO DATA SCIENCE METHODS | | | | | | | [9] | |
| Introduction to data science methods - Linear regression as an exemplar function approximation problem - Linear classification problems - Supervised Learning - Unsupervised Learning. | | | | | | | [9] | |
| | | | | | | | Total Hours | |
| | | | | | | | 45 | |
| Textbook(s): | | | | | | | | |
| 1. David C. Lay, 'Linear Algebra and its Applications', 5th Edition, Pearson Education, 2014. | | | | | | | | |
| 2. B.S. Grewal, 'Higher Engineering Mathematics', 43rd Edition, Khanna Publishers, Delhi, 2014 | | | | | | | | |
| Reference(s): | | | | | | | | |
| 1. G. Strang . Introduction to Linear Algebra, Wellesley-Cambridge Press, Fifth edition, USA, 2016. | | | | | | | | |
| 2. Bendat, J. S. and A. G. Piersol. Random Data: Analysis and Measurement Procedures. 4th Edition. John Wiley & Sons, Inc., NY, USA, 2010 | | | | | | | | |
| 3. Montgomery, D. C. and G. C. Runger. Applied Statistics and Probability for Engineers. 5th Edition. John Wiley & Sons, Inc., NY, USA, 2011. | | | | | | | | |
| 4. David G. Luenberger . Optimization by Vector Space Methods, John Wiley & Sons (NY), 1969. | | | | | | | | |
| 5. Cathy O'Neil and Rachel Schutt . Doing Data Science, O'Reilly Media, 2013 | | | | | | | | |

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Course Contents and Lecture Schedule

| S.No. | Topic | No. of Hours |
|------------|---|--------------|
| 1.0 | Basics of Data Science and Problems | |
| 1.1 | Introduction to Data science | 1 |
| 1.2 | Typology of problems | 1 |
| 1.3 | Importance of linear algebra | 1 |
| 1.4 | Linear algebra applications | 2 |
| 1.5 | Statistics and optimization from a data science perspective | 2 |
| 1.7 | Structured thinking for solving data science problems. | 2 |
| 2.0 | Linear Algebra and Matrices | |
| 2.1 | Linear Algebra | 1 |
| 2.2 | Matrices and their properties | 1 |
| 2.3 | Eigenvalues and eigenvectors | 1 |
| 2.4 | Matrix Factorizations | 1 |
| 2.5 | Inner products | 1 |
| 2.6 | Matrix Factorizations | 1 |
| 2.7 | Distance measures | 1 |
| 2.8 | Projections | 1 |
| 2.9 | Notion of hyperplanes - half-planes. | 1 |
| 3.0 | Probability and Statistics | |
| 3.1 | Probability, Statistics and Random Processes | 1 |
| 3.2 | Probability theory and axioms | 1 |
| 3.3 | Random variables | 1 |
| 3.4 | Probability distributions and density functions | 1 |
| 3.5 | Expectations and moments | 1 |
| 3.6 | Covariance and correlation | 1 |
| 3.7 | Statistics and sampling distributions | 1 |
| 3.8 | Hypothesis testing | 1 |
| 3.9 | Confidence (statistical) intervals, Correlation functions | 1 |
| 4.0 | Optimization view of machine learning | |
| 4.1 | Unconstrained optimization | 1 |
| 4.2 | Necessary and sufficiency conditions for optima | 1 |
| 4.3 | Gradient descent methods | 1 |
| 4.4 | Constrained optimization | 1 |
| 4.5 | KKT conditions | 1 |
| 4.6 | Introduction to non-gradient techniques | 1 |
| 4.7 | Introduction to least squares optimization | 1 |
| 4.8 | Optimization view of machine learning | 1 |
| 4.9 | Importance of Optimization in Machine Learning | |
| 5.0 | Introduction to data science methods | |
| 5.1 | Introduction to data science methods | 1 |
| 5.2 | Linear regression | 2 |
| 5.3 | An exemplar function approximation problem | 2 |
| 5.4 | Linear classification problems | 2 |
| 5.5 | Supervised Learning | 1 |
| 5.6 | Unsupervised Learning | 1 |
| | Total | 45 |

Course Designer

1.Ms.S.Keerthana - keerthanas@ksrct.ac.in

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| | | | | | | |
|------------------|----------------------------------|-----------------|----------|----------|----------|---------------|
| 60 IT E14 | TELECOMMUNICATION SYSTEMS | Category | L | T | P | Credit |
| | | PE | 3 | 0 | 0 | 3 |

Objective

- To understand the basics of analog modulation
- To impart the knowledge about the pulse modulation techniques
- To learn about the different digital modulation techniques
- To recognize the various antennas used in communication
- To explore the stages involved in satellite communication
-

Prerequisite

Basic knowledge of Electrical and Electronics Engineering

Course Outcomes

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

| | | |
|-----|--|------------|
| CO1 | Discuss the basic principles of analog modulation techniques | Understand |
| CO2 | Describe the various pulse modulation techniques | Understand |
| CO3 | Comprehend the choice of different digital modulation techniques | Analyze |
| CO4 | Examine the characteristics of different antennas and the application of microwaves in communication | Understand |
| CO5 | Identify the role of Satellite subsystems and Ground stations | Analyze |

Mapping with Programme Outcomes

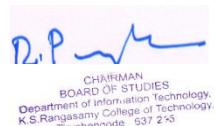
| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 2 | 1 | 1 | | | | | 2 | 2 | 2 | 2 | | 2 | |
| CO2 | 3 | 2 | 1 | 1 | | | | | 2 | 2 | 2 | 2 | | 2 | |
| CO3 | 3 | 2 | 1 | 1 | 1 | | | | 2 | 2 | 2 | 2 | | 2 | |
| CO4 | 3 | 2 | 1 | 1 | | | | | 2 | 2 | 2 | 2 | | | 2 |
| CO5 | 3 | 2 | 1 | 1 | | | | | 2 | 2 | 2 | 2 | | | 2 |
| 3 -Strong;2- Medium;1- Some | | | | | | | | | | | | | | | |

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 25 | 20 | 30 |
| Understand (Un) | 25 | 30 | 40 |
| Apply (Ap) | 00 | 00 | 00 |
| Analyse (An) | 10 | 10 | 30 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 00 | 00 |

Course Level Assessment Questions

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| | |
|-------------------------------|---|
| Course Outcome 1 (CO1) | |
| 1. | Express the amplitude modulated wave in its time domain and frequency domain and also denote its frequency spectrum. |
| 2. | Discuss the need for modulation in a communication system. |
| 3. | Illustrate how a phase modulated wave be generated using a frequency modulator. |
| Course Outcome 2 (CO2) | |
| 1. | Compare natural sampling with flat-top sampling. |
| 2. | Suggest the minimum sampling rate for an analog information signal by analyzing the sampled signal at different sampling rates. |
| 3. | Describe briefly the functions of different blocks in a single channel simplex Pulse Code Modulation system. |
| Course Outcome 3 (CO3) | |
| 1. | State the expression for MSK. Why is it called as minimum shift keying? |
| 2. | List the typical application areas of various digital modulation techniques. |
| 3. | Draw the ASK and FSK waveform for the digital data stream 1001011. |
| Course Outcome 4 (CO4) | |
| 1. | Classify the polarization of an antenna. |
| 2. | Design a dipole antenna for a signal of frequency 18 MHz. |
| 3. | Illustrate the three basic paths that radio signals radiated by the antenna take through space. |
| Course Outcome 5 (CO5) | |
| 1. | Illustrate Kepler's laws which describes the principle of a satellite that moves around the earth. |
| 2. | Outline the principle used to determine the location of a GPS receiver. |
| 3. | Define sub satellite point and discuss the method used to locate a satellite. |

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|--|------------|---|---|-----------|--------|---------------|-------|-----|
| 60 IT E14 – TeleCommunication Systems | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | | C | CA | ES |
| | V | 3 | 0 | 45 | 3 | 40 | 60 | 100 |
| ANALOG COMMUNICATION * | | | | | | | [9] | |

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| | |
|---|-----------|
| Elements of Electronic Communications System – Analog and Digital Transmission- Modulation – Types of Analog modulation- Principles of Amplitude Modulation- AM for a complex modulating signal- AM power and current distribution-Principles of Angle Modulation- Theory of FM- Spectrum analysis of FM- Theory of PM- Relationship between FM and PM- Comparison of AM, FM and PM | |
| PULSE MODULATION TECHNIQUES * Digital versus Analog transmissions- Classification of Pulse modulation techniques- Pulse amplitude modulation- Pulse width modulation- Pulse position modulation- Pulse code modulation- Differential PCM- Delta Modulation-Channel coding theorem - Linear Block codes - Hamming codes - Cyclic codes - Convolutional codes | [9] |
| DIGITAL COMMUNICATION * Types of digital modulation- Amplitude shift keying- Frequency shift keying- Phase shift keying- Quadrature phase shift keying-Quadrature Amplitude modulation- Minimum Shift keying- Choice of Digital modulation techniques – Simulation of communication system using MATLAB | [9] |
| ANTENNAS AND WAVE PROPAGATION * Antenna fundamentals – Common Antenna Types – Radio Wave Propagation – Microwave Concepts – Microwave Antennas – Microwave Applications – Radar principles | [9] |
| SATELLITE COMMUNICATION * Satellite Orbits – Kepler's laws- Satellite Communication Systems – Satellite Subsystems – Ground Stations – Satellite Applications – Global Positioning System | [9] |
| Total Hours | 45 |

Text Book(s):

1. T L Singal, "Analog and Digital Communications", 1st edition, Mc Graw Hill Education (India), 2012.
2. Louis E. Frenzel, "Principles of Electronic Communication Systems", 3rd Edition, Tata Mc Graw Hill, New Delhi, 2017.

Reference(s):

1. Wayne Tomasi, "Electronic Communication Systems Fundamentals through advanced", 5th edition, Pearson Education, 2009.
2. Herbert Taub, Donald L Schilling ,Goutam Saha , "Principles of Communication Systems", 4th edition, Mc Graw Hill Education, 2014.
3. George Kennedy, Bernard Davis, S.R.M.Prasanna, "Electronic Communication Systems", 5th edition, Mc Graw Hill Education, 2015.

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Course Contents and Lecture Schedule

| S.No. | Topic | No.of Hours |
|--------------|---|--------------------|
| 1 | Analog Communication | |
| 1.1 | Elements of Electronic Communications System | 1 |
| 1.2 | Analog and Digital Transmission | 1 |
| 1.3 | Modulation –Types of Analog modulation | 1 |
| 1.4 | Principles of Amplitude Modulation | 1 |
| 1.5 | AM power and current distribution | 1 |
| 1.6 | Principles of Angle Modulation- Theory of FM | 1 |
| 1.7 | Spectrum analysis of FM | 1 |
| 1.8 | Theory of PM | 1 |
| 1.9 | Relationship between FM and PM- Comparison of AM, FM and PM | 1 |

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| | | |
|----------|---|-----------|
| 2 | Pulse Modulation Techniques | |
| 2.1 | Digital versus Analog transmissions | 1 |
| 2.2 | Pulse amplitude modulation | 1 |
| 2.3 | Pulse width and position modulation | 1 |
| 2.4 | Pulse code modulation, Differential PCM | 1 |
| 2.5 | Delta Modulation | 1 |
| 2.6 | Channel coding theorem - Linear Block codes | 1 |
| 2.7 | Hamming codes | 1 |
| 2.8 | Cyclic codes | 1 |
| 2.9 | Convolutional codes | 1 |
| 3 | Digital Communication | |
| 3.1 | Amplitude shift keying | 1 |
| 3.2 | Frequency shift keying | 1 |
| 3.3 | Phase shift keying | 1 |
| 3.4 | Quadrature phase shift keying | 1 |
| 3.5 | Quadrature Amplitude modulation | 1 |
| 3.6 | Choice of Digital modulation techniques | 1 |
| 3.7 | Simulation of communication system using MATLAB | 3 |
| 4 | Antennas and wave propagation | |
| 4.1 | Antenna fundamentals | 1 |
| 4.2 | Common Antenna Types | 2 |
| 4.3 | Radio Wave Propagation | 1 |
| 4.4 | Microwave Concepts – Microwave Antennas | 2 |
| 4.5 | Microwave Applications | 1 |
| 4.6 | Radar Principles | 2 |
| 5 | Satellite Communication | |
| 5.1 | Satellite Orbits | 1 |
| 5.2 | Kepler's laws | 1 |
| 5.3 | Satellite Communication Systems | 1 |
| 5.4 | Satellite Subsystems | 2 |
| 5.5 | Ground Stations | 1 |
| 5.6 | Satellite Applications | 1 |
| 5.7 | Global Positioning System | 2 |
| | Total | 45 |

Course Designers

Dr.J.Nithya nithyaj@ksrct.ac.in

| 60 IT E15 | BIOINFORMATICS | Category | L | T | P | Credit |
|------------------|-----------------------|----------|---|---|---|--------|
| | | BS | 3 | 0 | 0 | 3 |

Objective

- To Understand scope and components of Bioinformatics technologies
- To understand data warehouse concepts, architecture and tools
- To understand data pre-processing and data visualization techniques
- To understand and apply various classification and clustering techniques using tools.
- To study algorithms for finding hidden and interesting patterns in data

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Course Outcomes

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

| | | |
|-----|---|------------|
| CO1 | Understand the scope and various components of Bioinformatics technologies. | Remember |
| CO2 | Understand data warehouse concepts, architecture and tools | Understand |
| CO3 | Understand data pre-processing and data visualization techniques | Understand |
| CO4 | Apply various classification and clustering techniques using tools | Apply |
| CO5 | Understand algorithms for finding hidden and interesting patterns in data | Understand |

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|---|---|---|---|-----------|--------|---------------|----|--------------------|
| BIOINFORMATICS | | | | | | | | |
| IT | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| V | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| INTRODUCTION | Need for Bioinformatics technologies – Overview of Bioinformatics technologies Structural bioinformatics – Data format and processing – Secondary resources and applications – Role of Structural bioinformatics - Biological Data Integration System. | | | | | | | 9 |
| DATA WAREHOUSING AND DATA MINING | Bioinformatics data – Data warehousing architecture – Data quality – Biomedical data analysis – DNA data analysis – Protein data analysis – Machine learning – Neural network architecture and applications in bioinformatics. | | | | | | | 9 |
| MODELING * | Hidden markov modeling for biological data analysis – Sequence identification –Sequence classification – multiple alignment generation – Comparative modeling –Protein modeling – Bayesian networks – Computer programs for molecular modeling. | | | | | | | 9 |
| PATTERN MATCHING AND VISUALIZATION * | Gene regulation – motif recognition – motif detection – strategies for motif detection – Visualization – Fractal analysis – DNA walk models – one dimension – two dimension– higher dimension – Game representation of Biological sequences – DNA, Protein, Amino acid sequences. | | | | | | | 9 |
| MICROARRAY ANALYSIS * | Microarray technology for genome expression study – image analysis for data extraction – preprocessing – segmentation – gridding – spot extraction – normalization, filtering – cluster analysis – gene network analysis – Compared Evaluation of Scientific Data Management Systems – Cost Matrix – Evaluation model - Benchmark –Tradeoffs. | | | | | | | 9 |
| Text book(s) | | | | | | | | Total Hours |
| | | | | | | | | 45 |
| 1. | Namita Mendiratta, Parag Rastogi,S.C. Rastogi, "Bioinformatics: Methods and Applications" PHI Learning, 30 Sep 2022. | | | | | | | |
| 2. | S Gladis Hepsyba Helen," Basic Bioinformatics ", MJp Publisher, July 2021. | | | | | | | |
| Reference(s): | | | | | | | | |
| 1. | Neil J. Jones, Pavel A. Pevzner, "Introduction to Bioinformatics Algorithms", ANE Books, Dec 2009. | | | | | | | |
| 2. | Yi-ping Phoebe Chen (Ed),"Bioinformatics Technologies", 2 nd Indian Reprint, 2014 | | | | | | | |
| 3. | Lesh, "Introduction to Bioinformatics", 4th Revised ed. Oxford University Press, Nov 2014 | | | | | | | |
| 4. | Arunima Mukerjee, "Bioinformatics", Oxford Book Company, Aug 2009 | | | | | | | |

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Mapping with Programme Outcomes

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| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|
| CO1 | 3 | 2 | | | | 2 | | | | | | | 3 | | |
| CO2 | 2 | 2 | | | | | 2 | | | | | | | 2 | 2 |
| CO3 | 2 | 2 | 2 | | | | 2 | | | 2 | | | | | |
| CO4 | 2 | 2 | 1 | 2 | | | 2 | 2 | | | 3 | | | | |
| CO5 | 3 | 3 | 2 | | 2 | | 1 | | 1 | | | 2 | | | |
| 3 -Strong;2- Medium;1- Some | | | | | | | | | | | | | | | |

Assessment Pattern

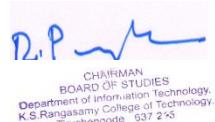
| Bloom's Category | Continuous Assessment Tests(Marks) | | End Sem Examination(Marks) |
|-------------------------|---|----------|-----------------------------------|
| | 1 | 2 | |
| Remember | 10 | 10 | 30 |
| Understand | 20 | 20 | 30 |
| Apply | 20 | 20 | 30 |
| Analyse | 10 | 10 | 10 |
| Evaluate | 0 | 0 | 0 |
| Create | 0 | 0 | 0 |

Course Level Assessment Questions

| | |
|------------------------|---|
| Course Outcome 1 (CO1) | |
| 1. | Discuss Structural bioinformatics in detail |
| 2. | Elaborate the Role of Structural bioinformatics |
| 3. | Explain the Secondary resources and applications in bioinformatics |
| Course Outcome 2 (CO2) | |
| 1. | Distinguish the DNA data analysis – Protein data analysis in detail. |
| 2. | Elaborate the Data warehousing architecture |
| 3. | Narrate the Neural network architecture and applications |
| Course Outcome 3 (CO3) | |
| 1. | List out the functions of biological data analysis |
| 2. | Illustrate the Bayesian networks |
| 3. | Differentiate between the Sequence identification and Sequence classification |

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| | |
|-------------------------------|---|
| Course Outcome 4 (CO4) | |
| 1. | Elaborate the Fractal analysis |
| 2. | List out the DNA walk models |
| 3. | Distinguish the one dimension ,two dimension and higher dimension |
| Course Outcome 5 (CO5) | |
| 1. | Illustrate the cluster analysis in detail. |
| 2. | Elaborate the data extraction in image analysis. |
| 3. | Describe the Cost Matrix |

Course Contents and Lecture Schedule

| S.No. | Topic | No.of Hours |
|-------|---|-------------|
| 1 | Introduction | |
| 1.1 | Introduction to Bioinformatics | 1 |
| 1.2 | Need for Bioinformatics | 1 |
| 1.3 | Need for Bioinformatics technologies | 1 |
| 1.4 | Overview of Bioinformatics technologies | 1 |
| 1.5 | Structural bioinformatics | 1 |
| 1.6 | Data format and processing | 1 |
| 1.7 | Secondary resources and applications | 1 |
| 1.8 | Role of Structural bioinformatics | 1 |
| 1.9 | Biological Data Integration System. | 1 |
| 2 | DATA WAREHOUSING AND DATA MINING | |
| 2.1 | Bioinformatics data | 1 |
| 2.2 | Data warehousing architecture | 1 |
| 2.3 | Data quality | 1 |
| 2.4 | Biomedical data analysis | 1 |
| 2.5 | DNA data analysis | 1 |
| 2.6 | Protein data analysis | 1 |
| 2.7 | Machine learning | 1 |
| 2.8 | Neural network architecture. | 1 |
| 2.9 | Applications in bioinformatics | 1 |
| 3 | MODELING | |
| 3.1 | Hidden markov modeling | 1 |
| 3.2 | Hidden markov modeling for biological data analysis | 1 |

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| | | |
|----------|---|-----------|
| 3.3 | Sequence identification | 1 |
| 3.4 | Sequence classification | 1 |
| 3.5 | Multiple alignment generation | 1 |
| 3.6 | Comparative modeling | 1 |
| 3.7 | Protein modeling | 1 |
| 3.8 | Bayesian networks | 1 |
| 3.9 | Computer programs for molecular modeling. | 1 |
| 4 | PATTERN MATCHING AND VISUALIZATION | |
| 4.1 | Gene regulation | 1 |
| 4.2 | Motif recognition – motif detection- strategies for motif detection | 1 |
| 4.3 | Visualization | 1 |
| 4.4 | Fractal analysis | 1 |
| 4.5 | DNA walk models | 1 |
| 4.6 | one dimension – two dimension– | 1 |
| 4.7 | Higher dimension | 1 |
| 4.8 | Game representation of Biological sequences | 1 |
| 4.9 | DNA, Protein, Amino acid sequences. | 1 |
| 5 | MICROARRAY ANALYSIS | |
| 5.1 | Microarray technology for genome expression study | 1 |
| 5.2 | Image analysis for data extraction | 1 |
| 5.3 | Preprocessing – segmentation | 1 |
| 5.4 | Gridding – spot extraction | 1 |
| 5.5 | normalization, filtering | 1 |
| 5.6 | cluster analysis - gene network analysis | 1 |
| 5.7 | Compared Evaluation of Scientific Data Management Systems | 1 |
| 5.8 | Cost Matrix – Evaluation model | 1 |
| 5.9 | Benchmark –Tradeoffs | 1 |
| | Total | 45 |

Course Designers

Mr.K.Saravanan (saravanank@ksrct.ac.in)

| 60 IT E16 | Compiler Design | Category | L | T | P | Credit |
|-----------|-----------------|----------|---|---|---|--------|
| | | PE | 3 | 0 | 0 | 3 |

Objective

- To understand the different phases of compiler.

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- To inspect the various parsing techniques.
- To interpret the Intermediate code generation and run-time environment.
- To design the front-back end of the compiler.
- To perceive the implementation of code generator

Prerequisite

Basic knowledge of mathematics and programming.

Course Outcomes

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

| | | |
|-----|---|---------|
| CO1 | Predict the phases of compiler | Apply |
| CO2 | Apply different parsing algorithms to develop the parsers for a given grammar | Apply |
| CO3 | Perform syntax-directed translation with intermediate language | Apply |
| CO4 | Analyze the environment for storage of generated intermediate code | Analyze |
| CO5 | Develop the optimized code generator | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | 2 | 3 | 2 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 3 | | 2 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 |
| CO3 | 3 | 3 | 3 | 3 | 3 | | | 3 | 2 | | 3 | 2 | 3 | 3 | 2 |
| CO4 | 3 | 2 | 3 | 3 | 3 | | | 3 | 3 | | 3 | 2 | | 3 | 2 |
| CO5 | 3 | 2 | 3 | 3 | 2 | | | 3 | 3 | | 2 | 2 | | 3 | 3 |

3-Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 10 | 10 | 10 |
| Understand (Un) | 20 | 10 | 20 |
| Apply (Ap) | 30 | 30 | 60 |
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 10 | 10 |

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Course Level Assessment Questions

| | |
|-------------------------------|--|
| Course Outcome 1(CO1) | |
| 1. | Explain various phases of compiler. |
| 2. | Construct the minimized DFA for the regular expression $(0+1)^*$ $(0+1)01$. |
| 3. | Discuss various aspects of compiler construction tools. |
| Course Outcome 2(CO2) | |
| 1. | Analyze the role of parser with suitable example. |
| 2. | Draw and explain the transition diagram that recognizes the lexemes matching the token relop (relational operator). |
| 3. | Generate SLR parsing table for the following S Aa bAc Bc bBa, Ad, Bd |
| Course Outcome 3(CO3) | |
| 1. | Describe syntax-directed translation schemes with appropriate example. |
| 2. | Explain how type conversion is performed with suitable example. |
| 3. | Write the translation scheme to generate three address code for the assignment statement. |
| Course Outcome 4 (CO4) | |
| 1. | Discuss in detail about: <ul style="list-style-type: none"> • Storage allocation strategies • Parameter passing method |
| 2. | Illustrate the design of a code generator with suitable example. |
| 3. | Explain in detail about issues in the design of a code generator. |
| Course Outcome 5(CO5) | |
| 1. | Explain principle source of code optimization with example. |
| 2. | Describe the concepts of peephole optimization with example. |
| 3. | Discuss in detail about optimization of basic block. |

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|--|------------|---|---|-----------|--------|---------------|----|-----|
| 60 IT E16 – Compiler Design | | | | | | | | |
| Information Technology | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| V | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| INTRODUCTION TO COMPILERS | | | | | | | | |
| Introduction to Compiler - Structure of a compiler — Lexical Analysis — Role of Lexical Analyzer — Input Buffering — Specification of Tokens — Recognition of Tokens — Lex — Finite Automata — Regular Expressions to Automata — Minimizing DFA — Compiler Construction Tools. | | | | | | | | |
| SYNTAX ANALYSIS | | | | | | | | |
| Role of Parser — Grammars — Error Handling — Context-free grammars — Writing a grammar — Top Down Parsing —Predictive Parser-LL(1) Parser-Shift Reduce Parser-LR Parser-LR (0)Item Construction of SLR Parsing Table -Introduction to LALR Parser — Error Handling and Recovery in Syntax Analyzer-YACC. | | | | | | | | |
| INTERMEDIATE CODE GENERATION ** | | | | | | | | |
| Syntax Directed Definitions, Evaluation Orders for Syntax Directed Definitions, Intermediate Languages: Syntax Tree, Three Address Code, Types and Declarations, Translation of Expressions, Type Checking. | | | | | | | | |
| RUN-TIME ENVIRONMENT AND CODE GENERATION | | | | | | | | |
| Storage Organization, Stack Allocation Space, Access to Non-local Data on the Stack, Heap Management — Issues in Code Generation — Design of a simple Code Generator. | | | | | | | | |

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| | |
|--|---------------------|
| CODE OPTIMIZATION * Principal Sources of Optimization — Peep-hole optimization — DAG- Optimization of Basic Blocks- Global Data Flow Analysis — Efficient Data Flow Algorithm. | [9] |
| | Total Hours 45 |
| Text Book(s): | |
| • Alfred Aho, Ravi Sethi, Jeffrey D Ullman, "Compilers Principles, Techniques and Tools", Pearson Education Asia, 2016. | |
| • Dhamdhere, D. M., "Compiler Construction Principles and Practice", 2nd edition, Macmillan India Ltd., New Delhi, 2012. | |
| Reference(s): | |
| • Jean Paul Tremblay, Paul G Serenson, "The Theory and Practice of Compiler Writing", BS Publications, 2005. | |
| • C. N. Fischer and R. J. LeBlanc, "Crafting a compiler with C", Benjamin Cummings, 2003. | |
| • Henk Alblas and Albert Nymeyer, "Practice and Principles of Compiler Building with C", PHI, 2001. | |
| • Kenneth C. Louden, "Compiler Construction: Principles and Practice", Thompson Learning, 2003. | |

** SDG-4 – Quality Education

* SDG-8 – Employment and decent work for all

Course Contents and Lecture Schedule

| S.No. | Topic | No.of Hours |
|----------|---|-------------|
| 1 | INTRODUCTION TO COMPILERS | |
| 1.1 | Introduction to Compiler - Structure of a compiler | 1 |
| 1.2 | Lexical Analysis — Role of Lexical Analyzer | 1 |
| 1.3 | Input Buffering | 1 |
| 1.4 | Specification of Tokens — Recognition of Tokens | 1 |
| 1.5 | Lex | 1 |
| 1.6 | Finite Automata — Regular Expressions to Automata | 1 |
| 1.7 | Minimizing DFA | 1 |
| 1.8 | Compiler Construction Tools | 1 |
| 2 | SYNTAX ANALYSIS | |
| 2.1 | Role of Parser | 1 |
| 2.2 | Grammars — Error Handling — Context-free grammars | 1 |
| 2.3 | Writing a grammar — Top Down Parsing | 1 |
| 2.4 | Predictive Parser | 1 |
| 2.5 | LL(1) Parser-Shift Reduce Parser-LR Parser | 1 |
| 2.6 | LR (0)Item Construction of SLR Parsing Table | 2 |
| 2.7 | LR (0)Item Construction of CLR Parsing Table | 1 |
| 2.8 | Introduction to LALR Parser | 1 |
| 2.9 | Error Handling and Recovery in Syntax Analyzer-YACC | 1 |
| 3 | INTERMEDIATE CODE GENERATION | |
| 3.1 | Syntax Directed Definitions | 1 |
| 3.2 | Evaluation Orders for Syntax Directed Definitions | 1 |
| 3.3 | Intermediate Languages: Syntax Tree | 1 |
| 3.4 | Three Address Code | 2 |
| 3.5 | Types and Declarations | 1 |
| 3.6 | Translation of Expressions | 2 |
| 3.7 | Type Checking | 1 |
| 4 | RUN-TIME ENVIRONMENT AND CODE GENERATION | |
| 4.1 | Storage Organization | 2 |

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| | | |
|----------|---------------------------------------|----|
| 4.2 | Stack Allocation Space | 1 |
| 4.3 | Access to Non-local Data on the Stack | 1 |
| 4.4 | Heap Management | 2 |
| 4.5 | Issues in Code Generation | 1 |
| 4.6 | Design of a simple Code Generator | 2 |
| 5 | CODE OPTIMIZATION | |
| 5.1 | Principal Sources of Optimization | 2 |
| 5.2 | Peep-hole optimization | 1 |
| 5.3 | DAG | 2 |
| 5.4 | Optimization of Basic Blocks | 2 |
| 5.5 | Global Data Flow Analysis | 1 |
| 5.6 | Efficient Data Flow Algorithm | 1 |
| | Total | 45 |

Course Designers

Mr.R.Arunkumar – rarunkumar@ksrct.ac.in

| 60 IT 5P1 | Operating Systems and Open Source Laboratory | Category | L | T | P | Credit |
|-----------|--|----------|---|---|---|--------|
| | | PC | 0 | 0 | 4 | 2 |

Objective

- To understand the concepts of OS and Implement in C through Unix
- To design and implement complex data structures and functionality of simple tasks in an operating system.
- To choose the best CPU scheduling algorithm for a given problem instance.
- To Identify the performance of various page replacement algorithms.
- To provide students with a theoretical and practical knowledge in open source and its applications

Course Outcomes

| | | |
|-----|--|------------|
| CO1 | Implement the basic commands to implement shell programming | Apply |
| CO2 | Implement the various system calls commands of UNIX | Apply |
| CO3 | Design the scheduling process using FCFS and SJF scheduling | Understand |
| CO4 | Demonstrate Page replacement policies concept using FIFO method | Evaluate |
| CO5 | Demonstrate the Perl programming using Arithmetic operation, Loop, String, functions | Evaluate |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 2 | 2 | 3 |
| CO2 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 2 | 2 | 3 |
| CO3 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 2 | 2 | 3 |
| CO4 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 2 | 2 | 3 |

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| | | | | | | | | | | | | | | | |
|--------------------------|---|---|---|---|---|--|--|--|--|--|--|--|---|---|---|
| CO5 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 2 | 2 | 3 |
| 3-Strong;2-Medium;1-Some | | | | | | | | | | | | | | | |

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|---|---|---|--|---|--|--|-----------|--------|----|---------------|-------|--|--|--|--|
| 60 IT 5P1 - Operating Systems and Open Source Laboratory | | | | | | | | | | | | | | | |
| IT | | | | | | | | | | | | | | | |
| Semester | Hours / Week | | | | | | Total hrs | Credit | | Maximum Marks | | | | | |
| | L | T | | P | | | | C | CA | ES | Total | | | | |
| V | 0 | 0 | | 4 | | | 60 | 2 | 60 | 40 | 100 | | | | |
| List of Experiments | | | | | | | | | | | | | | | |
| 1. | Shell programming | | | | | | | | | | | | | | |
| | • command syntax | | | | | | | | | | | | | | |
| | • write simple functions | | | | | | | | | | | | | | |
| | • basic tests | | | | | | | | | | | | | | |
| 2. | Write programs using the following system calls of UNIX operating system: | | | | | | | | | | | | | | |
| | fork, exec, getpid, exit, wait, close, stat, opendir, readdir | | | | | | | | | | | | | | |
| 3. | Write programs using the I/O system calls of UNIX operating system (open, read, write, etc) | | | | | | | | | | | | | | |
| 4. | Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time.* | | | | | | | | | | | | | | |
| 5. | Implementation of FIFO page replacement algorithms. | | | | | | | | | | | | | | |
| 6. | Implement the Producer – Consumer problem using semaphores. | | | | | | | | | | | | | | |
| 7. | To write a c program to implement IPC using shared memory | | | | | | | | | | | | | | |
| 8. | Implementation of Best-fit, First-fit algorithms for memory management.* | | | | | | | | | | | | | | |
| 9. | Installation of Open Office, Mail client & Web/internet browser and configuration.* | | | | | | | | | | | | | | |
| 10. | User Creation and Group Creation.* | | | | | | | | | | | | | | |
| 11. | Configuration of DNS, DHCP. | | | | | | | | | | | | | | |
| 12. | Configuration of device like Printer, Ethernet and TCP /IP. | | | | | | | | | | | | | | |
| 13. | Perl programming | | | | | | | | | | | | | | |
| | • Arithmetic operation | | | | | | | | | | | | | | |
| | • Loop | | | | | | | | | | | | | | |
| | • String | | | | | | | | | | | | | | |
| | • Functions | | | | | | | | | | | | | | |

* SDG 4 – Quality Education

Course Designers

Mrs.V.P.Dhivya - dhivyavp@ksrct.ac.in

| 60 IT 5P2 | Computer Networks Laboratory | Category | L | T | P | Credit |
|-----------|------------------------------|----------|---|---|---|--------|
| | | PC | 0 | 0 | 4 | 2 |

Objective

- To acquire knowledge on various networking protocols
- To learn the socket programming for client-server communication

Passed in BoS Meeting held on 16/05/2023
Approved in Academic Council Meeting held on 03/06/2023



- To analyze and implement flow control mechanisms
- To demonstrate the working of error control techniques
- To design unicast and multicast routing algorithms

Course Outcomes

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

| | | | | | | | | | | | | |
|-----|--|--|--|--|--|--|--|--|--|--|--|-------|
| CO1 | Acquire hands on experience on various networking protocols | | | | | | | | | | | Apply |
| CO2 | Implement socket programming for client-server communication | | | | | | | | | | | Apply |
| CO3 | Analyze and implement flow control mechanisms | | | | | | | | | | | Apply |
| CO4 | Implement error detection and correction techniques | | | | | | | | | | | Apply |
| CO5 | Implement unicast and multicast routing protocol | | | | | | | | | | | Apply |

Mapping with Programme Outcomes

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | 3 | 3 | | | | 2 | | | | 3 | 3 | |
| CO2 | 3 | 3 | 3 | 3 | 3 | | | | 2 | | | | 3 | 3 | |
| CO3 | 3 | 3 | 3 | 3 | 3 | | | | 2 | | | | 3 | 3 | |
| CO4 | 3 | 3 | 3 | 3 | 3 | | | | 2 | | | | 3 | 3 | |
| CO5 | 3 | 3 | 3 | 3 | 3 | | | | 2 | | 3 | 3 | 3 | 3 | |

3-Strong;2-Medium;1-Some

| K.S.Rangasamy College of Technology, Autonomous 2022 | | | | | | | | | |
|--|------------|---|---|-----------|--------|----|---------------|-------|--|
| 60 IT 5P2- Computer Networks Laboratory | | | | | | | | | |
| IT | | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | | Maximum Marks | | |
| | L | T | P | | C | CA | ES | Total | |
| V | 0 | 0 | 4 | 60 | 2 | 60 | 40 | 100 | |
| LIST OF EXPERIMENTS | | | | | | | | | |
| 1. Learn to use commands like tcpdump, netstat, ifconfig, nslookup and traceroute. | | | | | | | | | |
| Capture ping and traceroute PDUs using a network protocol analyzer and examine. | | | | | | | | | |
| 2. Write a code to simulating ARP /RARP protocols. * | | | | | | | | | |
| 3. Implementation of socket programming and client – server model * | | | | | | | | | |
| 4. Implement application using TCP / UDP sockets * | | | | | | | | | |
| i) Echo Client and echo server ii) Video Conferencing iii) File Transfer | | | | | | | | | |
| 5. Implementation of bit stuffing | | | | | | | | | |
| 6. Implementation of parity checker | | | | | | | | | |
| 7. Simulation of error detection code | | | | | | | | | |

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| | |
|---|----|
| 8. Simulation of error correction code | |
| 9. Simulation of transport layer Protocol and congestion control techniques * | |
| 10. Performance evaluation of unicast / multicast routing protocol * | |
| Total Hours | 60 |

*SDG 9 – Industry, Innovation and Infrastructure

Course Designers

Mrs.S.Geetha-geethas@ksrct.ac.in

| 60 CG 0P4 | CAREER SKILL DEVELOPMENT IV | Category | L | T | P | Credit |
|-----------|-----------------------------|----------|---|---|---|--------|
| | | CS | 0 | 0 | 2 | 1 |

Objective

- To help learners improve their vocabulary and enable them to use words appropriately in different academic and professional contexts.
- To help learners develop strategies that could be adopted while reading texts.
- To help learners acquire the ability to speak and write effectively in English in real life and career related situations.
- Improve listening, observational skills, and problem-solving capabilities
- Develop message generating and delivery skills

Prerequisite

Basic knowledge of Arithmetic and Logical Reasoning

Course Outcomes

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

| | | |
|-----|--|---------|
| CO1 | Compare and contrast products and ideas in technical texts. | Analyze |
| CO2 | Identify cause and effects in events, industrial processes through technical texts | Analyze |
| CO3 | Analyze problems in order to arrive at feasible solutions and communicate them orally and in the written format. | Analyze |
| CO4 | Report events and the processes of technical and industrial nature. | Apply |
| CO5 | Articulate their opinions in a planned and logical manner, and draft effective résumés in context of job search. | Apply |

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Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO 3 | PO 4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PO1 2 | PSO 1 | PSO2 |
|------------|------------|------------|-----------------|-----------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|------------------|------------------|-------------|
| CO1 | 2 | 2 | 2 | 3 | | 3 | | | | 2 | 3 | 3 | 2 | 3 | 2 |
| CO2 | 3 | 3 | 3 | 3 | | 2 | | | | 2 | 3 | 3 | 2 | 3 | 3 |
| CO3 | 2 | 2 | 2 | 2 | | 3 | | | | 2 | 3 | 3 | 2 | 3 | 2 |
| CO4 | 3 | 3 | 3 | 3 | | 2 | | | | 2 | 3 | 3 | | 3 | 3 |
| CO5 | 3 | 3 | 3 | 3 | | 2 | | | | 2 | 3 | 3 | | 3 | 3 |

3- Strong; 2-Medium; 1-Some

| K.S.Rangasamy College of Technology – Autonomous R2022 | | | | | | | | | | | | | | |
|---|--|---|---|--|--|-----------|--------|-----|---------------|-------|--|--|--|--------------------|
| Career Skill Development IV | | | | | | | | | | | | | | |
| Common to All Branches | | | | | | | | | | | | | | |
| Semester | Hours/Week | | | | | Total Hrs | Credit | | Maximum Marks | | | | | |
| | L | T | P | | | | C | CA | ES | Total | | | | |
| V | 0 | 0 | 2 | | | 30 | 1 | 100 | 00 | 100 | | | | |
| Verbal & Analytical Reasoning | | | | | | | | | | | | | | [6] |
| Seating Arrangements – Analytical Reasoning (PUZZELS) – Machin input and output - Coded Inequality – Eligibility Test | | | | | | | | | | | | | | |
| Quantitative Aptitude - Part – 4 | | | | | | | | | | | | | | [6] |
| Permutation and Combination - Probability - Quadratic equation - Geometry – Clock – Calendar – Logarithmic | | | | | | | | | | | | | | |
| Non-Verbal Reasoning | | | | | | | | | | | | | | [6] |
| Series Completion of Figures – Classification – Courting of figure – Figure matrix – Embedded Figure – Complete Figure – Paper Cutting and Folding – Mirror images and Water Images | | | | | | | | | | | | | | |
| Quantitative Aptitude - Part – 5 | | | | | | | | | | | | | | [6] |
| Mensuration of Area, Volume and Surface area in 2D and 3D Shapes – 2D Shapes – Square, Rectangle, Triangle, Circle, etc. - 3D Shapes – Cube, Cuboid , Sphere , Cone , etc. | | | | | | | | | | | | | | |
| Data Interpretation and Analysis | | | | | | | | | | | | | | [6] |
| Data interpretation Based on text - Data interpretation Based on Tabulation , Pie chart , Bar graph , And Line graph – Venn Diagram - Data sufficiency | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | Total Hours |
| Reference(s): | | | | | | | | | | | | | | 30 |
| 1. | Aggarwal, R.S. ‘A Modern Approach to Verbal and Non-verbal Reasoning’, Revised Edition 2008,Reprint 2009,S.Chand & Co Ltd., New Delhi. | | | | | | | | | | | | | |
| 2. | Abhijit Guha, ‘Quantitative Aptitude’, McGraw Hill Education, 6 th edition, 2016 | | | | | | | | | | | | | |
| 3. | Dinesh Khattar, ‘Quantitative Aptitude For Competitive Examinations’, Pearson Education (2020) | | | | | | | | | | | | | |
| 4. | Anne Thomson, ‘Critical Reasoning: A Practical Introduction’ Lexicon Books, 3 rd edition, 2022. Warszaw | | | | | | | | | | | | | |

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*SDG 4 – Quality Education

**SDG 8 – Decent work and economic growth

***SDG 9 – Industry, Innovation and Infrastructure

Course Contents and Lecture Schedule

| S.No | Topic | No. of Hours |
|----------|---|--------------|
| 1 | Verbal & Analytical Reasoning | |
| 1.1 | Seating Arrangements | 1 |
| 1.2 | Analytical Reasoning (PUZZELS) | 1 |
| 1.3 | Machin input and output | 1 |
| 1.4 | Coded Inequality | 1 |
| 1.5 | Eligibility Test | 2 |
| 2 | Quantitative Aptitude - Part – 4 | |
| 2.1 | Permutation and Combination | 1 |
| 2.2 | Probability | 1 |
| 2.3 | Quadratic equation - Geometry | 1 |
| 2.4 | Clock – Calendar | 1 |
| 2.5 | Logarithmic | 2 |
| 3 | Non-Verbal Reasoning | |
| 3.1 | Series Completion of Figures – Classification | 1 |
| 3.2 | Courting of figure – Figure matrix | 1 |
| 3.3 | Embedded Figure – Complete Figure | 1 |
| 3.4 | Paper Cutting and Folding | 1 |
| 3.5 | Mirror images and Water Images | 2 |
| 4 | Quantitative Aptitude - Part – 5 | |
| 4.1 | Mensuration of Area, Volume | 1 |
| 4.2 | Mensuration of Volume | 1 |
| 4.3 | Surface area in 2D and 3D Shapes | 1 |
| 4.4 | 2D Shapes – Square, Rectangle, Triangle, Circle, etc. | 1 |
| 4.5 | 3D Shapes – Cube, Cuboid , Sphere , Cone , etc. | 2 |
| 5 | Data Interpretation and Analysis | |
| 5.1 | Data interpretation Based on text | 1 |
| 5.2 | Data interpretation Based on Tabulation, Pie chart | 1 |
| 5.3 | Bar graph , And Line graph | 1 |
| 5.4 | Venn Diagram | 1 |
| 5.5 | Data sufficiency | 2 |
| | Total | 30 |

Course Designer

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Passed in BoS Meeting held on 16/05/2023
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K.S.RANGASAMY COLLEGE OF TECHNOLOGY, TIRUCHENGODE – 637215

(An Autonomous Institution affiliated to Anna University)

B.E. / B.Tech. Degree Programme**SCHEME OF EXAMINATIONS**

(For the candidates admitted from 2022-2023 onwards)

SIXTH SEMESTER

| Course Code | Name of the Course | Duration of Internal Exam | Weightage of Marks | | | Minimum Marks for Pass in End Semester Exam | |
|------------------|--------------------------------------|---------------------------|------------------------|----------------------|------------|---|-------|
| | | | Continuous Assessment* | End Semester Exam ** | Max. Marks | End Semester Exam | Total |
| THEORY | | | | | | | |
| 60 IT 601 | Data Mining and Analytics | 2 | 40 | 60 | 100 | 45 | 100 |
| 60 IT 602 | Full Stack Development | 2 | 40 | 60 | 100 | 45 | 100 |
| 60 IT 603 | Machine Learning | 2 | 40 | 60 | 100 | 45 | 100 |
| 60 IT 604 | Software Testing | 2 | 40 | 60 | 100 | 45 | 100 |
| 60 IT E2* | Elective – II | 2 | 40 | 60 | 100 | 45 | 100 |
| 60 IT L** | Open Elective – III | 2 | 40 | 60 | 100 | 45 | 100 |
| PRACTICAL | | | | | | | |
| 60 IT 6P1 | Data Mining and Analytics Laboratory | 2 | 60 | 40 | 100 | 45 | 100 |
| 60 IT 6P2 | Full Stack Development Laboratory | 2 | 60 | 40 | 100 | 45 | 100 |
| 60 IT 6P3 | Mini Project | 2 | | | | | 100 |
| 60 CG 0P5 | Comprehension Test | 2 | | | | | 100 |
| 60 CG 0P6 | Internship | 2 | | | | | 100 |

| 60 IT 601 | Data Mining and Analytics | Category | L | T | P | Credit |
|-----------|---------------------------|----------|---|---|---|--------|
| | | PC | 3 | 0 | 0 | 3 |

Objective

- To understand the concepts of Data Mining
- To familiarize with association rule mining
- To familiarize various classification algorithms
- To understand the concepts of Cluster analysis
- To implement the Data mining concepts with various domains

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Prerequisite

Nil

Course Outcomes

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

| | | | | | | | | | | | | |
|-----|---|--|--|--|--|--|--|--|--|--|--|----------|
| CO1 | Gain knowledge about the concepts of Data Mining | | | | | | | | | | | Remember |
| CO2 | Understand and Apply Association rule mining techniques | | | | | | | | | | | Apply |
| CO3 | Understand and Apply various Classification algorithms | | | | | | | | | | | Apply |
| CO4 | Gain knowledge on the concepts of Cluster Analysis | | | | | | | | | | | Apply |
| CO5 | Understand the importance of applying Data mining concepts in different domains | | | | | | | | | | | Apply |

Mapping with Programme Outcomes

| COs | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO 2 | PSO 3 |
|-----|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| CO1 | 2 | 2 | 2 | 2 | 2 | 2 | | | | 1 | 1 | 1 | 3 | 2 | |
| CO2 | 3 | 2 | 3 | 3 | 1 | 2 | | | | 1 | 1 | 1 | 3 | 2 | |
| CO3 | 3 | 2 | 1 | 1 | 3 | 2 | | | | 1 | 1 | 1 | 3 | 2 | |
| CO4 | 3 | 3 | 2 | 3 | 1 | 2 | | | | 1 | 1 | 1 | 3 | 2 | |
| CO5 | 3 | 3 | 2 | 3 | 1 | 2 | | | | 1 | 1 | 1 | 3 | 2 | |

3-Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 00 | 00 | 00 |
| Understand (Un) | 20 | 20 | 20 |
| Apply (Ap) | 40 | 40 | 80 |
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 00 | 00 |

Course Level Assessment Questions**Course Outcome 1(CO1)**

1. Describe challenges to data mining regarding data mining methodology and user interaction issues.
2. List out the types of data pre-processing techniques and explain in detail about them.

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| | |
|-------------------------------|--|
| 3. | Define data transformation? Why it is essential in the form of KDD? Give example |
| Course Outcome 2(CO2) | |
| 1. | Explain Association rule in mathematical notations. |
| 2. | Describe the method of generating frequent item sets without candidate generation |
| 3. | Generate Association Rules using the Apriori Algorithm |
| Course Outcome 3(CO3) | |
| 1. | Name some specific applications of cases where the data analysis task is Classification. |
| 2. | Explain classification by Decision tree induction |
| 3. | Explain the classifications of Data mining system. |
| Course Outcome 4 (CO4) | |
| 1. | Mention the fields in which clustering techniques are used |
| 2. | Discuss about the Constraint-Based Cluster Analysis |
| 3. | List out the requirements of cluster analysis |
| Course Outcome 5(CO5) | |
| 1. | Discuss about Machine Learning |
| 2. | Write down some applications of data mining |
| 3. | Describe the business applications in your industry where cluster analysis will be useful. |

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|---|---|---|---|-----------|--------|---------------|----|-----|
| 60 IT 601– Data Mining and Analytics | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| VI | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| Introduction | | | | | | | | |
| Introduction to Data Mining- Kinds of Data- Data mining Functionalities – Interesting Patterns- Task Primitives- Issues in Data Mining- Data Preprocessing | | | | | | | | |
| Association Rules * | | | | | | | | |
| Basic Concepts- Frequent Item Set Mining Methods- Association Rules- Correlation analysis | | | | | | | | |
| Classification and Prediction * | | | | | | | | |
| Issues Regarding Classification and Prediction- Decision Tree Induction Classification- Bayesian and Rule Based Classification- Support Vector Machine-Prediction | | | | | | | | |
| Cluster analysis * | | | | | | | | |
| What is Cluster Analysis-Types of data in Cluster Analysis-Categorization of Clustering Methods- Hierarchical Methods. | | | | | | | | |
| Trends in Data Mining ** | | | | | | | | |
| Applications of Data Mining-Machine Learning-Big Data-Cloud Computing | | | | | | | | |
| Total Hours | | | | | | | | |
| Textbook(s): | | | | | | | | |
| 1. | Jiawei Han and Micheline Kamber, "Data Mining – Concepts and Techniques", Second Edition, Morgan Kaufmann Publishers, 2006. | | | | | | | |
| Reference(s): | | | | | | | | |
| 1. | M. H. Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education. 2001. | | | | | | | |
| 2. | D. Hand, H. Mannila and P. Smyth, "Principles of Data Mining", Prentice Hall. 2001. | | | | | | | |

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| | |
|----|---|
| 3. | I H. Witten and E. Frank, "Data Mining: Practical Machine Learning Tools and Techniques", Morgan Kaufmann. 2000. |
| 4. | Nathan Marz, James Warren, "Big Data-Principles and best practices of scalable real-time data systems", DreamTech Press, 2015 |
| 5. | Arshdeep Bahga, Vijay Madisetti, "Cloud Computing: A Hands-On Approach", University Press, 2016 |

*SDG 4 – Quality Education

SDG 9 – Industry, Innovation and Infrastructure

Course Contents and Lecture Schedule

| S.No. | Topic | No. of Hours |
|------------|--|--------------|
| 1.0 | Introduction | |
| 1.1 | Introduction to Data Mining | 1 |
| 1.2 | Kinds of Data | 1 |
| 1.3 | Data mining Functionalities | 1 |
| 1.4 | Interesting Patterns | 1 |
| 1.5 | Task Primitives | 2 |
| 1.6 | Issues in Data Mining | 1 |
| 1.7 | Data Preprocessing | 2 |
| 2.0 | Association Rules | |
| 2.1 | Basic Concepts | 1 |
| 2.2 | Frequent Item Set Mining Methods | 3 |
| 2.3 | Association Rules | 3 |
| 2.4 | Correlation analysis | 2 |
| 3.0 | Classification and Prediction | |
| 3.1 | Issues Regarding Classification and Prediction | 1 |
| 3.2 | Decision Tree Induction Classification | 2 |
| 3.3 | Bayesian and Rule Based Classification | 2 |
| 3.4 | Support Vector Machine | 2 |
| 3.5 | Prediction | 2 |
| 4.0 | Cluster analysis | |
| 4.1 | What is Cluster Analysis | 2 |
| 4.2 | Types of data in Cluster Analysis | 2 |
| 4.3 | Categorization of Clustering Methods | 3 |
| 4.4 | Hierarchical Methods | 2 |
| 5.0 | Trends in Data Mining | |
| 5.1 | Applications of Data Mining | 2 |
| 5.2 | Machine Learning | 3 |
| 5.3 | Big Data | 2 |
| 5.4 | Cloud Computing | 2 |
| | Total | 45 |

Course Designers

1.Mrs.K.Mahalakshmi – mahalakshmik@ksrct.ac.in

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| 60 IT 602 | Full Stack Development | Category | L | T | P | Credit |
|------------------|-------------------------------|-----------------|----------|----------|----------|---------------|
| | | PC | 3 | 0 | 0 | 3 |

Objective

- To understand the various components of full stack development
- To learn Java features and applications
- To develop applications with MongoDB
- To understand the role, React JS in web applications
- To develop simple web applications with React

Prerequisite

Basic knowledge of any programming language with ability to solve logical problems

Course Outcomes

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

| | | |
|-----|---|------------|
| CO1 | Understand the various stacks available for web application development | Understand |
| CO2 | Use JAVA for application development | Apply |
| CO3 | Develop applications with MongoDB | Apply |
| CO4 | Use the features of Angular and Express | Apply |
| CO5 | Develop React applications | Create |

Mapping with Programme Outcomes

| Cos | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO 2 | PSO 3 |
|-----|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| CO1 | 3 | 2 | | | | | | | 2 | 1 | 1 | 1 | 1 | 1 | |
| CO2 | 3 | 3 | 3 | 3 | 2 | 1 | | | 2 | | 2 | 3 | 2 | 2 | 1 |
| CO3 | 3 | 3 | 2 | 2 | 2 | 2 | | | 2 | 2 | 2 | 3 | 2 | 2 | 1 |
| CO4 | 3 | 3 | 2 | 2 | 2 | 1 | | | 1 | 1 | 2 | 2 | 2 | 2 | 1 |
| CO5 | 3 | 3 | 3 | 3 | 3 | 1 | | | | | 2 | 2 | 2 | 2 | 1 |

3-Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | Model Exam | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|------------|-----------------------------|
| | 1 | 2 | | |
| Remember (Re) | 6 | 6 | 10 | 10 |
| Understand (Un) | 4 | 4 | 10 | 10 |
| Apply (Ap) | 40 | 40 | 70 | 70 |
| Analyze (An) | 10 | 10 | 10 | 10 |

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| | | | | |
|---------------|---|---|---|---|
| Evaluate (Ev) | - | - | - | - |
| Create (Cr) | - | - | - | - |

Course Level Assessment Questions

| Course Outcome 1 (CO1) | |
|-------------------------------|---|
| 1. | Understand the various stacks available for web application development |
| 2. | Learn the basics of difference between CI/CD, Full Stack, Single stack developer, DevOps. |
| 3. | Learn MERN, MEAN, LAMP Stack |
| Course Outcome 2 (CO2) | |
| 1. | Create a try block that contains the java code for the following scenario: Declare an integer array of size 6 and store the value '30' in the 8th position of the Array. Use multiple catch statements for catching the exception that may be thrown by the try block and display the name of the exception to be caught |
| 2. | Create an JDBC connection with database create, insert, update, delete a data using JAVA backend program. |
| 3. | Explain various concepts with example of Java servlets, API's, JSP, JDBC Drivers |
| Course Outcome 3 (CO3) | |
| 1. | Understand the working of MongoDB and Its applications |
| 2. | Create a Database connecting in MongoDB and use Advanced CRUD Operations such as Create, Run, Update, Delete records in Database |
| 3. | Create a Restaurant Database with MongoDB managing the data in Database such as Adding, Deleting, Updating new Menus, Customer Details, Bills etc., |
| Course Outcome 4 (CO4) | |
| 1. | Understand the concepts of React JS, API's, Server-side rendering State, props and JSX. |
| 2. | Explain concept and give examples of configuring routes use of React router. |
| 3. | Create a simple Web application with the help of React JS Frameworks |
| Course Outcome 5 (CO5) | |
| 1. | Create a real-time application using Java |
| 2. | Create a real-time application using React JS |
| 3. | Create a real-time Full web application using Java, React JS, MongoDB |

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|--|------------|---|---|------------|--------|---------------|----|-------|
| 60 IT 602 - Full Stack Development | | | | | | | | |
| COMMON TO CSE & IT | | | | | | | | |
| Semester | Hours/Week | | | Total hrs. | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | Total |
| VI | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| BASICS OF FULL STACK | | | | | | | | |
| Understanding the Basic Web Development Framework - User - Browser – Webserver - Backend Services – MVC Architecture - Understanding the different stacks – CI/CD – DevOps – Single Stack – Code Deployment - AWS -The role of Java and Advanced Java – Mongo DB – React JS. [9] | | | | | | | | |

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| | |
|---|-----|
| Advanced JAVA * Introduction to Java – Java Exception Handling - JDBC Architecture- JDBC Drivers and Connections- Java Servlets-Servlet Lifecycle-Servlet Creation-Session Tracking in servlets-JSP Introduction-JSP Life Cycle-JSP Scripts, Spring Boot introduction – Microservices – Rest API – Spring Boot Database and Data JPA. | [9] |
| MongoDB Introduction to MongoDB - Query API - create database – Create Collection - MongoDB Insert, Find, Update, Delete - MongoDB Operators- Aggregations-Indexing-Validation-Data API -Charts. | [9] |
| React JS Introduction to React JS – Basic React applications – React Components – React State – State, Props - JSX – REST APIs - Modularization and Webpack - Routing with React Router – Server-side rendering – React Hooks. | [9] |
| Realtime Applications ** Case Study on real time applications (Java) - Case Study on Real time (MongoDB) - Case Study on real time applications (React JS) – case study of Full web Application (MongoDB, Java, React JS, Spring Boot with Microservices). | [9] |
| Total Hours | 45 |
| Textbook(s): | |
| 1. Magnus Laesson, 'hands-on Microservices with Spring Boot and Spring Cloud', First Edition, Packt 2019 | |
| 2. Vasan Subramanian, 'Pro MERN Stack, Full Stack Web App Development with Mongo, Express, React, and Node', Second Edition, Apress, 2019. | |
| Reference(s): | |
| 1. Chris Northwood, 'The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer', Apress; 1st edition, 2018 | |
| 2. Kirupa Chinnathambi, 'Learning React: A Hands-On Guide to Building Web Applications Using React and Redux', Addison-Wesley Professional, 2nd edition, 2018 | |
| 3. Vivian Siahaan, Rismon Hasiholan Sianipar, "Java In Practice: JDBC And Database Applications" Sparta Publishing, Kindle 1 st Edition, 2019 | |

*SDG 4 – Quality Education

**SDG 9 – Industry, Innovation and Infrastructure

Course Contents and Lecture Schedule

| S. No. | Topic | No. of Hours |
|------------|--|--------------|
| 1.0 | Basics of Full Stack Development | |
| 1.1 | Understanding the Basic Web Development Framework | 1 |
| 1.2 | User, Browse, Webserver | 1 |
| 1.3 | Backend Services, Frontend Services and MVC Architecture | 1 |
| 1.4 | Understanding the different stacks | 1 |
| 1.5 | CI/CD, DevOps, Single Stack, Full Stack Developer | 1 |
| 1.6 | Code Deployment and basics of AWS | 1 |
| 1.7 | The role of Java and Advanced Java | 1 |
| 1.8 | The role of Database MongoDB | 1 |

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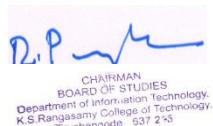
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| | | |
|--------------|--|-----------|
| 1.9 | The role of Frontend React JS | 1 |
| 2.0 | Advanced JAVA | |
| 2.1 | Introduction to Advanced Java | 1 |
| 2.2 | Java Exception Handling | 1 |
| 2.3 | JDBC Architecture, JDBC Drivers and Connections | 1 |
| 2.4 | Java Servlets | 1 |
| 2.5 | Servlets Lifecycle and Servlet Creation | 1 |
| 2.6 | Session Tracking in servlets and JSP introduction | 1 |
| 2.7 | JSP Life Cycle and Scripts | 1 |
| 2.8 | Spring Boots | 1 |
| 2.9 | Spring MVC and Spring Boot Core | 1 |
| 2.10 | Rest API | 1 |
| 2.11 | Spring Boot with Database | 1 |
| 2.12 | Spring Boot Data JPA | 1 |
| 2.13 | Microservices | 1 |
| 3.0 | MongoDB | |
| 3.1 | Introduction to MongoDB and Query API | 1 |
| 3.2 | Create database, Create Collection | 1 |
| 3.3 | MongoDB CRUD (Insert, Run, Update, Delete) | 1 |
| 3.4 | MongoDB Operators | 1 |
| 3.5 | Aggregations in MongoDB | 1 |
| 3.6 | Indexing in MongoDB | 1 |
| 3.7 | Validations | 1 |
| 4.0 | React JS | |
| 4.1 | Introduction to React JS and Its Frameworks | 1 |
| 4.2 | Basics React JS applications | 1 |
| 4.3 | React Component | 1 |
| 4.4 | React State, props, JSX | 1 |
| 4.5 | Rest API's | 1 |
| 4.6 | Modularization and Webpack | 1 |
| 4.7 | Routing with React Router | 1 |
| 4.8 | Server-side programming | 1 |
| 4.9 | React Hooks | 1 |
| 5.0 | Real-Time Applications | |
| 5.1 | Case Study on real time applications (Java) | 1 |
| 5.2 | Case Study on real time applications (Mongo DB) | 1 |
| 5.3 | Case Study on real time applications (React JS) | 1 |
| 5.4 | | 1 |
| 5.5 | Case Study on real time applications (Java, MongoDB, React JS, Spring Boot with Microservices) | 1 |
| 5.6 | | 1 |
| 5.7 | | 1 |
| Total | | 45 |

Course Designer

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| | | | | | | |
|------------------|-------------------------|-----------------|----------|----------|----------|---------------|
| 60 IT 603 | MACHINE LEARNING | Category | L | T | P | Credit |
| | | PC | 3 | 1 | 0 | 4 |

Objective

- To understand the need for machine learning for solving problem
- To study the various supervised, semi-supervised and unsupervised learning algorithms in machine learning
- To understand the machine learning theory and implement linear and non-linear learning models
- To implement distance-based clustering techniques, build tree and rule based models
- To apply reinforcement learning techniques for solving real-time applications

Prerequisite

Basic knowledge of mathematics and programming.

Course Outcomes

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

| | | |
|-----|---|-------|
| CO1 | Distinguish between, supervised, unsupervised and semi -supervised learning | Apply |
| CO2 | Apply the apt linear model for any given problem | Apply |
| CO3 | Suggest supervised, unsupervised or semi-supervised learning algorithms for assessing the distance-based analysis | Apply |
| CO4 | Design ensemble model to improve accuracy rate for real world datasets | Apply |
| CO5 | Apply reinforcement learning strategy for real-time applications | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO2 | 3 | 2 | 3 | 2 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO3 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO4 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |
| CO5 | 3 | 2 | 3 | 3 | | | | | 2 | 2 | 2 | 2 | 3 | 3 | |

3-Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | End Sem Examination (Marks) |
|------------------|-------------------------------------|-----------------------------|
|------------------|-------------------------------------|-----------------------------|

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| | 1 | 2 | |
|-----------------|----|----|----|
| Remember (Re) | 10 | 10 | 10 |
| Understand (Un) | 20 | 10 | 20 |
| Apply (Ap) | 30 | 30 | 60 |
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 10 | 10 |

Course Level Assessment Questions

| Course Outcome 1(CO1) | |
|-------------------------------|---|
| 1 | Describe about features, model and task in machine learning? |
| 2 | Illustrate the uses of three learning model with one example? |
| 3 | Explain about model with an example? |
| Course Outcome 2(CO2) | |
| 1 | Compare univariate linear regression and multivariate linear regression? |
| 2 | Relate spamassian e mail spam system with geometric model? Draw features table and instance space for the same with boundary condition? (Linear Classifier) |
| 3 | Compare univariate linear regression and multivariate linear regression? |
| Course Outcome 3(CO3) | |
| 1 | Describe about clustering around medoids in machine learning? |
| 2 | Calculate medoids for dataset with 2 columns and 6 rows with random data's |
| 3 | Illustrate the uses of three distance-based learning model with one example? |
| Course Outcome 4 (CO4) | |
| 1 | Compare Random Forest Trees and Boosting? |
| 2 | Identify advantages and disadvantages of both models to Titanic Dataset |
| 3 | Relate Adaboost with Stacking model? |
| Course Outcome 5(CO5) | |
| 1 | Demonstrate the usage of reinforcement learning in game development? |
| 2 | Distinguish between active and passive reinforcement learning? |
| 3 | Contrast the usage of learning an action utility function? |

Course Designers

- Mr.K.Senthil Kumar – senthilkumark@ksrct.ac.in

| K.S.Rangasamy College of Technology, Autonomous 2022 | | | | | | | | |
|--|------------|---|---|-----------|--------|---------------|----|-------|
| 60 IT 603- Machine Learning | | | | | | | | |
| Information Technology | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | Total |
| VI | 3 | 1 | 0 | 60 | 4 | 40 | 60 | 100 |
| FOUNDATIONS OF LEARNING Components of learning – learning models – geometric models – probabilistic models – logic models – grouping and grading – learning versus design – types of learning – supervised – unsupervised – reinforcement – theory of learning – feasibility of learning – error and noise – training versus testing – theory of generalization – generalization bound – approximation generalization tradeoff – bias and variance | | | | | | | | [9] |

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| | |
|---|-------|
| LINEAR MODELS * Linear classification – univariate linear regression – multivariate linear regression – Logistic regression – perceptrons – multilayer neural networks – learning neural networks structures – support vector machines – generalization and overfitting – regularization – validation | [9] |
| DISTANCE-BASED MODELS * Nearest neighbor models – K-means – clustering around medoids – silhouettes – hierarchical clustering – k-d trees – locality sensitive hashing – non-parametric regression | [9] |
| ENSEMBLE LEARNING * Ensemble Learning Model Combination Schemes, Voting, Error-Correcting Output Codes, Bagging: Random Forest Trees, Boosting: Adaboost, Stacking. | [9] |
| REINFORCEMENT LEARNING * Passive reinforcement learning – direct utility estimation – adaptive dynamic programming – temporal-difference learning – active reinforcement learning – exploration – learning an action utility function – Generalization in reinforcement learning – policy search – applications in game playing – applications in robot control | [9] |
| Total Hours = 45 + 15 (Tutorial) | 60 |
| Text Book(s): | |
| 1. Peter Flach, "Machine Learning: The art and science of algorithms that make sense of data", Cambridge University Press, 2012. | |
| 2. Andreas Muller,Sarah Guido, "Introduction to Machine Learning with Python: A Guide for Data Scientists",4th Edition,O'Reilly,2018. | |
| Reference(s): | |
| 1. T. M. Mitchell, "Machine Learning", McGraw Hill, 1997. | |
| 2. EthemAlpaydin, "Introduction to Machine Learning", 3rd Edition, MIT Press, 2014. | |
| 3. D. Barber, "Bayesian Reasoning and Machine Learning", Cambridge University Press, 2012. | |

* SDG 4 Quality Education

Course Contents and Lecture Schedule

| S.No. | Topic | No.of Hours |
|----------|--|-------------|
| 1 | FOUNDATION OF LEARNING | |
| 1.1 | Component of Learning – Learning Models | 1 |
| 1.2 | Geometric models – Probabilistic Models | 1 |
| 1.3 | Logic Models – Grouping & Grading | 1 |
| 1.4 | Learning Versus Design – Types of Learning | 1 |
| 1.5 | Supervised – Unsupervised – Reinforcement | 1 |
| 1.6 | Theory of Learning – Feasibility of learning | 1 |
| 1.7 | Error & Noise – Training versus Testing | 1 |
| 1.8 | Theory of Generalization – Generalization bound | 1 |
| 1.9 | Approximation Generalization – Bias & Variance | 1 |
| 2 | LINEAR MODELS | |
| 2.1 | Linear Classification – Univariate Linear Regression | 1 |

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| | | |
|----------|--|-----------|
| 2.2 | Multivariate Linear Regression – Logistic Regression | 1 |
| 2.3 | Perceptrons – Multilayer neural networks | 1 |
| 2.4 | Learning neural network structures | 1 |
| 2.5 | Support vector machines | 1 |
| 2.6 | Generalization | 1 |
| 2.7 | Over fitting | 1 |
| 2.8 | Regularization | 1 |
| 2.9 | Validation | 1 |
| 3 | DISTANCE BASED MODELS | |
| 3.1 | Nearest neighbor models | 1 |
| 3.2 | K – Means | 1 |
| 3.3 | Clustering around medoids | 1 |
| 3.4 | Silhouettes | 1 |
| 3.5 | Hierarchical Clustering | 1 |
| 3.6 | K – D Trees | 1 |
| 3.7 | Locality Sensitive Hashing | 1 |
| 3.8 | Non Parametric Regression | 1 |
| 3.9 | Demo of Non Parametric Regression | 1 |
| 4 | ENSEMBLE LEARNING | |
| 4.1 | Ensemble Learning Model Combination Schema | 1 |
| 4.2 | Voting | 1 |
| 4.3 | Error Correcting Output Codes | 1 |
| 4.4 | Bagging | 1 |
| 4.5 | Random Forest Trees | 1 |
| 4.6 | Boosting | 1 |
| 4.7 | Adaboost | 1 |
| 4.8 | Stacking | 1 |
| 4.9 | Demo of stacking | 1 |
| 5 | REINFORCEMENT LEARNING | |
| 5.1 | Passive Reinforcement Learning | 1 |
| 5.2 | Direct Utility Estimation – Adaptive dynamic Programming | 1 |
| 5.3 | Temporal difference Learning | 1 |
| 5.4 | Active Reinforcement learning – exploration | 1 |
| 5.5 | Learning an action utility function | 1 |
| 5.6 | Generalization in reinforcement learning search policy | 1 |
| 5.7 | Policy Search | 1 |
| 5.8 | Application in Game planning | 1 |
| 5.9 | Application in Robot Control | 1 |
| | Total | 45 |

| 60 IT 604 | SOFTWARE TESTING | Category | L | T | P | Credit |
|-----------|------------------|----------|---|---|---|--------|
| | | PC | 3 | 0 | 0 | 3 |

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Objective

- To introduce the basics and necessity of software testing.
- To provide various testing techniques along with concepts of software bugs and its impact.
- To develop and validate a test plan.
- To build a testing team required.
- To understand the need for the challenges in test automation and to develop testing scripts.

Prerequisite

Basic knowledge of Software Engineering, Software automation tools.

Course Outcomes

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

| | | |
|-----|--|-------|
| CO1 | Obtain an insight to software testing. | Apply |
| CO2 | Apply both black box testing and white box testing. | Apply |
| CO3 | Understand and apply multiple levels of testing. | Apply |
| CO4 | Understand the role of a tester as an individual and as a team member. | Apply |
| CO5 | Apply software testing for large projects using automated testing tools. | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|--------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | 3 | 3 | 2 | | | | | | | 3 | 3 | |
| CO2 | 3 | 3 | 3 | 3 | 3 | 2 | | | | | | | 3 | 3 | |
| CO3 | 3 | 3 | 3 | 3 | 3 | | | | | | | | 3 | 3 | |
| CO4 | 3 | 3 | 3 | 3 | 3 | | | | | | | | 3 | 3 | |
| CO5 | 3 | 3 | 3 | 3 | 3 | | | | | | | | 3 | 3 | |
| 3-Strong;2-Medium;1-Some | | | | | | | | | | | | | | | |

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 10 | 10 | 10 |

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Approved in Academic Council Meeting held on 03/06/2023

| | | | |
|-----------------|----|----|----|
| Understand (Un) | 20 | 10 | 20 |
| Apply (Ap) | 30 | 30 | 60 |
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 10 | 10 |

Course Level Assessment Questions

| | | | |
|-------------------------------|--|--|--|
| Course Outcome 1(CO1) | | | |
| 1. | State and explain all software testing principles | | |
| 2. | What are the typical origins of defects? Explain the major classes of defects in software artifacts. | | |
| 3. | Analyze why testing as an engineering activity in software testing. Explain with near diagram. | | |
| Course Outcome 2(CO2) | | | |
| 1. | Illustrate equivalence class partitioning testing techniques with an example. | | |
| 2. | Outline the steps in constructing a control flow graph and computing cyclomatic complexity with an example. | | |
| 3. | Describe in detail about the various types of system testing. | | |
| Course Outcome 3(CO3) | | | |
| 1. | Explain about the unit test planning | | |
| 2. | What is regression testing? Outline the issues to be addressed for developing test cases to perform regression testing. | | |
| 3. | Explain the different integration testing strategies for functions with suitable diagrams. | | |
| Course Outcome 4 (CO4) | | | |
| 1. | Name the reports of test results and the contents available in each test report. | | |
| 2. | Explore the procedure of building a test group. | | |
| 3. | Develop a use case to describe a user purchase of a laptop with credit card from online vendor using web based software. With use case, design a set of tests you would use during system test(general). | | |
| Course Outcome 5(CO5) | | | |
| 1. | Test automation can help to address several problems, Justify. Draw the framework for test automation. | | |
| 2. | Analyze which tool involved in monitoring Java and Java EE applications in QA and production environments | | |
| 3. | Explicate the functionality and characteristics of taxonomy of testing tools in detail. | | |

| K.S.Rangasamy College of Technology, Autonomous 2022 | | | | | | | |
|--|------------|---|---|-----------|--------|---------------|-------|
| 60 IT 604 – Software Testing | | | | | | | |
| Information Technology | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | |
| | L | T | P | | C | CA | ES |
| VI | 3 | 0 | 0 | 45 | 3 | 40 | 60 |
| Introduction to Software Testing | | | | | | | [9] |

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CHAIRMAN
BOARD OF STUDIES
Department of Information Technology
K.S.Rangasamy College of Technology
Tiruchengode - 637 245

| | |
|--|-------|
| Testing as an Engineering Activity - Testing Maturity Model - SDLC- Scope of Testing -Software Testing Principles – Origins and Cost of Defects – Defect Classes and Examples – Developer/Tester Support of Developing a Defect Repository – Defect Prevention Strategies. | |
| Software Testing Methodology Test Case Design Strategies – Black Box Approach – Random Testing - Boundary Value Analysis – Equivalence Class Partitioning – White Box Approach – Static Testing vs. Structural Testing – Code Functional Testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – Cyclomatic Complexity – Test Adequacy Criteria. | [9] |
| Software Testing Techniques * Need for Levels of Testing - Unit Test – Planning – Designing the Unit Test Process – Running the Unit Tests and Recording Results – Integration Test Planning – Scenario Testing –System Testing – Acceptance Testing – Performance Testing – Regression Testing –Internationalization Testing. | [9] |
| Test Management Organization Structures for Testing Teams – Testing Services – Test Planning Attachments– Locating Test Items – Test Management – Reporting Test Results – The Role of Three Groups in Test Planning and Policy Development – Introducing the Test Specialist – Skills Needed by a Test Specialist – Building a Testing Group. | [9] |
| Automation and Software Testing Tools ** Software Test Automation – Skill Needed for Automation – Scope of Automation – Design and Architecture for Automation – Requirements for a Test Tool – Challenges in Automation– Rational Testing Tools, Java Testing Tools – JavaMelody – Selenium – JUnit - JMeter- JSUnit, NUnit. | [9] |
| Total Hours | 45 |
| Text Book(s): | |
| 1. Paul C. Jorgensen, "Software Testing: A Craftsman's Approach", Fourth Edition, CRC Press, 2013 Paul C. Jorgensen, "Software Testing: A Craftsman's Approach", Fourth Edition, CRC Press, 2013 Paul C. Jorgensen, "Software Testing: A Craftsman's Approach", Fourth Edition, CRC Press, 2013 Paul C. Jorgensen, "Software Testing: A Craftsman's Approach", 4th Edition, CRC Press, 2013. 2. Ilene Burnstein, "Practical Software Testing", Springer International Edition, 2012. | |
| Reference(s): | |
| 1. Glenford J. Myers, Tom Badgett, Corey Sandler, "The Art of Software Testing", 3rd Edition, John Wiley & Sons, 2012. 2. Srinivasan Desikan, Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2009. 3. Dorothy Graham, Mark Fewster, "Experiences of Test Automation: Case Studies of Software Test Automation", Pearson Education, 2012. 4. Boris Beizer, "Software Testing Techniques", Dream Tech Press, 2009. | |

* SDG-4 – Quality Education

** SDG-8 – Employment and decent work for all

Course Contents and Lecture Schedule

| S. No. | Topic | No. of Hours |
|--------|---|--------------|
| 1 | Introduction to Software Testing | |

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| | | |
|----------|--|---|
| 1.1 | Testing as an Engineering Activity | 1 |
| 1.2 | Testing Maturity Model | 1 |
| 1.3 | SDLC - Scope of Testing | 1 |
| 1.4 | SDLC - Scope of Testing | 1 |
| 1.5 | Software Testing Principles | 1 |
| 1.6 | Origins and Cost of Defects | 1 |
| 1.7 | Defect Classes and Examples | 1 |
| 1.8 | Developer/Tester Support of Developing a Defect Repository | 1 |
| 1.9 | Defect Prevention Strategies | 1 |
| 2 | Software Testing Methodology | |
| 2.1 | Test Case Design Strategies | 1 |
| 2.2 | Black Box Approach – Random Testing | 1 |
| 2.3 | Boundary Value Analysis | 1 |
| 2.4 | Equivalence Class Partitioning | 1 |
| 2.5 | White Box Approach | 1 |
| 2.6 | Static Testing vs. Structural Testing | 1 |
| 2.7 | Code Functional Testing | 1 |
| 2.8 | Coverage and Control Flow Graphs – Covering Code Logic | 1 |
| 2.9 | Paths – Cyclomatic Complexity – Test Adequacy Criteria | 1 |
| 3 | Software Testing Techniques | |
| 3.1 | Need for Levels of Testing | 1 |
| 3.2 | Unit Test – Planning | 1 |
| 3.3 | Designing the Unit Test Process | 1 |
| 3.4 | Running the Unit Tests and Recording Results | 1 |
| 3.5 | Integration Test Planning – Scenario Testing | 1 |
| 3.6 | System Testing | 1 |
| 3.7 | Acceptance Testing | 1 |
| 3.8 | Performance Testing – Regression Testing | 1 |
| 3.9 | Internationalization Testing | 1 |
| 4 | Test Management | |
| 4.1 | Organization Structures for Testing Teams | 1 |
| 4.2 | Testing Services – Test Planning Attachments | 1 |
| 4.3 | Locating Test Items | 1 |
| 4.4 | Test Management | 1 |
| 4.5 | Reporting Test Results | 1 |
| 4.6 | The Role of Three Groups in Test Planning and Policy Development | 1 |
| 4.7 | Introducing the Test Specialist | 1 |
| 4.8 | Skills Needed by a Test Specialist | 1 |
| 4.9 | Building a Testing Group | 1 |
| 5 | Automation and Software Testing Tools | |
| 5.1 | Software Test Automation | 1 |
| 5.2 | Skill Needed for Automation – Scope of Automation | 1 |
| 5.3 | Design and Architecture for Automation | 1 |
| 5.4 | Requirements for a Test Tool | 1 |
| 5.5 | Challenges in Automation | 1 |

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| | | |
|-----|--|----|
| 5.6 | Rational Testing Tools | 1 |
| 5.7 | Java Testing Tools | 1 |
| 5.8 | JavaMelody – Selenium – JUnit - JMeter | 1 |
| 5.9 | JSUnit, NUnit | 1 |
| | Total | 45 |

Course DesignersMr.R.Arunkumar – rarunkumar@ksrct.ac.in

| 60 IT E21 | High Performance Networks | Category | L | T | P | Credit |
|-----------|---------------------------|----------|---|---|---|--------|
| | | PC | 3 | 0 | 0 | 3 |

Objective

- To provide insights about basic concepts in high performance networking, with a focus on throughput and latency performance metrics
- To understand the advanced network technologies and ATM networks
- To learn the transport layer protocols and congestion control mechanisms
- To explore the concept of unicast and multicast routing protocols
- To learn the working principles of network Management protocols and its application

Prerequisite

Basic knowledge of Computer Networks

Course Outcomes

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

| | | |
|-----|--|----|
| CO1 | Acquire Knowledge on concepts of high performance networking | Un |
| CO2 | Recognize the advanced network technologies and ATM networks | Un |
| CO3 | Explore the concepts of congestion control and transport layer protocols | Ap |
| CO4 | Attain solutions to various problems in network routing protocols | Ap |
| CO5 | Attain extensive knowledge on network management and Its application | Un |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 2 | 2 | 2 | 2 | | | | | | | | 3 | 3 | |
| CO2 | 3 | 3 | 2 | 2 | 2 | | | | | | | | 3 | 3 | |
| CO3 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 3 | 3 | |
| CO4 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 3 | 3 | |
| CO5 | 3 | 2 | 2 | 2 | 2 | | | | | | | | 3 | 3 | |

3-Strong;2-Medium;1-Some

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Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 10 | 10 | 20 |
| Understand (Un) | 20 | 20 | 40 |
| Apply (Ap) | 30 | 30 | 40 |
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 00 | 00 |

Course Level Assessment Questions

| Course Outcome 1(CO1) | |
|-------------------------------|---|
| 1. | Specify the Key Requirements for Efficiency of TCP/IP Networks |
| 2. | Describe the purpose of Internet backbone in Internet topology |
| 3. | Define the performance parameters of High-Speed Networks |
| Course Outcome 2(CO2) | |
| 1. | Enumerate the purpose of ATM cell |
| 2. | Differentiate circuit switching and packet switching |
| 3. | Define the flag used for Connection establishment and connection Release in TCP |
| Course Outcome 3(CO3) | |
| 1. | Give the flow control characteristics to improve QoS |
| 2. | Describe the methods used in Congestion avoidance mechanism |
| 3. | Specify the services and features SCTP protocol |
| Course Outcome 4 (CO4) | |
| 1. | With neat diagram explain RIP protocol |
| 2. | Write the difference between Unicasting and Multicasting Protocol |
| 3. | Analyse the Table-Driven and On-Demand Routing Protocols. |
| Course Outcome 5(CO5) | |
| 1. | Explain the purpose of voice over IP protocol. |
| 2. | Differentiate IP and mobile IP. |
| 3. | Enumerate the working principle of SNMP protocol with neat diagram. |

| K.S.Rangasamy College of Technology, Autonomous 2022 | | | | | | | |
|--|------------|---|---|-----------|--------|---------------|-------|
| 60 IT E21- High Performance Networks | | | | | | | |
| Information Technology | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | |
| | L | T | P | | C | CA | ES |
| VI | 3 | 0 | 0 | 45 | 3 | 40 | 60 |
| TCP/IP Networks * | | | | | | | [9] |

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| | |
|---|-------|
| Standards and Administration - Internet Structure - ISPs and Backbone Networks - Internet Architecture - Key Requirements for Efficiency of Networks: Scalable Connectivity, Cost-Effective Resource Sharing, Support for Services, Manageability - Performance Parameters for High-Speed Networks; Application Performance Needs. | |
| Network Technologies for High-Speed Networks *** Ethernet and its High speed versions – FDDI - Frame Relay Networks – SONET- DWDM – ATM - Design goals - Architecture and Logical Connection - ATM Cells - Connection establishment and Release – Switching - ATM Layers | [9] |
| TCP/IP Transport Layer and Congestion Control Client/Server paradigm - Peer-to-Peer Paradigm - Port numbers - TCP connection - TCP flow and congestion control–Congestion Avoidance Mechanisms: DECbit, Random Early Detection(RED) - Source-Based Congestion Avoidance, UDP services and applications, SCTP Services & Features. | [9] |
| Internet Routing Protocols *** Unicast Routing Protocols : RIP – OSPF- BGP - Multicast Routing and Protocols: DVMRP- MOSPF – PIM- MBGP- Mobile Adhoc Networks: Introduction - Table-Driven and On-Demand Routing Protocols. | [9] |
| Network Management and Application ** Network management- choosing a configuration method-MIB-SNMP-XMLCORBA- COPS-VPNS-mobile IP-voice over IP. | [9] |
| Total Hours | 45 |
| Text Book(s): | |
| 1. George Varghese. Network algorithms. Chapman & Hall/CRC, 2010. | |
| 2. Kaven Pahlavan And Prashant Krishnamoorthy, "Principles Of Wireless Network", Prentice Hall Of India, 2010 | |
| Reference(s): | |
| 1. Kurose, J.F. & Ross, K.W. (2009). Computer networking: a top-down approach. Addison-Wesley (5th ed.). | |
| 2. Behrouz A. Forouzan, "TCP/IP Protocol Suite", 4th Edition, Tata McGraw Hill, 2015. | |
| 3. Andrew S. Tanenbaum, "Computer Networks", 4th Edition, PHI, 2003. | |

*SDG 4-Quality Education

**SDG 9-Industry Innovation and Infrastructure

***SDG 11-Sustainable Cities and Communities

Course Contents and Lecture Schedule

| S.No. | Topics | No.of Hours |
|-------|--|-------------|
| 1 | TCP/IP Networks | |
| 1.1 | Standards and Administration | 1 |
| 1.2 | Internet Structure - ISPs and Backbone Networks | 1 |
| 1.3 | Internet Architecture | 1 |
| 1.4 | TCP/IP Protocol Suite | 1 |
| 1.5 | Key Requirements for Efficiency of Networks: Scalable Connectivity | 1 |
| 1.6 | Cost-Effective Resource Sharing | 1 |
| 1.7 | Support for Services, Manageability | 1 |
| 1.8 | Performance Parameters for High-Speed Networks | 1 |

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| | | |
|----------|--|-----------|
| 1.9 | Application Performance Needs | 1 |
| 2 | Network Technologies for High-Speed Networks | |
| 2.1 | Ethernet and its High speed versions | 1 |
| 2.2 | FDDI - Frame Relay Networks | 1 |
| 2.3 | SONET- DWDM | 1 |
| 2.4 | ATM - Design goals | 1 |
| 2.5 | Architecture and Logical Connection | 1 |
| 2.6 | ATM Cells | 1 |
| 2.7 | Connection establishment and Release | 1 |
| 2.8 | Switching | 1 |
| 2.9 | ATM Layers | 1 |
| 3 | TCP/IP Transport Layer and Congestion Control | |
| 3.1 | Client/Server paradigm | 1 |
| 3.2 | Peer-to-Peer Paradigm- Port numbers | 1 |
| 3.3 | TCP connection | 1 |
| 3.4 | TCP flow and congestion control | 1 |
| 3.5 | Congestion Avoidance Mechanisms: DECbit, Random Early Detection(RED) | 1 |
| 3.6 | Source-Based Congestion Avoidance | 1 |
| 3.7 | UDP services and applications | 1 |
| 3.8 | SCTP Services & Features | 1 |
| 3.9 | Network layer services | 1 |
| 4 | Internet Routing Protocols | |
| 4.1 | Unicast Routing Protocols : RIP | 1 |
| 4.2 | OSPF- BGP | 1 |
| 4.3 | Multicast Routing and Protocols: DVMRP | 1 |
| 4.4 | MOSPF | 1 |
| 4.5 | PIM | 1 |
| 4.6 | MBGP | 1 |
| 4.7 | Mobile Adhoc Networks: Introduction | 1 |
| 4.8 | Table-Driven Routing Protocols | 1 |
| 4.9 | On-Demand Routing Protocols | 1 |
| 5 | Network Management And Application | |
| 5.1 | Network management | 1 |
| 5.2 | Configuration method | 1 |
| 5.3 | MIB | 1 |
| 5.4 | SNMP | 1 |
| 5.5 | XML CORBA | 1 |
| 5.6 | COPS | 1 |
| 5.7 | VPNS | 1 |
| 5.8 | Mobile IP | 1 |
| 5.9 | Voice over IP | 1 |
| | Total | 45 |

Course Designers

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Dr.M.Sangeetha-sangeetham@ksrct.ac.in

| 60 IT E22 | DISTRIBUTED COMPONENT ARCHITECTURE | Category | L | T | P | Credit |
|-----------|------------------------------------|----------|---|---|---|--------|
| | | PC | 3 | 0 | 0 | 3 |

Objectives

- To understand the fundamentals of distributed component techniques
- To identify different approaches to create and implement component using java and corba technologies
- To gain knowledge on .net technologies for client server connection
- To analyze different COM techniques in .NET components and design a framework for component
- To gain knowledge on assembly tools and testing tools

Prerequisite

Basic knowledge of Web Technology

Course Outcomes

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

| | | | | | | | | | | | | | |
|-----|---|--|--|--|--|--|--|--|--|--|--|--|------------|
| CO1 | Acquire knowledge about distributed components techniques and callbacks | | | | | | | | | | | | Apply |
| CO2 | Analyze threads, Java Beans with its events and properties and archive files | | | | | | | | | | | | Analyze |
| CO3 | Develop CORBA component technology with its implementation | | | | | | | | | | | | Analyze |
| CO4 | Classify .net based component technologies for client server connection | | | | | | | | | | | | Understand |
| CO5 | Examine the concept of distributed component framework with its development tools | | | | | | | | | | | | Analyze |

| COs | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO 1 | PSO 2 | PSO 3 |
|-----|------|------|------|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| CO1 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 3 | 3 | 2 |
| CO2 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 3 | 3 | 2 |
| CO3 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 3 | 3 | 2 |
| CO4 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 3 | 3 | 2 |
| CO5 | 3 | 3 | 3 | 2 | 2 | | | | | | | | 3 | 3 | 2 |

3-Strong;2-Medium;1-Some

Mapping with Programme Outcomes**Assessment Pattern**

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | - | - | 10 |
| Understand (Un) | 10 | 20 | 30 |
| Apply (Ap) | 20 | 10 | 20 |

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| | | | |
|---------------|----|----|----|
| Analyse (An) | 20 | 20 | 20 |
| Evaluate (Ev) | - | - | - |
| Create (Cr) | 10 | 10 | 20 |

| K.S.Rangasamy College of Technology – Autonomous R2022 | | | | | | | |
|--|--|---|---|-----------|--------|---------------|----|
| 60 IT E22 – Distributed Component Architecture | | | | | | | |
| Information Technology | | | | | | | |
| Semester | Hours / Week | | | Total hrs | Credit | Maximum Marks | |
| | L | T | P | | C | CA | ES |
| VI | 3 | 0 | 0 | 45 | 3 | 40 | 60 |
| Note: The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated. | | | | | | | |
| Introduction Client/server computing- building blocks - types of servers and clients- types of middleware aspects of client/server systems - Component technology- components- definitions- properties – benefits -components and interfaces - direct and indirect interfaces - versions- interfaces as contracts -callbacks- component architecture- component frameworks-components and middleware | | | | | | | |
| Lab Exercise : Create an application of number conversion using COM/DCOM | | | | | | | |
| Java Based Component Technologies * Threads – Java Beans – Events and connections – properties – introspection – JAR files – reflection – object serialization – Enterprise Java Beans – Distributed Object models – RMI and RMI-IIOP – ORM | | | | | | | |
| Lab Exercise : Create an application to deploy the components for multimedia file | | | | | | | |
| Corba Component Technologies ** The OMG way - system object model - CORBA timeline - CORBA architecture - ORB-services facilities- Portable Object Adapter - business objects - IIOP-transport mechanisms- IDL- CCM- CCM container- Model Driven architecture | | | | | | | |
| Lab Exercise : Create a Time display distributed application using CORBA | | | | | | | |
| Net Based Component Technologies * The Microsoft way-component object model- From COM, COM+, DCOM to .NET framework evolution-web services technologies-XML,WSDL,UDDI,SOAP-Common Language Runtime-.NET framework class library-ADO.NET,ASP.NET- contexts –reflection – remoting | | | | | | | |
| Lab Exercise : Create a mark list application using Net Beans IDE | | | | | | | |
| Component Frameworks and Development Connectors – EJB containers – CLR contexts and channels - JAXB – Black Box component framework – cross-development environment – component-oriented programming – Component design and implementation tools – testing tools - assembly tools – Open source framework | | | | | | | |
| Lab Exercise : Create a calculator application using EJB | | | | | | | |
| Total Hours 45 | | | | | | | |
| Text book(s): | | | | | | | |
| 1. | Clemens szyperski, Dominik Gruntz and Stephan Murer ,Component Software beyond object oriented programming, third edition, Pearson education,2004. | | | | | | |
| 2. | Robert Orfali,Dan Harkey,Jeri Edwards,Client/ Server Survival Guide, Third edition,John wiley Inc,2003. | | | | | | |

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| Reference(s): | |
|----------------------|--|
| 1. | G.Sudha Sadasivam, "Component - Based Technology", Wiley India Pvt. Ltd, 2008. |
| 2. | David Chappell, Understanding .NET, Pearson Education Inc, 2002. |
| 3. | Bill Burke, Richard Monson-Haefel, Enterprise JavaBeans, Fifth Edition,O'Reilly, 2001. |
| 4 | Mowbray, "Inside CORBA", Pearson Education, 2003. |

* SDG 4-Quality Education

**SDG 9 – Industry Innovation and Infrastructure

Course Level Assessment Questions

| Course Outcome 1(CO1) | |
|-------------------------------|--|
| 1. | Explain the types of middleware aspects of client/server systems |
| 2. | Classify the types of servers and clients |
| 3. | Illustrate the component architecture with an example |
| Course Outcome 2(CO2) | |
| 1. | Explicate the thread with an relevant example |
| 2. | Elucidate the Distributed Object models and along with an advantages |
| 3. | Discuss the ORM with an example |
| Course Outcome 3(CO3) | |
| 1. | Illustrate the CORBA architecture with an example |
| 2. | Describe the Portable Object Adapter with an advantages |
| 3. | Illuminate the Model Driven architecture with an example |
| Course Outcome 4 (CO4) | |
| 1. | Explain the component object model with an example |
| 2. | Explicate the web service technologies with an relevant example |
| 3. | Describe the -.NET framework class library with an example |
| Course Outcome 5(CO5) | |
| 1. | Differentiate the EJB containers and jaxb |
| 2. | Illustrate the Black Box component framework with an example |
| 3. | Explain the component-oriented programming with an relevant example |

Course Contents and Lecture Schedule

| S.No | Topic | No. of hours |
|------|--|--------------|
| 1 | Introduction | |
| 1.1 | Client/server computing | 1 |
| 1.2 | building blocks | 1 |
| 1.3 | types of servers and clients | 1 |
| 1.4 | types of middleware aspects of client/server systems | 1 |
| 1.5 | Component technology- components | 1 |
| 1.6 | definitions- properties – benefits -components and interfaces - direct and indirect interfaces | 1 |
| 1.7 | versions- interfaces as contracts -callbacks | 1 |
| 1.8 | component frameworks | 1 |

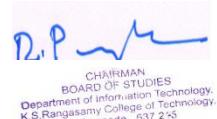
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| | | |
|-----|--|---|
| 1.9 | components and middleware | 1 |
| 2 | Java Based Component Technologies | |
| 2.1 | Threads | 1 |
| 2.2 | Java Beans | 1 |
| 2.3 | Events and connections | 1 |
| 2.4 | properties – introspection | 1 |
| 2.5 | JAR files | 1 |
| 2.6 | Reflection- | 1 |
| 2.7 | Enterprise Java Beans | 1 |
| 2.8 | Distributed Object models- | 1 |
| 2.9 | RMI and RMI-IIOP – ORM | 1 |
| 3 | Corba Component Technologies | |
| 3.1 | The OMG way | 1 |
| 3.2 | system object | 1 |
| 3.3 | CORBA timeline | 1 |
| 3.4 | CORBA architecture | 1 |
| 3.5 | ORB-services facilities | 1 |
| 3.6 | Portable Object Adapter | 1 |
| 3.7 | business objects | 1 |
| 3.8 | IDL- CCM- CCM container | 1 |
| 3.9 | Model Driven architecture | 1 |
| 4 | Net Based Component Technologies | |
| 4.1 | The Microsoft way- .NET framework class library | 1 |
| 4.2 | component object model | 1 |
| 4.3 | From COM, COM+, DCOM to .NET framework evolution | 1 |
| 4.4 | web services technologies-XML | 1 |
| 4.5 | WSDL - UDDI | 1 |
| 4.6 | SOAP-Common Language Runtime | 1 |
| 4.7 | .NET framework class library | 1 |
| 4.8 | ADO.NET,ASP.NET-contexts | 1 |
| 4.9 | reflection – remoting | 1 |
| 5 | Component Frameworks and Development | |
| 5.1 | Connectors | 1 |
| 5.2 | EJB containers | 1 |
| 5.3 | CLR contexts and channels | 1 |
| 5.4 | JAXB | 1 |
| 5.5 | Black Box component framework | 1 |
| 5.6 | environment-component-oriented programming | 1 |
| 5.7 | Component design and implementation tools | 1 |
| 5.8 | testing tools - assembly tools | 1 |
| 5.9 | Open source framework | 1 |

Course Designers

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Mr.M.Thilakraj mthilakraj@ksrct.ac.in

| 60 IT E23 | Distributed Computing | Category | L | T | P | Credit |
|-----------|-----------------------|----------|---|---|---|--------|
| | | PE | 3 | 0 | 0 | 3 |

Objective

- To understand the foundation of distributed systems.
- To learn issues related to clock Synchronization and the need for global state in distributed systems.
- To learn distributed mutual exclusion and deadlock detection algorithms.
- To understand the significance of agreement, fault tolerance and recovery protocols in Distributed Systems.
- To understand the basics of cloud computing

Prerequisite

Basic knowledge of Operating Systems.

Course Outcomes

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

| | | |
|-----|--|------------|
| CO1 | Elucidate the foundations and issues of distributed systems | Understand |
| CO2 | Understand the various synchronization issues and global state for distributed systems. | Understand |
| CO3 | Understand the Mutual Exclusion and Deadlock detection algorithms in distributed systems | Understand |
| CO4 | Describe the agreement protocols and fault tolerance mechanisms in distributed systems. | Understand |
| CO5 | Understand the various services of cloud environment | Understand |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|--------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 2 | 1 | | | | | | | | | | | 2 | | |
| CO2 | 2 | 1 | 2 | 2 | | | | | | | | | 3 | | |
| CO3 | 3 | 2 | 1 | 1 | | | | | | | | | 3 | 2 | 2 |
| CO4 | 3 | 2 | 1 | 1 | | | | | | | | | 3 | 2 | 2 |
| CO5 | 3 | 2 | | | | | | | | | | | 3 | 2 | 2 |
| 3-Strong;2-Medium;1-Some | | | | | | | | | | | | | | | |

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Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|-------------------------|--|----------|------------------------------------|
| | 1 | 2 | |
| Remember (Re) | 10 | 10 | 10 |
| Understand (Un) | 20 | 10 | 20 |
| Apply (Ap) | 30 | 30 | 60 |
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 10 | 10 |

Course Level Assessment Questions

| | |
|------------------------------|---|
| Course Outcome 1(CO1) | |
| | Explain in detail about Message Passing System. |
| | Elucidate the models of Communication Networks. |
| | Describe the design issues and challenges in Distributed systems. |
| Course Outcome 2(CO2) | |
| | Discuss in detail about synchronous program on Asynchronous systems. |
| | Convey the significance of Casual order and Total order. |
| | Illustrate the snapshot algorithm for FIFO channels. |
| Course Outcome 3(CO3) | |
| | Why the Lamport's algorithm is needed in distributed environment? Give the explanation with an example. |
| | Compare Token-Based Algorithms with Suzuki-Kasami's Broadcast Algorithm. |
| | Suggest the ways to detect the deadlock in distributed systems. |
| Course Outcome 4(CO4) | |
| | Discuss about the agreement in failure free system for synchronous and asynchronous system. |
| | Illustrate the issues in failure recovery. |
| | Explain the Algorithm for Asynchronous Checkpointing and Recovery. |
| Course Outcome 5(CO5) | |
| | Elucidate the various cloud deployment models with suitable diagrams. |
| | Describe the significance of virtualization and load balancing in cloud environment. |
| | Exponent the compute and storage services in cloud computing. |

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|--|-------------------|----------|----------|------------------|---------------|----------------------|-----------|--------------|
| 60 IT E23 – Distributed Computing | | | | | | | | |
| B.Tech - Information Technology | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | Total |
| VI | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| INTRODUCTION | | | | | | | | [9] |
| Introduction: Definition-Relation to Computer System Components – Motivation – Message - Passing Systems versus Shared Memory Systems – Primitives for Distributed Communication – Synchronous versus Asynchronous Executions – Design Issues and Challenges; A Model of Distributed Computations: A Distributed Program – A Model of Distributed Executions – Models of | | | | | | | | |

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| | |
|---|-------|
| Communication Networks – Global State of a Distributed System, Logical Time: Physical Clock Synchronization: NTP – A Framework for a System of Logical Clocks – Scalar Time – Vector Time. | |
| MESSAGE ORDERING AND SNAPSHOTS * Message Ordering and Group Communication: Message Ordering Paradigms – Asynchronous Execution with Synchronous Communication – Synchronous Program Order on Asynchronous System – Group Communication – Causal Order – Total Order; Global State and Snapshot Recording Algorithms: Introduction – System Model and Definitions – Snapshot Algorithms for FIFO Channels. | [9] |
| DISTRIBUTED MUTEX AND DEADLOCK ** Distributed Mutual exclusion Algorithms: Introduction – Preliminaries – Lamport's algorithm – Ricart-Agrawala's Algorithm — Token-Based Algorithms – Suzuki-Kasami's Broadcast Algorithm; Deadlock Detection in Distributed Systems: Introduction – System Model – Preliminaries – Models of Deadlocks – Chandy-Misra-Haas Algorithm for the AND model and OR Model. | [9] |
| CONSENSUS AND RECOVERY Consensus and Agreement Algorithms: Problem Definition – Overview of Results – Agreement in a Failure-Free System (Synchronous and Asynchronous) – Agreement in Synchronous Systems with Failures; Checkpointing and Rollback Recovery: Introduction – Background and Definitions – Issues in Failure Recovery – Checkpoint-based Recovery – Coordinated Checkpointing Algorithm – Algorithm for Asynchronous Checkpointing and Recovery | [9] |
| CLOUD COMPUTING *** Definition of Cloud Computing – Characteristics of Cloud – Cloud Deployment Models – Cloud Service Models – Driving Factors and Challenges of Cloud – Virtualization – Load Balancing – Scalability and Elasticity – Replication – Monitoring – Cloud Services and Platforms: Compute Services – Storage Services – Application Services | [9] |
| Total Hours | 45 |
| Text Book(s): | |
| 1. Kshemkalyani, Ajay D., and Mukesh Singhal, "Distributed computing: principles, algorithms and systems", Cambridge University Press, 2011 | |
| 2. George Coulouris, Jean Dollimore and Tim Kindberg, "Distributed Systems Concepts and Design", Fifth Edition, Pearson Education, 2012 | |
| Reference(s): | |
| 4. Arshdeep Bagga, Vijay Madisetti, "Cloud Computing: A Hands-On Approach", Universities Press, 2014. | |
| 5. Pradeep L Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007. | |
| 6. Tanenbaum A S, Van Steen M, "Distributed Systems: Principles and Paradigms", Pearson Education, 2007. | |
| 7. Mukesh Singhal, Niranjan G Shivaratri, "Advanced Concepts in Operating systems", McGraw Hill Publishers, 1994. | |

* SDG-4 – Quality Education

** SDG-8 – Employment and decent work for all

*** SDG-9 – Industry, Innovation and Infra structure

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Course Contents and Lecture Schedule

| S.No. | Topic | No. of Hours |
|----------|---|--------------|
| 1 | INTRODUCTION | |
| 1.1 | Introduction: Definition, Relation to Computer System Components | 1 |
| 1.2 | Motivation, Message, Passing Systems versus Shared Memory Systems | 1 |
| 1.3 | Primitives for Distributed Communication | 1 |
| 1.4 | Synchronous versus Asynchronous Executions, Design Issues and Challenges | 1 |
| 1.5 | A Model of Distributed Computations: A Distributed Program, A Model of Distributed Executions | 1 |
| 1.6 | Models of Communication Networks, Global State of a Distributed System | 1 |
| 1.7 | Logical Time: Physical Clock Synchronization: NTP | 1 |
| 1.8 | A Framework for a System of Logical Clocks | 1 |
| 1.9 | Scalar Time, Vector Time | 1 |
| 2 | MESSAGE ORDERING AND SNAPSHOTS | |
| 2.1 | Message Ordering Paradigms | 1 |
| 2.2 | Asynchronous Execution with Synchronous Communication | 1 |
| 2.3 | Synchronous Program Order on Asynchronous System | 1 |
| 2.4 | Group Communication | 1 |
| 2.5 | Causal Order | 1 |
| 2.6 | Total Order | 1 |
| 2.7 | Global State and Snapshot Recording Algorithms: Introduction | 1 |
| 2.8 | System Model and Definitions | 1 |
| 2.9 | Snapshot Algorithms for FIFO Channels. | 1 |
| 3 | DISTRIBUTED MUTEX AND DEADLOCK | |
| 3.1 | Distributed Mutual exclusion Algorithms: Introduction, Preliminaries | 1 |
| 3.2 | Lamport's algorithm | 1 |
| 3.3 | Ricart-Agrawala's Algorithm | 1 |
| 3.4 | Token-Based Algorithms | 1 |
| 3.5 | Suzuki-Kasami's Broadcast Algorithm | 1 |
| 3.6 | Deadlock Detection in Distributed Systems: Introduction | 1 |
| 3.7 | System Model, Preliminaries | 1 |
| 3.8 | Models of Deadlocks | 1 |
| 3.9 | Chandy-Misra-Haas Algorithm for the AND model and OR Model | 1 |
| 4 | CONSENSUS AND RECOVERY | |
| 4.1 | Consensus and Agreement Algorithms: Problem Definition | 1 |
| 4.2 | Overview of Results | 1 |
| 4.3 | Agreement in a Failure-Free System (Synchronous and Asynchronous) | 1 |
| 4.4 | Agreement in Synchronous Systems with Failures | 1 |
| 4.5 | Checkpointing and Rollback Recovery: Introduction, Background and Definitions | 1 |
| 4.6 | Issues in Failure Recovery | 1 |
| 4.7 | Checkpoint-based Recovery | 1 |

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| | | |
|-----|---|-----------|
| 4.8 | Coordinated Checkpointing Algorithm | 1 |
| 4.9 | Algorithm for Asynchronous Checkpointing and Recovery | 1 |
| 5 | CLOUD COMPUTING | |
| 5.1 | Definition of Cloud Computing, Characteristics of Cloud | 1 |
| 5.2 | Cloud Deployment Models, Cloud Service Models | 1 |
| 5.3 | Driving Factors and Challenges of Cloud | 1 |
| 5.4 | Virtualization, Load Balancing | 1 |
| 5.5 | Scalability and Elasticity, Replication | 1 |
| 5.6 | Monitoring, Cloud Services and Platforms | 1 |
| 5.7 | Compute Services | 1 |
| 5.8 | Storage Services | 1 |
| 5.9 | Application Services | 1 |
| | Total | 45 |

Course Designers

Mr. R.T.Dinesh Kumar (dineshkumarrr@ksrct.ac.in)

| 60 IT E24 | AUGMENTED REALITY/VIRTUAL REALITY | Category | L | T | P | Credit |
|-----------|-----------------------------------|----------|---|---|---|--------|
| | | PE | 3 | 0 | 0 | 3 |

Objective

- To impart the fundamental aspects and principles of AR/VR technologies.
- To know the internals of the hardware and software components involved in the development of AR/VR enabled applications.
- To learn about the graphical processing units and their architectures.
- To gain knowledge about AR/VR application development.
- To know the technologies involved in the development of AR/VR based applications.

Prerequisite

NIL

Course Outcomes

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

| | | |
|-----|--|------------|
| CO1 | Understand the basic concepts of AR and VR | Understand |
| CO2 | Understand the tools and technologies related to AR/VR | Understand |
| CO3 | Know the working principle of AR/VR related Sensor devices | Apply |
| CO4 | Design of various models using modeling techniques | Analyze |

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| | | |
|-----|---|-------|
| CO5 | Develop AR/VR applications in different domains | Apply |
|-----|---|-------|

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 2 | 2 | - | 3 | - | - | - | 2 | 2 | 1 | 2 | 2 | 1 | 2 |
| CO2 | 3 | 2 | 2 | 1 | 3 | - | - | - | 3 | 2 | 2 | 3 | 3 | 1 | 2 |
| CO3 | 3 | 3 | 2 | 2 | 3 | - | - | - | 3 | 2 | 1 | 2 | 3 | 2 | 2 |
| CO4 | 3 | 3 | 3 | 2 | 3 | - | - | - | 3 | 2 | 2 | 3 | 3 | 2 | 2 |
| CO5 | 3 | 3 | 3 | 3 | 3 | - | - | - | 3 | 3 | 3 | 3 | 3 | 3 | 3 |

3=Strong;2=Medium;1=Some

Assessment Pattern

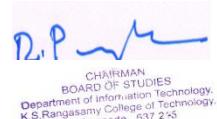
| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 10 | 10 | 10 |
| Understand (Un) | 20 | 10 | 20 |
| Apply (Ap) | 30 | 30 | 60 |
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 10 | 10 |

Course Level Assessment Questions

| Course Outcome 1(CO1) | |
|-----------------------|---|
| 1. | How has the evolution of Augmented Virtual Reality technologies shaped its current landscape? |
| 2. | How are AVR technologies applied in different industries, and what specific benefits do they offer? |
| 3. | What are some of the major challenges faced in the development of AVR, and what opportunities exist for overcoming them? |
| Course Outcome 2(CO2) | |
| 1. | What are the primary hardware components utilized in AVR systems, and how do they contribute to immersive experiences? |
| 2. | What are the various types of display devices and interfaces commonly employed in AVR setups, and how do they impact user engagement? |
| 3. | What role do input devices and interaction techniques play in facilitating user interaction within AVR environments? |
| Course Outcome 3(CO3) | |

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| | |
|-------------------------------|--|
| 1. | How do human-centered design principles shape the development of Augmented Virtual Reality (AVR) applications, and what strategies can be employed to ensure user needs and preferences are prioritized? |
| 2. | Can you discuss the importance of user experience (UX) design in AVR applications, and provide examples of how UX principles enhance usability and engagement within virtual environments? |
| 3. | What are some key interface design considerations specific to AVR systems, and how do designers optimize interfaces to provide intuitive and seamless interactions for users? |
| Course Outcome 4 (CO4) | |
| 1. | What role does User Experience (UX) design play in optimizing the usability and satisfaction of AVR applications? |
| 2. | What are some key interface design considerations unique to AVR environments, and how do they enhance user engagement and immersion? |
| 3. | How can immersive storytelling techniques be effectively utilized in AVR applications to create compelling narrative experiences? |
| Course Outcome 5(CO5) | |
| 1. | What are some advanced rendering techniques used in Augmented Virtual Reality (AVR) systems, and how do they enhance visual realism and immersion? |
| 2. | In what ways can artificial intelligence and machine learning technologies enhance the functionality and interactivity of AVR applications? |
| 3. | What are the benefits and considerations associated with utilizing augmented reality cloud services for AVR development and deployment? |

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|---|------------|---|---|-----------|--------|---------------|----|-------|
| 60 IT E24 – Augmented Reality/Virtual Reality | | | | | | | | |
| Information Technology | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | TOTAL |
| VI | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| INTRODUCTION TO AUGMENTED VIRTUAL REALITY (AVR) Overview of AVR technologies - History and evolution - Key concepts and terminology - Applications of AVR in various industries - Challenges and opportunities in AVR development - Ethics and societal implications of AVR - Future trends and advancements | | | | | | | | 9 |
| AVR HARDWARE AND SOFTWARE * Hardware components of AVR systems - Sensors and tracking technologies - Display devices and interfaces - Input devices and interaction techniques - Software development platforms - Programming languages for AVR development - Integration of hardware and software in AVR systems | | | | | | | | 9 |
| DESIGN PRINCIPLES FOR AVR * Human-centered design principles - User experience (UX) design - Interface design considerations - Immersive storytelling technique - Interaction design for AVR applications - Prototyping and testing in AVR development - Accessibility considerations in AVR design | | | | | | | | 9 |
| AVR DEVELOPMENT TOOLS AND TECHNIQUES ** | | | | | | | | 9 |

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| | |
|---|---|
| Development environments - 3D modeling and asset creation tools - Animation techniques for AVR content - Audio design and spatial sound - Scripting and coding for AVR applications - Optimization and performance tuning in AVR development - Collaborative development workflows for AVR projects | |
| ADVANCED TOPICS IN AVR ** Advanced rendering techniques - Multi-user and distributed AVR systems - Artificial intelligence and machine learning - Augmented reality cloud services - Wearable and mobile AVR devices - Legal and regulatory aspects - Emerging applications and future directions | 9 |
| Total Hours | 45 |
| Text Book(s) | |
| 1. | "Augmented Virtual Reality: Concepts, Technologies, and Applications", Author: John Smith, Edition: 2nd Edition, Publication: XYZ Publishers, Year: 2021 |
| 2. | "Virtual Reality and Augmented Reality Hardware and Software", Author: Jane Doe, Edition: 3rd Edition, Publication: ABC Press, Year: 2019 |
| 3. | "Designing for Virtual Reality: Principles and Practices", Author: Michael Johnson, Edition: 1st Edition, Publication: XYZ Publishers, Year: 2020 |
| 4. | "Unity Virtual Reality Projects: Learn VR and AR by building experiences", Author: Jonathan Linowes, Edition: 2nd Edition, Publication: Packt Publishing, Year: 2018 |
| 1. | "Augmented Human: How Technology is Shaping the New Reality", Author: Helen Papagiannis, Edition: 1st Edition, Publication: O'Reilly Media, Year: 2022 |
| Reference(s): | |
| 1. | Billinghurst, M., & Kato, H. (Eds.). (2019). Augmented Reality: Where We Will All Live. Springer. |
| 2. | Cruz-Neira, C., Sandin, D. J., & DeFanti, T. A. (1993). Surround-screen projection-based virtual reality: the design and implementation of the CAVE. Proceedings of the 20th annual conference on Computer Graphics and Interactive Techniques. |
| 3. | Sherman, W., & Craig, A. (2019). Understanding Virtual Reality: Interface, Application, and Design. Morgan Kaufmann. |
| 4. | Wagner, D., Pintaric, T., & Ledermann, F. (2018). VRVis: A System for Interactive Virtual Reality Visualization. IEEE Computer Graphics and Applications, 38(3), 87-93. |
| 5. | Schmalstieg, D., & Hollerer, T. (2016). Augmented Reality: Principles and Practice. Addison-Wesley Professional. |

* SDG 4 - Quality Education

** SDG 9 – Industry, Innovation and Infrastructure

Course Contents and Lecture Schedule

| S.No. | Topic | No Of Hours |
|-------|--|-------------|
| 1 | INTRODUCTION TO AUGMENTED VIRTUAL REALITY (AVR) | |
| 1.1 | Overview of AVR technologies | 1 |
| 1.2 | History and evolution | 1 |
| 1.3 | Key concepts and terminology | 1 |
| 1.4 | Applications of AVR in various industries | 1 |
| 1.5 | Challenges and opportunities in AVR development | 1 |
| 1.6 | Ethics and societal implications | 2 |
| 1.7 | Future trends and advancements | 1 |
| 1.8 | Advancements | 1 |
| 2 | AVR HARDWARE AND SOFTWARE | |
| 2.1 | Hardware components of AVR systems | 1 |

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| | | |
|----------|--|-----------|
| 2.2 | Sensors and tracking technologies | 1 |
| 2.3 | Display devices | 1 |
| 2.4 | Interfaces | 1 |
| 2.5 | Input devices and interaction techniques | 2 |
| 2.6 | Software development platforms | 1 |
| 2.7 | Programming languages for AVR development | 1 |
| 2.8 | Integration of hardware and software in AVR systems | 1 |
| 3 | DESIGN PRINCIPLES FOR AVR | |
| 3.1 | Human-centered design principles | 1 |
| 3.2 | User experience (UX) design | 1 |
| 3.3 | Interface design considerations | 1 |
| 3.4 | Immersive storytelling techniques | 2 |
| 3.5 | Interaction design for AVR applications | 1 |
| 3.6 | Prototyping and testing in AVR development | 2 |
| 3.7 | Accessibility considerations in AVR design | 1 |
| 4 | AVR DEVELOPMENT TOOLS AND TECHNIQUES | |
| 4.1 | Development environments | 1 |
| 4.2 | 3D modeling and asset creation tools | 1 |
| 4.3 | Animation techniques for AVR content | 2 |
| 4.4 | Audio design and spatial sound | 1 |
| 4.5 | Scripting and coding for AVR applications | 1 |
| 4.6 | Optimization and performance tuning in AVR development | 1 |
| 4.7 | Collaborative development workflows for AVR projects | 2 |
| 5 | ADVANCED TOPICS IN AVR | |
| 5.1 | Advanced rendering techniques | 1 |
| 5.2 | Multi-user and distributed AVR systems | 2 |
| 5.3 | Artificial intelligence and machine learning | 1 |
| 5.4 | Augmented reality cloud services | 1 |
| 5.5 | Wearable and mobile AVR devices | 1 |
| 5.6 | Legal and regulatory aspects | 2 |
| 5.7 | Emerging applications and future directions | 1 |
| | Total | 45 |

Course Designers

Ms. P. Keerthana – keerthanap@ksrct.ac.in

| 60 IT E25 | DIGITAL IMAGE PROCESSING | Category | L | T | P | Credit |
|-----------|--------------------------|----------|---|---|---|--------|
| | | PE | 3 | 0 | 0 | 3 |

Objective

- To understand the image fundamentals and steps in image processing
- To learn the image enhancement models
- To explore the image compression standards
- To analyze the image restoration and segmentation procedures
- To understand the fundamentals of image representation and description

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Prerequisite

Basic knowledge of Integrals, Partial Differential Equations and Laplace Transform

Course Outcomes

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

| | | |
|-----|--|------------|
| CO1 | Identify the fundamentals of digital image and the principles of color image processing | Understand |
| CO2 | Perform the image enhancement in spatial domain and enhance the image to a desired quality in frequency domain | Understand |
| CO3 | Implement the image compression models and different methods for lossy and lossless compression | Understand |
| CO4 | Examine the basics of image restoration and segmentation techniques | Analyze |
| CO5 | Analyze the methods for image representation and description | Analyze |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 2 | 1 | 1 | 2 | | | | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO2 | 3 | 2 | 1 | 1 | 2 | | | | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO3 | 3 | 2 | 1 | 1 | 2 | | | | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO4 | 3 | 2 | 1 | 1 | 2 | | | | 2 | 2 | 2 | 2 | 2 | 1 | |
| CO5 | 3 | 2 | 1 | 1 | 2 | | | | 2 | 2 | 2 | 2 | 2 | 1 | |
| 3 -Strong;2- Medium;1- Some | | | | | | | | | | | | | | | |

AssessmentPattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 20 | 20 | 30 |
| Understand (Un) | 20 | 20 | 30 |
| Apply (Ap) | 00 | 10 | 20 |
| Analyse (An) | 20 | 10 | 20 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 00 | 00 |

Course Level Assessment Questions

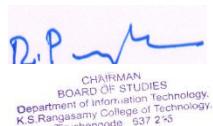
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| | |
|-------------------------------|---|
| Course Outcome 1 (CO1) | |
| 1. | Discuss the fundamental steps involved in digital image processing. |
| 2. | Specify the colour components of image in image processing. |
| 3. | Identify the role of quantization in image processing. |
| Course Outcome 2 (CO2) | |
| 1. | Denote the applications of histogram equalization. |
| 2. | How smoothing can be done using spatial filters? |
| 3. | How does the process of filtering affects the images? |
| Course Outcome 3 (CO3) | |
| 1. | Discuss the process of LZW coding in image compression. |
| 2. | Compare lossless and lossy compression. |
| 3. | Why wavelet transform is preferred in image processing? |
| Course Outcome 4 (CO4) | |
| 1. | Discuss the different filters involved in image restoration. |
| 2. | Why edge detection is most common approach for detecting discontinuities? |
| 3. | How is the watershed transformation applied to image segmentation? |
| Course Outcome 5 (CO5) | |
| 1. | Specify the fourier descriptors in image processing. |
| 2. | Analyze the techniques of region representation in image processing. |
| 3. | Identify the descriptors of texture in an image. |

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|---|------------|---|---|-----------|--------|---------------|-------|-----|
| 60 IT E25 – Digital Image Processing | | | | | | | | |
| Information Technology | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| VI | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| Digital Image Fundamentals * Introduction – Fields that use digital image processing – Fundamental steps in digital image processing - Elements of visual perception – Image sampling and quantization – Basic relationship | | | | | | | [9] | |

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CHAIRMAN
BOARD OF STUDIES
Department of Information Technology
K.S.Rangasamy College of Technology
Tiruchengode - 637 245

| | |
|--|--|
| between pixels – Color image processing – Color Fundamentals and Models- File Formats – Image Operations Practice: Reading/ Writing of images and basic image operations in Matlab | |
| Image Enhancement * Spatial Domain methods: Basic grey level transformation – Histogram equalization – Enhancement using arithmetic/logic operations – Spatial filtering: smoothing, sharpening filters – Frequency domain methods: Filtering in Frequency Domain Practice: Implementation of simple spatial filters in Matlab | [9] |
| Image Compression and Wavelets * Fundamentals – Image compression models – Error free compression: Variable length coding, LZW coding, Bit plane coding – Lossy compression: Lossy predictive coding, Transform coding, Wavelet coding – Subband Coding -Image compression standards. | [9] |
| Image Restoration and Segmentation * Noise models – Mean Filters – Adaptive filters - Notch Filters – Inverse Filtering – Wiener filtering- Detection of discontinuities – Edge linking and boundary detection – Thresholding – Region based segmentation – Segmentation by morphological watersheds. Practice: Implementation of image segmentation in Matlab | [9] |
| Image Representation and Description * Representation – Boundary descriptors: Shape numbers, Fourier descriptors, Statistical moments – Regional descriptors: Topological descriptors, Texture – Relational descriptors - Patterns and Pattern classes - Recognition based on matching. | [9] |
| Total Hours | 45 |
| Text Book(s): | |
| 1. | Rafael C Gonzalez, Richard E. Woods, "Digital Image Processing", Pearson Education, 4 th Edition, 2018. |
| 2. | William K Pratt," Digital Image Processing", CRC press, 2013. |
| Reference(s): | |
| 1. | Jayaraman S., Veerakumar T., EsakkirajanS., "Digital Image Processing", Tata Mc Graw Hill Education, New Delhi, 2009. |
| 2. | Milan Sonka, Vaclav Hlavac, Roger Boyle, "Image Processing Analysis and Machine Vision", Fourth Edition, Cengage India, 2017 |
| 3. | Anil K. Jain, "Fundamentals of Digital Image Processing", PHI, 2011. |
| 4. | S.Sridhar, "Digital Image Processing", Oxford University Press Higher Education,2016. |

* SDG 4 – Quality Education

Course Contents and Lecture Schedule

| S.No. | Topic | No.of Hours |
|-------|---|-------------|
| 1 | Digital Image Fundamentals | |
| 1.1 | Introduction – Fields that use digital image processing | 1 |
| 1.2 | Fundamental steps in digital image processing | 1 |
| 1.3 | Elements of visual perception | 1 |
| 1.4 | Image sampling and quantization | 1 |
| 1.5 | Color image processing | 1 |
| 1.6 | Color Fundamentals and Models | 1 |

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| | | |
|----------|---|------------------------|
| 1.7 | File Formats – Image Operations | 1 |
| 1.8 | Reading/ Writing of images and basic image operations in Matlab | 2 |
| 2 | Image Enhancement | |
| 2.1 | Spatial Domain methods: Basic grey level transformation | 1 |
| 2.2 | Histogram equalization | 1 |
| 2.3 | Enhancement using arithmetic/logic operations | 1 |
| 2.4 | Spatial filtering: smoothing | 1 |
| 2.5 | Frequency domain methods | 1 |
| 2.6 | Sharpening filters | 1 |
| 2.7 | Filtering in Frequency Domain | 1 |
| 2.8 | Implementation of simple spatial filters in Matlab | 2 |
| 3 | Image Compression and Wavelets | |
| 3.1 | Fundamentals | 1 |
| 3.2 | Image compression models | 1 |
| 3.3 | Variable length coding | 1 |
| 3.4 | LZW coding, Bit plane coding | 1 |
| 3.5 | Lossy predictive coding | 1 |
| 3.6 | Transform coding, Wavelet coding | 1 |
| 3.7 | Subband Coding | 1 |
| 3.8 | Image compression standards | 2 |
| 4 | Image Restoration and Segmentation | |
| 4.1 | Noise models | 1 |
| 4.2 | Mean Filters – Adaptive filters | 1 |
| 4.3 | Notch Filters – Inverse Filtering- Wiener filtering | 1 |
| 4.4 | Detection of discontinuities - Thresholding | 1 |
| 4.5 | Region based segmentation - Edge linking and boundary detection | 1 |
| 4.6 | Segmentation by morphological watersheds | 1 |
| 4.7 | Implementation of image segmentation in Matlab | 2 |
| 5 | Image Representation and Description | |
| 5.1 | Representation – Boundary descriptors | 1 |
| 5.2 | Shape numbers, Fourier descriptors | 1 |
| 5.3 | Statistical moments | 1 |
| 5.4 | Regional descriptors: Topological descriptors | 1 |
| 5.5 | Texture – Relational descriptors | 1 |
| 5.6 | Patterns and Pattern classes | 2 |
| 5.7 | Recognition based on matching | 2 |
| | | Total 45 |

Course Designers

Dr.J.Nithya nithyaj@ksrct.ac.in

| 60 IT E26 | Information Retrieval Techniques | Category | L | T | P | Credit |
|-----------|----------------------------------|----------|---|---|---|--------|
|-----------|----------------------------------|----------|---|---|---|--------|

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| | | | | | | |
|--|--|----|---|---|---|---|
| | | PC | 3 | 0 | 0 | 3 |
|--|--|----|---|---|---|---|

Objective

To study the basic retrieval techniques of information
 To understand the basics of information retrieval with pertinence to modeling, query operations and indexing
 To study dynamic approaches for information retrieval
 To study the clustering and pattern matching methods
 To study web search techniques catering retrieval process

Prerequisite

Basic knowledge of DBNS and Web Technology.

Course Outcomes

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

| | | |
|-----|--|------------|
| CO1 | Evaluate the performance of retrieval using algebraic and probabilistic models | Remember |
| CO2 | Apply different types of queries to retrieve information | Understand |
| CO3 | Compare various indexing and searching in retrieval and visualize it. | Analyse |
| CO4 | Categorize complex indexing approach to retrieve data | Apply |
| CO5 | Implement online IR systems and libraries to retrieve data | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | | | 3 | | | | | 2 | | | 2 | 3 | 1 |
| CO2 | 3 | 3 | 3 | 3 | 3 | | | | | | | | 2 | 3 | 1 |
| CO3 | 3 | 2 | | 3 | 2 | | | | | | | | 2 | 3 | 1 |
| CO4 | 3 | 2 | | 3 | 3 | | | | | | | | 2 | 3 | 1 |
| CO5 | 3 | 3 | | | 3 | | | | | | 2 | | 2 | 3 | 1 |

3-Strong;2-Medium;1-Some

Assessment Pattern

| Bloom's Category | Continuous Assessment Tests (Marks) | | End Sem Examination (Marks) |
|------------------|-------------------------------------|----|-----------------------------|
| | 1 | 2 | |
| Remember (Re) | 10 | 10 | 10 |

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| | | | |
|-----------------|----|----|----|
| Understand (Un) | 20 | 10 | 20 |
| Apply (Ap) | 30 | 30 | 60 |
| Analyse (An) | 00 | 00 | 00 |
| Evaluate (Ev) | 00 | 00 | 00 |
| Create (Cr) | 00 | 10 | 10 |

Course Level Assessment Questions

| Course Outcome 1(CO1) | |
|-------------------------------|---|
| 1 | Describe about features of classic information Retrieval. |
| 2 | Illustrate the uses of Retrieval process model with one example. |
| 3 | Explain about Probabilistic model with an example. |
| Course Outcome 2(CO2) | |
| 1 | Compare local and global Analysis. |
| 2 | How can you find similarity between doc and query in probabilistic principle Using Bayes' rule? |
| 3 | Show the Advantages of User Relevance Feedback method. |
| Course Outcome 3(CO3) | |
| 1 | Describe the document pre-processing steps in detail. |
| 2 | Discuss the Boolean retrieval in detail with diagram |
| 3 | Give the challenges in Sequential searching methods. |
| Course Outcome 4 (CO4) | |
| 1 | Outline the principle elements of the Spatial Access Methods |
| 2 | Examine inverted index and forward index. |
| 3 | Discuss in detail about the two dimensional color images |
| Course Outcome 5(CO5) | |
| 1 | Briefly explain web search architectures. |
| 2 | List and explain the components of IR block diagram |
| 3 | Demonstrate the architecture of search engine. |

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|--|------------|---|---|-----------|--------|---------------|----|-------|
| Information Retrieval Techniques | | | | | | | | |
| Information Technology | | | | | | | | |
| Semester | Hours/Week | | | Total hrs | Credit | Maximum Marks | | |
| | L | T | P | | C | CA | ES | |
| VI | 3 | 0 | 0 | 45 | 3 | 40 | 60 | 100 |
| Introduction Basic Concepts – Retrieval Process – Modeling – Classic Information Retrieval- Algebraic and Probabilistic Models – Retrieval Performance Evaluation | | | | | | | | [9] |
| Query Languages and Operations * Languages – Key Word based Querying – Pattern Matching – Structural Queries – Query Operations – User Relevance Feedback – Local and Global Analysis – Text and Multimedia languages. | | | | | | | | [9] |
| Text Operations, Indexing and Searching * | | | | | | | | [9] |

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| | |
|---|---|
| Document Preprocessing – Clustering – Text Compression - Indexing and Searching – Inverted files – Boolean Queries – Sequential searching – Pattern matching – User Interface and Visualization – Human Computer Interaction | |
| Multimedia Models, Indexing and Searching * Data Models – Query Languages – Spatial Access Methods – Generic Multimedia Indexing Approach – One Dimensional Time Series – Two Dimensional Color Images – Feature Extraction | [9] |
| Searching The Web and Libraries * Searching the Web – Challenges – Characterizing the Web – Search Engines – Browsing – Meta-searchers – Online IR systems –Digital Libraries – Architectural Issues – Document Models, Representations and Access. | [9] |
| Total Hours | 45 |
| Text Book(s): | |
| 1. | Ricardo Baeza-Yate, Berthier Ribeiro-Neto, "Modern Information Retrieval", Pearson Education Asia, 2 nd Edition,2005. |
| 2. | Christopher D. Manning, Prabhakar Raghavan, Hinrich Schutze, —Introduction to Information Retrieval, Cambridge University Press, First South Asian Edition, 2008. |
| Reference(s): | |
| 1. | G.G. Chowdhury, "Introduction to Modern Information Retrieval", Neal-Schuman Publishers, 3 rd edition, 2010. |
| 2. | Daniel Jurafsky and James H. Martin, "Speech and Language Processing", Pearson Education, 3 rd edition,2023. |
| 3. | David A. Grossman, Ophir Frieder, "Information Retrieval: Algorithms, and Heuristics", Academic Press, 2 nd edition, 2004. |
| 4. | Charles T. Meadow, Bert R. Boyce, Donald H. Kraft, "Text Information Retrieval Systems", Academic Press, 2000. |

* SDG 4 – Quality Education

Course Contents and Lecture Schedule

| S.No. | Topic | No.of Hours |
|-------|---------------------------------------|-------------|
| 1 | Introduction | |
| 1.1 | Basic Concepts | 1 |
| 1.2 | Retrieval Process | 1 |
| 1.3 | Modeling | 1 |
| 1.4 | Classic Information Retrieval | 2 |
| 1.5 | Algebraic and Probabilistic Models | 2 |
| 1.6 | Retrieval Performance Evaluation | 2 |
| 2 | Query Languages and Operations | |
| 2.1 | Languages | 1 |
| 2.2 | Key Word based Querying | 1 |
| 2.3 | Pattern Matching | 1 |
| 2.4 | Structural Queries | 1 |
| 2.5 | Query Operations | 2 |

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| | | |
|----------|--|-----------|
| 2.6 | User Relevance Feedback | 1 |
| 2.7 | Local and Global Analysis | 1 |
| 2.8 | Text and Multimedia languages | 1 |
| 3 | Text Operations, Indexing and Searching | |
| 3.1 | Document Preprocessing | 1 |
| 3.2 | Clustering, Text Compression | 1 |
| 3.3 | Indexing and Searching | 1 |
| 3.4 | Inverted files | 1 |
| 3.5 | Boolean Queries | 1 |
| 3.6 | Sequential searching | 1 |
| 3.7 | Pattern matching | 1 |
| 3.8 | User Interface and Visualization | 1 |
| 3.9 | Human Computer Interaction | 1 |
| 4 | Multimedia Models, Indexing and Searching | |
| 4.1 | Data Models | 1 |
| 4.2 | Query Languages | 1 |
| 4.3 | Spatial Access Methods | 1 |
| 4.4 | Generic Multimedia Indexing Approach | 2 |
| 4.5 | One Dimensional Time Series | 1 |
| 4.6 | Two Dimensional Color Images | 1 |
| 4.7 | Feature Extraction | 2 |
| 5 | Searching The Web and Libraries | |
| 5.1 | Searching the Web | 1 |
| 5.2 | Challenges | 1 |
| 5.3 | Characterizing the Web | 1 |
| 5.4 | Search Engines | 1 |
| 5.5 | Browsing | 1 |
| 5.6 | Meta-searchers, Online IR systems | 1 |
| 5.7 | Digital Libraries | 1 |
| 5.8 | Architectural Issues | 1 |
| 5.9 | Document Models, Representations and Access | 1 |
| | Total | 45 |

Course Designers

Dr.C.Rajan – rajan@ksrct.ac.in

| 60 IT 6P1 | Data Mining and Analytics Laboratory | Category | L | T | P | Credit |
|-----------|--------------------------------------|----------|---|---|---|--------|
| | | PC | 0 | 0 | 4 | 2 |

Objective

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- To get practical exposure on implementation of well-known data mining Experiments
- To get exposure to real life data sets for analysis and prediction
- To use the principle algorithms and techniques in data mining, such as clustering, association mining, classification and prediction.
- To develop skills and apply data mining tools for solving practical problems

Prerequisite

Nil

Course Outcomes

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

| | | |
|-----|--|-------|
| CO1 | Use different features of WEKA tool | Apply |
| CO2 | Preprocess the data for mining | Apply |
| CO3 | Determine association rules | Apply |
| CO4 | Model various classifiers. | Apply |
| CO5 | Examine clusters from the available data | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 2 | 2 | 3 | 2 | 3 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO2 | 2 | 3 | 3 | 2 | 3 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO3 | 2 | 2 | 3 | 2 | 3 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO4 | 3 | 2 | 3 | 2 | 2 | | | | 2 | | | 2 | 3 | 3 | 2 |
| CO5 | 3 | 3 | 2 | 2 | 3 | | | | 2 | | | 2 | 3 | 3 | 2 |

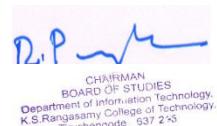
3- Strong; 2-Medium; 1-Low

List of Experiments

1. Basics of WEKA tool
 - a. Investigate the Application interfaces. b. Explore the default datasets.
2. Pre-process a given dataset based on the following:
 - a. Attribute Selection b. Handling Missing Values
3. Pre-process a given dataset based on the following: a. Discretization b. Eliminating Outliers
4. Create a dataset in ARFF (Attribute-Relation File Format) for any given dataset and perform Market-Basket Analysis.
5. Generate Association Rules using the Apriori algorithm.
6. Generate Association Rules using the FP-Growth algorithm.
7. Build a Decision Tree using ID3 algorithm. *
8. Demonstrate classification process on a given dataset using Naïve Bayesian Classifier.
9. Demonstrate classification process on a given dataset using Rule based Classifier.

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10. Demonstrate classification process on a given dataset using Nearest Neighbor Classifier.
11. Build a distance matrix of the given data using various distance measures.
12. Cluster the given dataset by using the k-Means algorithm and visualize the cluster mean values and standard deviation of dataset attributes. *
13. Cluster the given dataset using a hierarchical clustering algorithm.

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Course Designers

Mrs.K.Mahalakshmi- mahalakshmik@ksrct.ac.in

| 60 IT 6P2 | Full Stack Development Laboratory | Category | L | T | P | Credit |
|-----------|-----------------------------------|----------|---|---|---|--------|
| | | PC | 0 | 0 | 4 | 2 |

Objective

- To develop full stack applications with clear understanding of user interface, business logic and data storage.
- To design and develop user interface screens for a given scenario
- To develop the functionalities as web components as per the requirements
- To implement the database according to the functional requirements
- To integrate the user interface with the functionalities and data storage

Prerequisite

Basic knowledge of any programming language with ability to solve logical problems

Course Outcomes

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

| | | |
|-----|---|-------|
| CO1 | Design full stack applications with clear understanding of user interface, business logic and data storage. | Apply |
| CO2 | Design and develop user interface screens | Apply |

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| | | |
|-----|--|-------|
| CO3 | Implement the functional requirements using appropriate tool | Apply |
| CO4 | Design and develop database based on the requirements | Apply |
| CO5 | Integrate all the necessary components of the application | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|
| CO1 | 3 | 3 | 3 | 1 | 3 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 1 |
| CO2 | 3 | 3 | 3 | 1 | 3 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 1 |
| CO3 | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 1 | 2 | 1 | 1 | 1 | 2 | 2 | 1 |
| CO4 | 3 | 3 | 3 | 3 | 3 | 2 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 1 |
| CO5 | 3 | 3 | 3 | 2 | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 2 | 1 |

3- Strong; 2-Medium; 1-Low

List of Experiments

- Java Programs, CI/CD
- Java Exception Handling
- Java with JDBC and Drivers and Connections
- Java Servlets *
- Spring Boot *
- Rest API **
- Spring Boot Database **
- Data JPA **
- Microservices **
- MongoDB *
- Web application using React JS **S

Mini project: Develop a Realtime application using the concepts of Java, Spring Boot, Microservices, React JS along with JDBC.

*SDG 4 – Quality Education

SDG 9 – Industry, Innovation and Infrastructure

Course Designer

- Mr. V. Shiyam – shiyamv@ksrct.ac.in

| 60 CG 0P5 | Comprehension Test* | Category | L | T | P | C | CA | ES | Total |
|-----------|---------------------|----------|---|---|---|---|----|----|-------|
|-----------|---------------------|----------|---|---|---|---|----|----|-------|

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| | | | | | | | | | |
|----------------|--|----|---|---|---|----|-----|---|-----|
| Semester VI | | CG | 2 | 0 | 0 | 1* | 100 | - | 100 |
|----------------|--|----|---|---|---|----|-----|---|-----|

Objectives

- To evaluate the knowledge gained in core courses relevant to the programme of study.
- To assess the technical skill in solving complex engineering problems.

Prerequisite

Fundamental knowledge in all core subjects.

Course Outcomes

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

| | | |
|-----|--|-------|
| CO1 | Infer knowledge in their respective programme domain. | Apply |
| CO2 | Attend interviews for career progression | Apply |
| CO3 | Exhibit professional standards to solve engineering problems | Apply |
| CO3 | Promote holistic approach to problem solving | Apply |
| CO5 | Examine the competency of graduates in specific programme domain | Apply |

Mapping with Programme Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|---------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|
| CO1 | 3 | 3 | 2 | 2 | | | | | 1 | 2 | 2 | 3 |
| CO2 | 3 | 3 | 2 | 2 | | | | | 1 | 2 | 2 | 3 |
| CO3 | 3 | 3 | 2 | 2 | | | | | 1 | 2 | 2 | 3 |
| CO4 | 3 | 3 | 2 | 2 | | | | | 1 | 2 | 2 | 3 |
| CO5 | 3 | 3 | 2 | 2 | | | | | 1 | 2 | 2 | 3 |
| 3- Strong;2-Medium;1-Some | | | | | | | | | | | | |

Assessment Pattern

The overall knowledge of the candidate in various courses he/she studied shall be evaluated with multiple choice questions.

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