VISION
To accomplish excellence in education and research by empowering the students with entrepreneurial skill and required knowledge in computer science and engineering.

MISSION
- To educate the students to gain an understanding of the fundamentals of core and allied disciplines so that they can enhance their skills in the areas of Computer Science and Engineering and develop solutions to potential problems.
- To impart the importance of teamwork, independent & innovative thinking and leadership qualities.
- To inculcate in the students the attitudes and values that will prepare them for lifelong learning.
- To generate new knowledge and technology for the benefit of the society through quality research and projects.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)
The Programme Educational Objectives (PEOs) are defined and developed for each program with the consultation and involvement of various stakeholders such as management, students, industry, regulating authorities, alumni, faculty and parents. Their interests, social relevance and contributions are taken into account in defining and developing the PEOs.
The Program Educational Objectives (PEOs) of the Computer Science and Engineering are listed below:

I. To provide students with a strong foundation in the Mathematical, Scientific and Engineering fundamentals necessary to formulate, solve and analyze engineering problems and to prepare them for graduate studies, R&D.

II. To provide exposure to emerging cutting edge technologies, adequate training & opportunities to work as teams on multidisciplinary projects with effective communication skills and leadership qualities.

III. To prepare the students for a successful career for bridging the digital divide and meeting the requirements of Indian and multinational companies.

IV. To promote student awareness on life-long learning and to introduce them to professional ethics and codes of professional practice.
PROGRAMME OUTCOMES:

PO1. Able to apply knowledge of computing and mathematics appropriate to the discipline.

PO2. Able to analyze a problem, and identify and define the computing requirements appropriate to its solution.

PO3. Able to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.

PO4. Able to function effectively on teams to accomplish a common goal through effective learning.

PO5. Able to understand the professional, ethical, legal, security and social issues and responsibilities.

PO6. Able to communicate effectively in technical and non technical group forums with a range of audiences such as peer to peer and peer to group.

PO7. Able to analyze the local and global impact of computing on individuals, organizations, and society.

PO8. Able to recognize the need for and an ability to engage in continuing professional development.

PO9. Able to use current techniques, skills, and tools necessary for computing practice.

PO10. Able to apply algorithmic principles, and computer science theory in the modeling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.

PO11. Able to apply design and development principles in the construction of complex software systems with dynamic requirements.
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## OPEN ELECTIVES

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# Project work
**SEMESTER – I**

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**Goal**
The goal of the programme is to provide a theoretical input towards nurturing accomplished learners who can function effectively in the English language skills; to cultivate in them the ability to indulge in rational thinking, independent decision-making and lifelong learning; to help them become responsible members or leaders of the society in and around their workplace or living space; to communicate successfully at the individual or group level on engineering activities with the engineering community in particular, and on multi-disciplinary activities in general, with the world at large.

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<td>1. Have the self-confidence to improve upon their informative listening skills by an enhanced acquisition of the English language.</td>
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<td>2. Enable learners to communicate in an intelligible English accent and pronunciation.</td>
<td>2. Speak English at the formal and informal levels and use it for daily conversation, presentation, group discussion and debate.</td>
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<td>3. Assist the learners in reading and grasping a passage in English.</td>
<td>3. Read, comprehend and answer questions based on literary, scientific and technological texts.</td>
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<td>4. Learn the art of writing simple English with correct spelling, grammar and punctuation.</td>
<td>4. Write instructions, recommendations, checklists, process-description, letter-writing and report writing.</td>
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<td>5. Cultivate the ability of the learners to think and indulge in divergent and lateral thoughts.</td>
<td>5. Have the confidence to develop thinking skills and participate in brainstorming, mind-mapping, audiovisual activities, creative thinking and also answer tests in the job-selection processes.</td>
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**UNIT LISTENING SKILL**

Listening to the sounds, silent letters & stress in English words & sentences – Listening to conversation & telephonic conversation -- Listening for general meaning & specific information -- Listening for positive & negative comments – Listening to technical topics – Listening to prose & poetry reading -- Listening exercises.

**Embedded language learning:** Sentence definition -- Spelling & punctuation -- Imperative form – Sequencing of sentences -- Gerunds -- Infinitives -- ‘Wh-’questions.

**UNIT II SPEAKING SKILL**

Self-introduction – Expressing personal opinion – Dialogue – Conversation – Simple oral interaction -- Speaking on a topic -- Expressing views for & against -- Speaking on personal topics like hobbies, topics of interest, present & past experiences, future plans – Participating in group discussions, role plays, debates, presentations, power-point presentations & job-interviews.

UNIT III READING SKILL
Reading anecdotes, short stories, poems, parts of a novel, notices, message, time tables, advertisements, leaflets, itinerary, content page – Reading pie chart & bar chart -- Skimming and scanning -- Reading for contextual meaning – Scanning for specific information -- Reading newspaper & magazine articles – Critical reading -- Reading-comprehension exercises.

Embedded language learning: Tenses – Active and passive voice -- Impersonal passive -- Words and their function -- Different grammatical forms of the same word.

UNIT IV WRITING SKILL
Writing emails, notes, messages, memos, notices, agendas, advertisements, leaflets, brochures, instructions, recommendations & checklists -- Writing paragraphs -- Comparisons & contrasts – Process description of Flow charts – Interpretation of Bar charts & Pie charts – Writing the minutes of a meeting -- Report writing -- Industrial accident reports -- Letter-writing -- Letter to the editors – Letter inviting & accepting or declining the invitation – Placing orders – Complaints -- Letter requesting permission for industrial visits or implant training, enclosing an introduction to the educational institution -- Letters of application for a job, enclosing a CV or Resume – Covering letter.

Embedded language learning: Correction of errors – Subject-verb Concord -- Articles – Prepositions -- Direct and indirect speech.

UNIT V THINKING SKILL
Eliciting & imparting the knowledge of English using thinking blocks – Developing thinking skills along with critical interpretation side by side with the acquisition of English -- Decoding diagrams & pictorial representations into English words, expressions, idioms and proverbs.

Embedded language learning: General vocabulary -- Using expressions of cause and effect -- Comparison & contrast -- If-conditionals -- Expressions of purpose and means.

TOTAL 45

REFERENCE BOOKS
### AIM

- The course is aimed at developing the basic Mathematical skills of engineering students that are imperative for effective understanding of engineering subject and make use of MATLAB software to visualize the application of the concepts learnt.

### OBJECTIVES

- To find out algebraic Eigen value problems from practical areas and obtain the Eigen solutions in certain cases using MATLAB.
- To diagonalize a matrix which would render the Eigen solution procedure very simple.
- To understand effectively the basic concepts of differentiation and partial differentiation and their applications.
- To understand effectively the methods of integration and their applications.
- To solve differential equations of certain type, that they might encounter in the same or higher semesters.
- To find the values and the expansions of trigonometric and hyperbolic functions using MATLAB

### OUTCOME

- Visualized the Cayley-Hamilton theorem, Diagonalization of Matrix, Taylor’s series, Maxima and Minima of functions of two variables, integration- Area, volume, surface and Hyperbolic function using MATLAB.
- Functions and their interesting properties in science and engineering using MATLAB is the outcome of this paper

### UNIT I MATRICES

Characteristic equation – Eigen values and Eigen vectors – Properties - Cayley Hamilton theorem (Statement only) – Verification and inverse using Cayley Hamilton theorem- Diagonalization of matrices using similarity transformation.
Lab: Eigen values and Eigen vectors, Verification and inverse using Cayley Hamilton theorem- Diagonalisation

UNIT II DIFFERENTIAL CALCULUS 12(8+4)


Lab: Taylor’s series – Maxima and minima of functions of two variables

UNIT III INTEGRAL CALCULUS 12(8+4)

Integration – Methods of integration – Substitution method - Integration by parts – Integration using partial fraction - Bernoulli’s formula. Applications of Integral Calculus: Area, Surface area and Volume.

Lab: Applications of Integral Calculus: Area, Surface area and Volume.

UNIT IV ORDINARY DIFFERENTIAL EQUATIONS 12(8+4)

Second order differential equations with constant coefficients – Particular integrals – $e^{ax}$, $sin ax, cos ax, x^m$, $e^{ax}$ Cos bx, $e^{ax}$ Sin bx. Solutions of homogeneous differential equations with variable coefficients - Variation of parameters.

Lab: Solution of Second order differential equations.

UNIT V TRIGONOMETRY 12(8+4)

Expansions of $sin n \theta$, $cos n \theta$, $tan n \theta$ where n is an positive integer. Expansions of $sin^m \theta$, $cos^n \theta$, $sin^m \theta cos^n \theta$ in terms of sines and cosines of multiples of $\theta$ where m and n are positive integers. Expansions of $sin \theta \cdot cos \theta$, $tan \theta \cdot tan \theta$. Hyperbolic functions - Relation between trigonometric and hyperbolic functions - Inverse hyperbolic function.

Lab: Expansions of $sin \theta$, $cos \theta$, $tan \theta$ and $sin n \theta$, $cos n \theta$, $tan n \theta$ and hyperbolic functions.

TOTAL: 60

TEXT BOOK:


REFERENCES

2. Bali N.P, Narayana Iyengar. N.Ch., Engineering Mathematics,
**PHA101 ENGINEERING PHYSICS**

**Goal**
To impart fundamental knowledge in various fields of Physics and its applications.

**OBJECTIVES**

<table>
<thead>
<tr>
<th>The course should enable the students to</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Develop strong fundamentals of properties and behavior of the materials</td>
</tr>
<tr>
<td>2. Enhance theoretical and modern technological aspects in acoustics and ultrasonics.</td>
</tr>
<tr>
<td>3. Correlate the theoretical principles with application oriented study of optics.</td>
</tr>
<tr>
<td>4. Provide a strong foundation in the understanding of solids and materials testing.</td>
</tr>
<tr>
<td>5. Enrich the knowledge of students in modern engineering materials.</td>
</tr>
</tbody>
</table>

**OUTCOMES**

<table>
<thead>
<tr>
<th>The student should be able to</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Understand the properties and behaviour of materials.</td>
</tr>
<tr>
<td>2. Have a fundamental knowledge of acoustics which would facilitate in acoustical design of buildings and on ultrasonics and be able to employ it as an engineering tool.</td>
</tr>
<tr>
<td>3. Understand the concept, working and application of lasers and fiber optics.</td>
</tr>
<tr>
<td>4. Know the fundamentals of crystal physics and non destructive testing methods.</td>
</tr>
<tr>
<td>5. Have an understanding of the production, characteristics and application of the new engineering materials. This would aid them in the material selection stage.</td>
</tr>
</tbody>
</table>

**UNIT I PROPERTIES OF MATTER**


**UNIT II ACOUSTICS AND ULTRASONICS**


**UNIT III LASER AND FIBRE OPTICS**


**UNIT IV CRYSTAL PHYSICS AND NON-DESTRUCTIVE TESTING**

9


UNIT V MODERN ENGINEERING MATERIALS AND SUPERCONDUCTING MATERIALS


Superconducting Materials: Superconducting phenomena – Properties of superconductors – Meissner effect – Type I and Type II superconductors – High Tc superconductors (qualitative) – uses of superconductors.

TOTAL 45

TEXT BOOKS


REFERENCE BOOKS

**CYA101**  | **ENGINEERING CHEMISTRY**
---|---
Goal | To impart basic principles of chemistry for engineers.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The students should be able to</td>
</tr>
</tbody>
</table>
| 1. Make the students conversant with the basics of  
  a. Water technology and  
  b. Polymer science.  
2. Provide knowledge on the requirements and properties of a few important engineering materials.  
3. Educate the students on the fundamentals of corrosion and its control.  
4. Give a sound knowledge on the basics of a few significant terminologies and concepts in thermodynamics.  
5. Create an awareness among the present generation about the various conventional energy sources. | 1. Gain basic knowledge in water analysis and suitable water treatment method.  
2. Get an idea on the type of polymers to be used in engineering applications.  
3. Get awareness about new materials  
4. Get knowledge on the effects of corrosion and protection methods will help the young minds to choose proper metal / alloys and also to create a design that has good corrosion control.  
5. Get exposure on the important aspects of basic thermodynamics will be able to understand the advanced level thermodynamics in engineering applications.  
6. Get a good background on the various aspects of energy sources will create awareness on the need to utilize the fuel sources effectively and also for exploring new alternate energy resources. |

**UNIT I WATER TECHNOLOGY AND POLYMER CHEMISTRY**  
9


**UNIT II ENGINEERING MATERIALS**  
9

25

UNIT III ELECTROCHEMISTRY AND CORROSION

UNIT IV CHEMICAL THERMODYNAMICS

UNIT V FUELS AND ENERGY SOURCES

TEXT BOOKS

REFERENCE BOOKS
1. B. K. Sharma, Engineering chemistry, Krishna Prakasam Media (P) Ltd., 2003
3. A. Gowarikar, Text Book of Polymer Science, 2002
Goal
To develop graphical skills for communicating concepts, ideas and designs of engineering products and to give exposure to national standards relating to technical drawings using Computer Aided Design and Drafting practice.

Objectives
The course should enable the students to
1. Introduce drawing standards and use of drawing instruments.
2. Introduce first angle projection.
3. Practice of engineering hand sketching and introduce to computer aided drafting.
4. Familiarize the students with different type of projections.
5. Introduction to Solid modelling
6. Introduce the process of design from sketching to parametric 3D CAD and 2D orthographic drawings to BIS.

Outcome
The students should be able to
1. Develop parametric design and the conventions of formal engineering drawing.
2. Produce and interpret 2D & 3D drawings
3. Communicate a design idea/concept graphically.
4. Examine a design critically and with understanding of CAD – The student learn to interpret drawings, and to produce designs using a combination of 2D and 3D software.
5. Get a Detailed study of an engineering artefact.

UNIT I BASICS OF ENGINEERING GRAPHICS AND PLANE CURVES

Importance of graphics Use of drawing instruments - BIS conventions and specifications - drawing sheet sizes, layout and folding - lettering - Dimensioning-Geometrical constructions - Scales. Introduction to plane curves like ellipse, parabola, cycloids and involutes.


UNIT II VISUALIZATION, ORTHOGRAPHIC PROJECTIONS AND FREE HAND SKETCING

Visualization concepts and Free Hand sketching: Visualization principles —Representation of Three Dimensional objects — Pictorial Projection methods - Layout of views- Free hand sketching of multiple views from pictorial views of objects.Drafting of simple Geometric Objects/Editing
General principles of presentation of technical drawings as per BIS - Introduction to Orthographic projections - Naming views as per BIS - First angle projection method. Conversion to orthographic views from given pictorial views of objects, including dimensioning – Drafting of Orthographic views from Pictorial views.

UNIT III  PROJECTIONS OF POINTS, LINES, SURFACES AND SOLIDS  18

Introduction to Projections of points – Projections of straight lines located in first quadrant using rotating line method only – Projections of plane surfaces when the surface of the lamina is inclined to one reference plane only – Projections of simple solids when the axis of the solid is inclined to one reference plane only – Sectioning of above solids in simple positions – Section Views. Practice includes drafting the projection of lines and solids using appropriate software. 2D drawing commands: Zoom, Picture editing commands, Dimensioning and 2D drafting.

UNIT IV GEOMETRICAL MODELING AND ISOMETRIC VIEWS  15


UNIT V COMPUTER AIDED DESIGN AND DRAFTING  15

Preparation of solids of machine components like slide block, solid bearing block, bushed bearing, gland, wall bracket, guide bracket, shaft bracket, jig plate, shaft support (open type), vertical shaft support etc using appropriate modeling software.

Introduction to computer aided drafting and dimensioning using appropriate software. Generate 2D drawing from the 3D models – generate and develop the lateral surfaces of the objects. Presentation Techniques of Engineering Drawings – Title Blocks – Printing/Plotting of drawing.

TOTAL 75

TEXT BOOKS


REFERENCE BOOKS

1. Introduction to AutoCAD – 2D and 3D Design, A.Yarmwood, Newnes Elsevier, 2011


**Bureau of Indian Standards (BIS) for Engineering Drawing:**


CSA101 | COMPUTER PROGRAMMING
---|---
**Goal** | To introduce computers and programming in C and also explore the power of computational techniques that are currently used by engineers and scientists and to develop programming skills with reasonable complexity.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Acquire the basic knowledge in computer hardware and software.</td>
<td>1. Understand the functions of digital computer.</td>
</tr>
<tr>
<td>2. Learn the problem solving techniques.</td>
<td>2. Devise computational strategies for solving problems.</td>
</tr>
<tr>
<td>3. Gain knowledge in C programming.</td>
<td>3. Develop applications using C programming language</td>
</tr>
</tbody>
</table>

**UNIT - I  COMPUTER FUNDAMENTALS**

**UNIT- II  COMPUTER PROGRAMMING AND LANGUAGES**

**UNIT - III  FUNDAMENTALS OF C**

**UNIT- IV  FUNCTIONS, ARRAYS AND STRINGS**
Functions – Storage Class – Arrays – Working with strings and standard functions.

**UNIT - V  POINTERS, STRUCTURES AND UNION**

**TOTAL 45**

**TEXT BOOKS**

**REFERENCES**

<table>
<thead>
<tr>
<th>CSA131</th>
<th>COMPUTER PROGRAMMING LABORATORY</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>To develop the programming skill using C programming languages and to get familiar with Office suite.</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Objectives**

The course should enable the students to

1. To gain practical knowledge in Word processing and Spread Sheet software
2. To learn problem solving in C.

**Outcomes**

The students should be able to

1. Use Wordprocessing software to create document, table, text formatting and Mail merge options.
2. Use Spread sheet for small calculations using formula editor, creating different types of charts and including pictures etc.
3. Write and execute the C programs for small applications.

**LIST OF EXPERIMENTS**

**a) Word Processing**

1. Document creation, Text manipulation with Scientific notations.
2. Table creation, Table formatting and Conversion.
4. Drawing - flow Chart

**b) Spread Sheet**

5. Chart - Line, XY, Bar and Pie.
6. Formula - formula editor.
7. Spread sheet - inclusion of object, Picture and graphics, protecting the document

**c) Programming in C**

8. Write a C program to prepare the electricity bill.
9. Write a C program to demonstrate functions using
   (a) Call by value  (b) Call by reference.
10. Write a C program to print the Fibonacci series for the given number.
11. Write a C program to find the factorial of number using recursion.
12. Write a C program to implement the basic arithmetic operations using Switch Case statement.
13. Write a C program to check whether the given number is an Armstrong number.
14. Write a C program to check whether the given string is a Palindrome.
15. Write a C program to create students details using Structures.
16. Write a C program to demonstrate the Command Line Arguments.
17. Write a C program to implement the Random Access in Files.
18. Write C programs to solve some of the Engineering problems (Branch specific)

HARDWARE/SOFTWARE REQUIRED FOR BATCH OF 30 STUDENTS

HARDWARE
LAN system with 33 nodes (OR) Standalone PCs - 33 Nos

SOFTWARE
OS - Windows / Linux
Application package - MS office/Star office/ Open Office
Software – Turbo C/Borland C/ GCC
GEA131  ENGINEERING PRACTICES LABORATORY – I  L T P C 0 0 3 1

<table>
<thead>
<tr>
<th>Goal</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>To provide the students with hands on experience on various basic</td>
<td></td>
</tr>
<tr>
<td>engineering practices in Civil and Mechanical Engineering.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The students should be able to</td>
</tr>
<tr>
<td>1. Relate theory and practice of basic Civil and Mechanical Engineering</td>
<td>1. Identify and use of tools, Types of joints used in welding, carpentry and plumbing operations.</td>
</tr>
<tr>
<td>2. Learn concepts of welding and machining practice</td>
<td>2. Have hands on experience on basic fabrication techniques such as carpentry and plumbing practices.</td>
</tr>
<tr>
<td>3. Learn concepts of plumbing and carpentry practice</td>
<td>3. Have hands on experience on basic fabrication techniques of different types of welding and basic machining practices.</td>
</tr>
</tbody>
</table>

**LIST OF EXPERIMENTS**

1. **Mechanical Engineering**
   1. **Welding:** Arc welding - butt joints, lap joints and T joints.
   2. **Basic Machining:** Facing, Turning, Threading and Drilling practice.
   3. **Machine assembly practice:** Study of centrifugal pump
   4. **Study on**
      a. Smithy operations- Production of hexagonal headed bolt.
      b. Foundry operations – mould preparation for gear and step cone pulley.

2. **Civil Engineering**
   1. Basic pipe connection using valves, couplings, unions, reducers, elbows in household fitting.
   2. Practice in mixed pipe connections: Metal, plastic and flexible pipes used in household appliances.
   3. Wood work: Sawing, Planning and making common joints.
   4. Study of joints in door panels, wooden furniture.

**Text Book**

List of equipment and components
( For a Batch of 30 Students )

CIVIL
1. Assorted components for plumbing consisting of metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings. 15 Sets.
2. Carpentry vice (fitted to work bench) 15 Nos.
4. Models of industrial trusses, door joints, furniture joints 5 each
5. Power Tools:
   (a) Rotary Hammer 2 Nos
   (b) Demolition Hammer 2 Nos
   (c) Circular Saw 2 Nos
   (d) Planer 2 Nos
   (e) Hand Drilling Machine 2 Nos
   (f) Jigsaw 2 Nos

MECHANICAL
1. Arc welding transformer with cables and holders 5 Nos.
2. Welding booth with exhaust facility 5 Nos.
3. Welding accessories like welding shield, chipping hammer, wire brush, etc. 5 Sets.
4. Oxygen and acetylene gas cylinders, blow pipe and other welding outfit. 2 Nos.
5. Centre lathe 2 Nos.
6. Hearth furnace, anvil and smithy tools 2 Sets.
7. Moulding table, foundry tools 2 Sets.
8. Power Tool: Angle Grinder 2 Nos
9. Study-purpose items: centrifugal pump, air-conditioner One each.
ELA131 COMMUNICATION SKILLS LABORATORY I

Goal
To provide a practical input towards nurturing accomplished learners who can function effectively in the English language skills.

Objectives

The course should enable the students to:

1. Extend the ability of the learners to be able to listen to English and comprehend its message.
2. Enable the learners to have a functional knowledge of spoken English.
3. Assist the learners to read and grasp the meaning of technical and non-technical passages in English.
4. Help the learners develop the art of writing without mistakes.
5. Expand the thinking capability of the learners so that they would learn how to view things from a different angle.

Outcomes

The students should be able to:

1. Listen to and evaluate English without difficulty and comprehend its message.
2. Develop a functional knowledge of spoken English so as to use it in the institution and at job interviews.
3. Read and comprehend the meaning of technical and non-technical passages in English.
4. Develop the art of writing so as to put down their thoughts and feelings in words.
5. Think independently and contribute creative ideas.

UNIT I LISTENING SKILL

Topics: Listening to conversations and interviews of famous personalities in various fields -- Listening practice related to the TV -- Talk shows – News – Educative programmes -- Watching films for critical comments -- Listening for specific information -- Listening for summarizing information -- Listening to monologues for taking notes -- Listening to answer multiple-choice questions.

UNIT II SPEAKING SKILL


UNIT III READING SKILL

Topics: Reading anecdotes to predict the content – Reading for interpretation -- Suggested reading - Short stories and poems -- Critical reading – Reading for information transfer – Reading newspaper and magazine articles for critical commentary – Reading brochures, advertisements, pamphlets for improved presentation.
UNIT IV WRITING SKILL
At the beginning of the semester, the students will be informed of a mini dissertation of 1000 words they need to submit individually on any non-technical topic of their choice. The parts of the dissertation will be the assignments carried out during the semester and submitted towards the end of the semester on a date specified by the department. This can be judged as part of the internal assessment.

UNIT V THINKING SKILL
Practice in preparing thinking blocks to decodediagrammatical representations into English words, expressions, idioms and proverbs – Inculcating interest in English using thinking blocks. Making pictures and improvising diagrams to form English words, phrases and proverbs -- Picture reading.

REFERENCES

Websites for learning English
3. Intercultural: English Listening Lesson Library Online http://www.elllo.org/
The goal of the programme is to provide a practical knowledge in physics.

Objectives

The course should enable the student to,
1. Expose the students for practical training through experiments to understand and appreciate the concepts learnt in Physics

Outcome

The student will be able to,
1. Perform the experiments related to the subject will help the students to apply the practical knowledge in industrial applications and for developing or modifying methods

<table>
<thead>
<tr>
<th>S.No.</th>
<th>List of Experiments</th>
<th>Batch 2 (30)</th>
<th>Batch 1 (30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Week</td>
<td>Periods</td>
</tr>
<tr>
<td>1</td>
<td>Torsional Pendulum - Determination of rigidity modulus of the material of a wire.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Non Uniform Bending - Determination of Young's Modulus.</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Viscosity - Determination of co-efficient of Viscosity of a liquid by Poiseuille's flow.</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Lee's Disc - Determination of thermal conductivity of a bad conductor.</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Air Wedge - Determination of thickness of a thin wire.</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Spectrometer - Refractive index of a prism.</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Semiconductor laser - Determination of wavelength of Laser using Grating.</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Total</td>
<td>7</td>
<td>21</td>
</tr>
</tbody>
</table>

56 Periods
## LIST OF EQUIPMENTS REQUIRED FOR A BATCH OF 30 STUDENTS

<table>
<thead>
<tr>
<th>No.</th>
<th>Equipment</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Torsional Pendulum</td>
<td>(500 gm, wt, 60 cm wire Al-Ni Alloy)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>2</td>
<td>Travelling Microscope</td>
<td>(X10)</td>
<td>15 nos.</td>
</tr>
<tr>
<td>3</td>
<td>Capillary tube</td>
<td>(length 10cm, dia 0.05mm)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>4</td>
<td>Magnifying lens</td>
<td>(X 10)</td>
<td>15 nos.</td>
</tr>
<tr>
<td>5</td>
<td>Lee's disc apparatus</td>
<td>(std form)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>6</td>
<td>Stop watch</td>
<td>( +/- 1 s)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>7</td>
<td>Meter scale</td>
<td>1m length</td>
<td>5 nos.</td>
</tr>
<tr>
<td>8</td>
<td>Spectrometer</td>
<td>(main scale 360 deg, ver 30&quot;)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>9</td>
<td>Grating</td>
<td>(2500 LPI)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>10</td>
<td>Laser</td>
<td>(632.8 nm)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>11</td>
<td>Semi transparent glass plate</td>
<td>Al coating, 65 nm thickness, 50% visibility</td>
<td>5 nos.</td>
</tr>
<tr>
<td>12</td>
<td>Equilateral prism</td>
<td>(n = 1.54)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>13</td>
<td>Thermometer</td>
<td>+/- 1 deg</td>
<td>8 nos.</td>
</tr>
<tr>
<td>14</td>
<td>Screw gauge</td>
<td>(+/- 0.001cm)</td>
<td>12 nos.</td>
</tr>
<tr>
<td>15</td>
<td>Vernier caliper</td>
<td>(+/- 0.01 cm)</td>
<td>8 nos.</td>
</tr>
<tr>
<td>16</td>
<td>Steam Boiler</td>
<td>1 L</td>
<td>5 nos.</td>
</tr>
<tr>
<td>17</td>
<td>Scale</td>
<td>50 cms</td>
<td>5 nos.</td>
</tr>
<tr>
<td>18</td>
<td>Cylindrical mass</td>
<td>100 gms</td>
<td>10 sets</td>
</tr>
<tr>
<td>19</td>
<td>Slotted wt</td>
<td>300 gms</td>
<td>5 sets</td>
</tr>
<tr>
<td>20</td>
<td>Heater</td>
<td>1.5 KW</td>
<td>5 nos.</td>
</tr>
<tr>
<td>21</td>
<td>Transformer sodium vapour lamp</td>
<td>1 KW</td>
<td>10 nos.</td>
</tr>
<tr>
<td>22</td>
<td>Sodium vapour lamp</td>
<td>700 W</td>
<td>5 nos.</td>
</tr>
<tr>
<td>No.</td>
<td>Equipment</td>
<td>Capacity</td>
<td>Quantity</td>
</tr>
<tr>
<td>-----</td>
<td>----------------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>23</td>
<td>Burette</td>
<td>50 mL</td>
<td>5 nos</td>
</tr>
<tr>
<td>24</td>
<td>Beaker</td>
<td>250 mL</td>
<td>5 nos</td>
</tr>
<tr>
<td>25</td>
<td>Spirit level</td>
<td></td>
<td>10 nos</td>
</tr>
</tbody>
</table>

**REFERENCES**

Goal

The goal of the programme is to provide a practical knowledge in engineering chemistry.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to,</td>
<td>The student will be able to,</td>
</tr>
<tr>
<td>1. Expose the students for practical training through experiments to understand and appreciate the concepts learnt in Chemistry</td>
<td>1. Performing the experiments related to the subject will help the students to apply the practical knowledge in industrial applications and for developing or modifying methods</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S.No.</th>
<th>List of Experiments</th>
<th>Batch 1 (30)</th>
<th>Batch 2 (30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Any five)</td>
<td>Week</td>
<td>Periods</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L</td>
<td>P</td>
</tr>
<tr>
<td>1</td>
<td>Estimation of Commercial soda by acid-base titration</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Determination of Percentage of nickel in an alloy</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Determination of Temporary, permanent and total hardness of water by EDTA method</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Determination of Chloride content in a water sample</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Potentiometric Estimation of iron</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Conductometric Titration of a strong acid with a strong base</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Conductometric Titration of mixture of acids.</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>Determination of Degree of polymerization of a polymer by Viscometry</td>
<td>15</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td>60 Periods</td>
<td>60 Periods</td>
</tr>
</tbody>
</table>

40
List of Glassware and Equipments required for a batch of 30 students

1. Burett (50 mL) 30 nos.
2. Pipette (20 mL) 30 nos.
3. Conical Flask (250 mL) 30 nos.
4. Distilled water bottle (1 L) 30 nos.
5. Standard flask (100 mL) 30 nos.
6. Funnel (small) 30 nos.
7. Glass rod 20 cm length 30 nos.
8. Reagent Bottle (250 mL) 30 nos.
9. Reagent Bottle (60 mL) 30 nos.
10. Beaker (100 mL) 30 nos.
11. Oswald Viscometer Glass 30 nos.
12. Measuring Cylinder (25 mL) 30 nos.
13. Digital Conductivity Meter PICO make 8 nos.
14. Conductivity cell (K=1) 12 nos.
15. Digital Potentiometer PICO make 8 os.
17. Platinum Electrode Polypropylene 12 nos.
19. Pipette stands Wooden 30 nos.
20. Retard stands Metal 30 nos.
22. Clamps with Boss heads Metal 30 nos.

REFERENCES

SEMESTER-II

MAA 102– ENGINEERING MATHEMATICS – II

(Common to All Branches)

<table>
<thead>
<tr>
<th>MAA 102</th>
<th>ENGINEERING MATHEMATICS-II</th>
<th>4 CREDITS</th>
</tr>
</thead>
</table>

L T P C

| 3 1 0 4 |

AIM

- The course is aimed at developing the basic Mathematical skills of engineering students that are imperative for effective understanding of engineering subject using MATLAB.

OBJECTIVES

- To understand effectively the evaluation of double and triple integrals and their applications
- To know the basics of vector calculus comprising of gradient, divergence, curl, line surface and volume integrals along with the classical theorems involving them
- To have a sound knowledge of Laplace transform and its properties. Solutions of Laplace transform using MATLAB.
- To understand and expand periodic functions as Fourier series using MATLAB

OUTCOME

- To understand effectively the evaluation of double and triple integrals and their applications
- To know the basics of vector calculus comprising of gradient, divergence, curl, line surface and volume integrals along with the classical theorems involving them
- To have a sound knowledge of Laplace transform and its properties. Solutions of Laplace transform using MATLAB.
- To understand and expand periodic functions as Fourier series using MATLAB

UNIT I  MULTIPLE INTEGRALS  12(8+4)

Double integration – Cartesian and polar co-ordinates – Change of order of integration. Area as a double integral – Triple integration in Cartesian co ordinates – Volume as a triple integral - Change of variables between Cartesian and polar coordinates.

Lab: Area and Volume of double integration and triple integration.

UNIT II  VECTOR CALCULUS  12(8+4)
Gradient, Divergence and Curl – Unit normal vector, Directional derivative – angle between surfaces-Irrotational and solenoidal vector fields.

Green’s theorem - Gauss divergence theorem and Stoke’s theorem (without proof) – Verification and evaluation of the above theorems - Simple applications to regions such as square, rectangle, triangle, cuboids and rectangular parallelopipeds.

Lab: Green’s theorem - Gauss divergence theorem and Stoke’s theorem

UNIT III  LAPLACE TRANSFORM  


Lab: Solutions of differential equations using Laplace transform

UNIT IV  FOURIER SERIES  

Dirichlet’s Conditions – General Fourier Series – Odd and even functions – Half range sine and cosine series –Harmonic Analysis.

Lab: Solutions of Fourier series and Harmonic Analysis.

UNIT V  COMPLEX VARIABLES  

Functions of a complex variable – Analytic function - Cauchy - Riemann equations (Statement only) – Properties of analytic function (Statement only) – Construction of Analytic functions by Milne – Thomson method.

Lab: Cauchy - Riemann equations, Milne – Thomson method

TOTAL: 60

TEXT BOOK:


REFERENCE:

**Goal**
To impart fundamental knowledge in various fields of Physics and its applications.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to:</td>
<td>The students should be able to:</td>
</tr>
<tr>
<td>1. Develop strong fundamentals of properties and behaviour of the materials</td>
<td>1. Understand the properties and behaviour of materials.</td>
</tr>
<tr>
<td>2. Enhance theoretical and modern technological aspects in acoustics and ultrasonics.</td>
<td>2. Have a fundamental knowledge of acoustics which would facilitate in acoustical design of buildings and on ultrasonics and be able to employ it as an engineering tool.</td>
</tr>
<tr>
<td>3. Enable the students to correlate the theoretical principles with application oriented study of optics.</td>
<td>3. Understand the concept, working and application of lasers and fiber optics.</td>
</tr>
<tr>
<td>4. Provide a strong foundation in the understanding of solids and materials testing.</td>
<td>4. Know the fundamentals of crystal physics and non destructive testing methods.</td>
</tr>
<tr>
<td>5. Enrich the knowledge of students in modern engineering materials.</td>
<td>5. Have an understanding of the production, characteristics and application of the new engineering materials. This would aid them in the material selection stage.</td>
</tr>
</tbody>
</table>

**UNIT I PROPERTIES OF MATTER**
9

Elasticity - types of moduli of elasticity - Stress-Strain diagram - Young's modulus of elasticity

**UNIT II ACOUSTICS AND ULTRASONICS**
9

Classification of sound - characteristics of musical sound - intensity - loudness - Weber Fechner law - Decibel - Reverberation - Reverberation time, derivation of Sabine's formula for reverberation time(Jaeger's method) - absorption coefficient and its determination - factors affecting acoustics of building (Optimum reverberation time, loudness, focusing, echo, echelon effect, resonance and noise) and their remedies. Ultrasonics - production - Magnetostriction and
Piezoelectric methods - properties - applications of ultrasonics with particular reference to detection of flaws in metal (Non-Destructive testing NDT) - SONAR.

UNIT III LASER AND FIBRE OPTICS


UNIT IV CRYSTAL PHYSICS AND NON-DESTRUCTIVE TESTING

Crystal Physics: Lattice - Unit cell - Bravais lattice - Lattice planes - Miller indices - 'd' spacing in cubic lattice - Calculation of number of atoms per unit cell - Atomic radius - coordination number Packing factor for SC, BCC, FCC and HCP structures.

Non Destructive Testing: Liquid penetrate method - Ultrasonic flaw detection - ultrasonic flaw detector (block diagram) - X-ray Radiography - Merits and Demerits of each method.

UNIT V MODERN ENGINEERING MATERIALS AND SUPERCONDUCTING MATERIALS


Superconducting Materials: Superconducting phenomena - Properties of superconductors - Meissner effect - Type I and Type II superconductors - High Tc superconductors (qualitative) - uses of superconductors.

TOTAL 45

TEXT BOOKS


REFERENCES


Goal
To impart basic principles of chemistry for engineers.

OBJECTIVES

The course should enable the students to:

1. Make the students conversant with the basics of (a) Water technology and (b) Polymer science.
2. Provide knowledge on the requirements and properties of a few important engineering materials.
3. Educate the students on the fundamentals of corrosion and its control.
4. Give a sound knowledge on the basics of a few significant terminologies and concepts in thermodynamics.
5. Create an awareness among the present generation about the various conventional energy sources.

OUTCOMES

The students should be able to:

1. Gain basic knowledge in water analysis and suitable water treatment method.
2. Get an idea on the type of polymers to be used in engineering applications.
4. Get knowledge on the effects of corrosion and protection methods will help the young minds to choose proper metal / alloys and also to create a design that has good corrosion control.
5. Get exposure on the important aspects of basic thermodynamics will be able to understand the advanced level thermodynamics in engineering applications.
6. Get a good background on the various aspects of energy sources will create awareness on the need to utilize the fuel sources effectively and also for exploring new alternate energy resources.

UNIT I WATER TECHNOLOGY AND POLYMER CHEMISTRY

Hardness (Definition, Types, Units) - problems - Estimation of Hardness (EDTA Method) - Water softening - Carbonate conditioning and Calgon conditioning - Demineralization (Ion-Exchange Method) - Water Quality Parameters - Municipal Water Treatment- Desalination - Reverse Osmosis.

Classification of Polymers - PVC, Bakelite - preparation, properties and applications - Effect of Polymer Structure on Properties - Compounding of Plastics- Polymer Blends and Polymer Alloys Definition, Examples
UNIT II  ENGINEERING MATERIALS

Properties of Alloys - Heat Treatment of Steel - Polymer Composites - types and applications. Lubricants - Classification, properties and applications - Mechanism of Lubrication - MoS2 And Graphite - Adhesives - classification and properties - Epoxy resin (Preparation, properties and applications) - Refractories - Classification, Properties and General Manufacture - Abrasives Classification, Properties and Uses - Carbon nano tubes - preparation, properties and applications.

UNIT III  ELECTROCHEMISTRY AND CORROSION

Conductometric Titration - HCl vs NaOH and mixture of acids vs NaOH - Electrochemical Series and its applications - Nernst Equation - problems - Polarization, Decomposition Potential, Over-voltage ( definitions only) - Galvanic series - Corrosion (Definition, Examples, effects) - Mechanism of Dry Corrosion and Wet Corrosion - Differential aeration Corrosion, examples - Factors Influencing Corrosion - Metal and Environment - Corrosion Control - Design -Cathodic Protection methods - Protective Coatings - Galvanising - Anodising - Electroplating (Cu and Ni) and Electroless plating (Cu and Ni) Constituents of Paints and varnish.

UNIT IV  CHEMICAL THERMODYNAMICS


UNIT V  FUELS AND ENERGY SOURCES


TOTAL 45

TEXT BOOKS

REFERENCES
1. B. K. Sharma, Engineering chemistry, Krishna Prakasam Media (P) Ltd., 2003
3. A. Gowarikar, Text Book of Polymer Science, 2002
4. Kuriacose& Rajaram, Vols. 1 & 2, Chemistry in Engineering and Technology, 2004
<table>
<thead>
<tr>
<th>CYA102</th>
<th>ENVIRONMENTAL SCIENCE AND ENGINEERING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>The aim of this course is to create awareness in every engineering graduate about the importance of environment, the effect of technology on the environment and ecological balance and make him/her sensitive to the environment problems in every professional endeavour that he/she participates.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to:</td>
<td>The students should be able to:</td>
</tr>
<tr>
<td>1. Understand about the environment, the precious resources in the environment</td>
<td>1. Conserve the resources</td>
</tr>
<tr>
<td>2. Understand the conservation of these resources.</td>
<td>2. Make the environment useful for the future generations and finally to maintain ecological balance and preserve biodiversity.</td>
</tr>
<tr>
<td>3. Understand the role of a human being in maintaining a clean environment</td>
<td></td>
</tr>
</tbody>
</table>

UNIT I INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES

Definition, scope and importance – Need for public awareness – Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – Role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT II ECOSYSTEMS AND BIODIVERSITY

Concept of an ecosystem – Structure and function of an ecosystem – Producers, consumers and decomposers – Energy flow in the ecosystem – Ecological succession – Food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to Biodiversity – Definition: genetic, species and ecosystem diversity – Biogeographical classification of India – Value of biodiversity:
consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, National and local levels – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

Field study of common plants, insects, birds
Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT III ENVIRONMENTAL Ecosystems

Definition – Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – Solid waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

III effects of fireworks and upkeep of clean environment: Chemical contents of fireworks- and health hazards-Soil pollution, water pollution, air pollution and noise pollution.

Field Study of local polluted site – Urban / Rural / Industrial / Agricultural

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT


UNIT V HUMAN POPULATION AND THE ENVIRONMENT


TEXT BOOKS

REFERENCES

CSB101 | DATA STRUCTURES | L T P C | 3 1 0 4
--- | --- | --- | ---
**Goal** | To provide an in-depth knowledge in problem solving techniques using data structures.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Learn determining the efficiency of algorithms.</td>
<td>1. Compute the time complexity of algorithms</td>
</tr>
<tr>
<td>2. Understand the concepts and applications of stack and queue data structures.</td>
<td>2. Implement stacks and queues for various applications.</td>
</tr>
<tr>
<td>3. Learn various sorting and searching techniques.</td>
<td>3. Implement tree data structure for different applications.</td>
</tr>
<tr>
<td>4. Understand the concepts and applications of tree and graph data structures.</td>
<td>4. Implement various sorting and searching techniques.</td>
</tr>
<tr>
<td>5. Have a good understanding of problem solving using data structure.</td>
<td>5. Apply the concepts of graph for computing shortest path and construct MST.</td>
</tr>
</tbody>
</table>

**UNIT I** **PROBLEM SOLVING** 12
Problem solving – Top-down Design – Implementation – Sample algorithms

**UNIT II** **LISTS, STACKS AND QUEUES** 12
Abstract Data Type (ADT) – The List ADT – Array– Multi Dimensional Array – Singly Linked List -, Doubly linked list - Array of Lists - Polynomial representation and addition
The Stack ADT – Infix to Postfix conversion – Postfix evaluation-The Queue ADT-Circular queue-Garbage Collection and Compaction.

**UNIT III** **TREES AND HASHING** 12

**UNIT IV** **SORTING AND SEARCHING** 12

**UNIT V** **GRAPHS** 12

**TOTAL 60**
TEXT BOOKS

REFERENCE BOOKS
This course advances students’ knowledge in problem solving and programming principles for scientific and technical applications through the presentation of object-oriented programming in the C++ language. The course emphasizes data abstraction and object-oriented programming design through the implementation, in C++, of classes and numerous related concepts. This includes inheritance, polymorphism, and inter-object communication, as well as techniques with which you can generalize classes, such as templates and operator overloading.

**OBJECTIVES**

<table>
<thead>
<tr>
<th>The course should enable the students to</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Learn Object-oriented programming paradigm.</td>
</tr>
<tr>
<td>2. Understand object-oriented features through C++ programming language.</td>
</tr>
<tr>
<td>3. Learn exception handling.</td>
</tr>
<tr>
<td>4. Learn Generic classes and templates.</td>
</tr>
</tbody>
</table>

**OUTCOMES**

<table>
<thead>
<tr>
<th>The student should be able to</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Explain concepts of object oriented programming.</td>
</tr>
<tr>
<td>2. Write simple programs in C++.</td>
</tr>
<tr>
<td>3. Demonstrate the concept of functions, operator overloading, inheritance through C++ programs.</td>
</tr>
<tr>
<td>4. Implement the concepts of exception handling, generic functions, and templates.</td>
</tr>
</tbody>
</table>

**UNIT I  INTRODUCTION**


Implementing oops concepts in C++ Objects, Classes, Encapsulation, Data Abstraction, Inheritance, Polymorphism, Dynamic Binding, Message Passing, Default Parameter Value, Using Reference variables with Functions.

**UNIT II  FUNCTIONS AND OVERLOADING**

Abstract data types, Class Component, Object & Class, Constructors Default and Copy Constructor, Assignment operator deep and shallow coping, Access modifiers – private, public and protected. Implementing Class Functions within Class declaration or outside the Class declaration, instantiation of objects, Scope resolution operator, Working with Friend Functions, Using Static Class members. Understanding Compile Time Polymorphism function overloading Rules of Operator Overloading (Unary and Binary) as member function/friend function, Implementation of operator overloading of Arithmetic Operators, Overloading Output/ Input, Prefix/ Postfix Increment and decrement Operators, Overloading comparison operators, Assignment, subscript and function call Operator, concepts of namespaces.
UNIT III  INHERITANCE AND POLYMORPHISM  12

Inheritance: Inheritance, Types of Inheritance, Abstract Classes, Ambiguity resolution using scope resolution operator and Virtual base class, Aggregation, composition vs classification hierarchies, Overriding inheritance methods, Constructors and Destructor in derived classes. Multiple Inheritance.

Polymorphism: Polymorphism, Type of Polymorphism – compile time and runtime, Understanding Dynamic polymorphism: Pointer to objects, Virtual Functions (concept of VTABLE) , pure virtual functions, Abstract Class.

UNIT IV  EXCEPTION HANDLING AND FILES  12

Understanding of working and implementation of Exception Handling.

Advanced Input/Output, Manipulating strings, Using istream /ostream member functions, Using Manipulators, Creating Manipulator Functions, Understanding Implementation of Files, Writing and Reading Objects.

UNIT V  TEMPLATES  12

Generic Programming: and mastering STL Understanding Generic Functions with implementation of searching sorting algorithm. Overloading of Function Templates.

Understanding Class Templates using Implementation of Generic stack, linked lists: singly and doubly linked lists, Binary Search Tree basic operations. Understanding Inheritance with Generic Class.


TOTAL 60

TEXT BOOKS

1. K.R.Venugopal, Rajkumar Buunya “Mastering C++”, 2013

REFERENCE BOOKS

UNIT I SPEAKING SKILLS

Art of Speaking- Body Language and speaking- Non Verbal communication- Vocal Communication Techniques- Intercultural communication- The difference in Approach in five countries- Vocabulary Enrichment- Pronunciation of words-Mark the stress on appropriate syllable-split the word into syllables- Speaking as an Art-Simple Oral Interaction-Body Language and Speaking- Five characteristics of an ideal GD- group discussions - role plays- short speeches- Extempore – JAM –Debate-Talk shows-Power point presentation and speaking

UNIT II LANGUAGE SKILLS

Functional Grammar: Synonyms and Antonyms – Active and Passive Voice- Direct and Indirect Speech- Conditional Clauses- collocations- rearrange the jumbled sentences and make meaningful sentences- Language functions: apologising, greeting, clarifying, inviting, advising, agreeing, disagreeing, refusing, thanking, interrupting, expressing obligation, expressing preferences,CV / application letters- Job interviews-FAQ’s – e- mail etiquette
UNIT III PEOPLE SKILLS/SOFT SKILLS

SWOT analysis- JOHARI window- Goal setting- speaking on Goals - goals to be achieved- modes of behaviour to achieve the goals- decision making- time management -stress management- power of positive attitude- leadership skills

UNIT IV COMPREHENSION SKILLS

Art of Listening- listening to English news- listening to debates on current issues - Listening to dialogues for general meaning and specific information- listening to toast master speeches- -cloze exercises-open comprehension questions-Art of Listening-Reading passages –interpreting in own words- reading articles in magazines/journals/newspapers- writing articles for newspaper-reporting events-completing the middle/end of a story

UNIT V PERSONALITY DEVELOPMENT

Define Personality- Types of Personality-Personality test- Leadership Skills - Interpersonal Skills- Team Work - Mind Mapping- concept maps- Study skills and techniques -Edward De Bono’s lateral thinking-exercises-questionnaires-project

TOTAL 46

TEXT BOOK

English for Life and the workplace through LSRW&T skills by Dr. Dolly John, Pearson Publications

REFERENCES

2. Effective technical Communication, M. Ashraf Rizvi, Tata McGraw Hill Companies
3. Professional Speaking Skills, Aruna Koneru, Oxford University Press

Web links for reference for Flipped classroom sessions

1. https://owl.english.purdue.edu/exercises/28/12/33
### Goal
The goal of the programme is to provide a practical knowledge in physics.

### Objectives
The course should enable the student to,

1. Expose the students for practical training through experiments to understand and appreciate the concepts learnt in Physics

### Outcome
The student will be able to,

1. Perform the experiments related to the subject will help the students to apply the practical knowledge in industrial applications and for developing or modifying methods

<table>
<thead>
<tr>
<th>S.No.</th>
<th>List of Experiments</th>
<th>Batch 2 (30)</th>
<th>Batch 1 (30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Periods</td>
<td>Periods</td>
</tr>
<tr>
<td></td>
<td></td>
<td>allotted Week allotted</td>
<td>allotted L P</td>
</tr>
<tr>
<td>1</td>
<td>Torsional Pendulum - Determination of rigidity modulus of the material of a wire.</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Non Uniform Bending - Determination of Young's Modulus.</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Viscosity - Determination of co-efficient of Viscosity of a liquid by Poiseuille's flow.</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>Lee's Disc - Determination of thermal conductivity of a bad conductor.</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Air Wedge - Determination of thickness of a thin wire.</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Spectrometer - Refractive index of a prism.</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>Semiconductor laser - Determination of wavelength of Laser using Grating.</td>
<td>7</td>
<td>21</td>
</tr>
</tbody>
</table>

**Total**

56 Periods

### LIST OF EQUIPMENTS REQUIRED FOR A BATCH OF 30 STUDENTS
<table>
<thead>
<tr>
<th>No.</th>
<th>Equipment</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Torsional Pendulum</td>
<td>(500 gm, wt, 60 cm wire Al-Ni Alloy)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>2</td>
<td>Travelling Microscope</td>
<td>(X10)</td>
<td>15 nos.</td>
</tr>
<tr>
<td>3</td>
<td>Capillary tube</td>
<td>(length 10cm, dia 0.05mm)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>4</td>
<td>Magnifying lens</td>
<td>(X 10)</td>
<td>15 nos.</td>
</tr>
<tr>
<td>5</td>
<td>Lee’s disc apparatus</td>
<td>(std form)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>6</td>
<td>Stop watch</td>
<td>( +/- 1 s)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>7</td>
<td>Meter scale</td>
<td>1m length</td>
<td>5 nos.</td>
</tr>
<tr>
<td>8</td>
<td>Spectrometer</td>
<td>(main scale 360 deg, ver 30&quot;)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>9</td>
<td>Grating</td>
<td>(2500 LPI)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>10</td>
<td>Laser</td>
<td>(632.8 nm)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>11</td>
<td>Semi transparent glass plate</td>
<td>Al coating, 65 nm thickness, 50% visibility</td>
<td>5 nos.</td>
</tr>
<tr>
<td>12</td>
<td>Equilateral prism</td>
<td>(n = 1.54)</td>
<td>5 nos.</td>
</tr>
<tr>
<td>13</td>
<td>Thermometer</td>
<td>+/- 1 deg</td>
<td>8 nos.</td>
</tr>
<tr>
<td>14</td>
<td>Screw gauge</td>
<td>(+/- 0.001cm)</td>
<td>12 nos.</td>
</tr>
<tr>
<td>15</td>
<td>Vernier caliper</td>
<td>(+/- 0.01 cm)</td>
<td>8 nos.</td>
</tr>
<tr>
<td>16</td>
<td>Steam Boiler</td>
<td>1 L</td>
<td>5 nos.</td>
</tr>
<tr>
<td>17</td>
<td>Scale</td>
<td>50 cms</td>
<td>5 nos.</td>
</tr>
<tr>
<td>18</td>
<td>Cylindrical mass</td>
<td>100 gms</td>
<td>10 sets</td>
</tr>
<tr>
<td>19</td>
<td>Slotted wt</td>
<td>300 gms</td>
<td>5 sets</td>
</tr>
<tr>
<td>20</td>
<td>Heater</td>
<td>1.5 KW</td>
<td>5 nos.</td>
</tr>
<tr>
<td>21</td>
<td>Transformer sodium vapour lamp</td>
<td>1 KW</td>
<td>10 nos.</td>
</tr>
<tr>
<td>22</td>
<td>Sodium vapour lamp</td>
<td>700 W</td>
<td>5 nos</td>
</tr>
<tr>
<td>23</td>
<td>Burette</td>
<td>50 Ml</td>
<td>5 nos</td>
</tr>
<tr>
<td>24</td>
<td>Beaker</td>
<td>250 mL</td>
<td>5 nos</td>
</tr>
<tr>
<td>25</td>
<td>Spirit level</td>
<td></td>
<td>10 nos.</td>
</tr>
</tbody>
</table>
REFERENCE

**Goal**
The goal of the programme is to provide a practical knowledge in engineering chemistry.

**OBJECTIVES**
The course should enable the student to,
1. Expose the students for practical training through experiments to understand and appreciate the concepts learnt in Chemistry

**OUTCOME**
The student will be able to,
1. Performing the experiments related to the subject will help the students to apply the practical knowledge in industrial applications and for developing or modifying methods

<table>
<thead>
<tr>
<th>S.No.</th>
<th>List of Experiments</th>
<th>Batch 1 (30)</th>
<th>Batch 2 (30)</th>
<th>Week allotted</th>
<th>Periods allotted</th>
<th>L</th>
<th>P</th>
<th>L</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Estimation of Commercial soda by acid-base titration</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Determination of Percentage of nickel in an alloy</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Determination of Temporary, permanent and total hardness of water by EDTA method</td>
<td>5</td>
<td>3</td>
<td>6</td>
<td>1</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Determination of Chloride content in a water sample</td>
<td>7</td>
<td>3</td>
<td>8</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Potentiometric Estimation of iron</td>
<td>9</td>
<td>1</td>
<td>3</td>
<td>10</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Conductometric Titration of a strong acid with a strong base</td>
<td>11</td>
<td>1</td>
<td>3</td>
<td>12</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Conductometric Titration of mixture of acids.</td>
<td>13</td>
<td>1</td>
<td>3</td>
<td>14</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Determination of Degree of polymerization of a polymer by Viscometry</td>
<td>15</td>
<td>1</td>
<td>3</td>
<td>24</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**60 Periods**
# List of Glassware and Equipments required for a batch of 30 students

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Burett</td>
<td>(50 mL)</td>
<td>30 nos</td>
</tr>
<tr>
<td>2</td>
<td>Pipette</td>
<td>(20 mL)</td>
<td>30 nos.</td>
</tr>
<tr>
<td>3</td>
<td>Conical Flask</td>
<td>(250 mL)</td>
<td>30 nos</td>
</tr>
<tr>
<td>4</td>
<td>Distilled water bottle</td>
<td>(1 L)</td>
<td>30 nos</td>
</tr>
<tr>
<td>5</td>
<td>Standard flask</td>
<td>(100 mL)</td>
<td>30 nos</td>
</tr>
<tr>
<td>6</td>
<td>Funnel</td>
<td>(small)</td>
<td>30 nos</td>
</tr>
<tr>
<td>7</td>
<td>Glass rod</td>
<td>20 cm length</td>
<td>30 nos</td>
</tr>
<tr>
<td>8</td>
<td>Reagent Bottle</td>
<td>(250 mL)</td>
<td>30 nos.</td>
</tr>
<tr>
<td>9</td>
<td>Reagent Bottle</td>
<td>(60 mL)</td>
<td>30 nos</td>
</tr>
<tr>
<td>10</td>
<td>Beaker</td>
<td>(100 mL)</td>
<td>30 nos</td>
</tr>
<tr>
<td>11</td>
<td>Oswald Viscometer</td>
<td>Glass</td>
<td>30 nos</td>
</tr>
<tr>
<td>12</td>
<td>Measuring Cylinder</td>
<td>(25 mL)</td>
<td>30 nos</td>
</tr>
<tr>
<td>13</td>
<td>Digital Conductivity Meter</td>
<td>PICO make</td>
<td>8 nos</td>
</tr>
<tr>
<td>14</td>
<td>Conductivity cell</td>
<td>(K=1)</td>
<td>12 nos</td>
</tr>
<tr>
<td>15</td>
<td>Digital Potentiometer</td>
<td>PICO make</td>
<td>8 os</td>
</tr>
<tr>
<td>16</td>
<td>Calomel Electrode</td>
<td>Glass</td>
<td>12 nos</td>
</tr>
<tr>
<td>17</td>
<td>Platinum Electrode</td>
<td>Polypropylene</td>
<td>12 nos</td>
</tr>
<tr>
<td>18</td>
<td>Burette Stands</td>
<td>Wooden</td>
<td>30 nos</td>
</tr>
<tr>
<td>19</td>
<td>Pipette stands</td>
<td>Wooden</td>
<td>30 nos</td>
</tr>
<tr>
<td>20</td>
<td>Retard stands</td>
<td>Metal</td>
<td>30 nos</td>
</tr>
<tr>
<td>21</td>
<td>Porcelain Tiles</td>
<td>White</td>
<td>30 os</td>
</tr>
<tr>
<td>22</td>
<td>Clamps with Boss heads</td>
<td>Metal</td>
<td>30 nos</td>
</tr>
</tbody>
</table>

## REFERENCES


Goal
To provide knowledge of basic engineering practices.

Objectives
The course should enable the students
1. To impart knowledge on basic engineering concepts.

Outcome
The students should be able to
1. To learn how to use Electrical and Electronics tools.

LIST OF EXPERIMENTS

Electrical Engineering:
1. Wiring for a tube light. 6
2. Wiring for a lamp and fan. 6
3. Staircase wiring 3
4. Study of (i) Iron box and (ii) Fan with Regulator Electronics Engineering 6
5. Study of Electronic components and Equipments 3
6. Characteristics of PN junction diode & measurement of Ripple factor of half wave and full wave rectifier. 9
7. Applications of OP-AMP - Inverter, Adder and Subtractor. 9
8. Study and verification of Logic Gates 3

PRACTICAL 45

Components Required:

Electrical Engineering
Choke 2 nos
Starter 2 nos
Tubelight stand 2 nos
36W tubelight 2 nos
Fan 2 nos
40W lamp 5 nos
Single way switch 10 nos
Two way switch 5 nos
Iron box 2 nos
Fan with regulator opened 1 no (demo purpose )

Electronics Engineering
IC Trainer Kit, Resistors, Capacitors, CRO, Function Generator,BreadBoard,Regulated Power Supply, Zener Diode, PN Junction Diode, Potentiometer, Digital Multimeter,Ammeter, Voltmeter, Wattmeter, IC 7408,IC 7432,IC 7486, IC 7400, IC 7404, IC 7402

TEXT BOOK
## CSB131
### DATA STRUCTURES AND OBJECT ORIENTED PROGRAMMING USING C++ LABORATORY

<table>
<thead>
<tr>
<th>Goal</th>
<th>To practice the concepts learned in the subject “CSB102 Object Oriented Programming and C++” for implementation of Data Structures.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td><strong>Outcome</strong></td>
</tr>
<tr>
<td>The course should enable the students to</td>
<td>The students will be able to</td>
</tr>
<tr>
<td>2. Gain knowledge in object oriented concepts.</td>
<td>2. Demonstrate the implementation of constructors, destructors and operator overloading.</td>
</tr>
<tr>
<td>3. Work practically on day to day problems and to solve them using C++</td>
<td>3. Apply fundamental algorithmic problems including type casting, inheritance, and polymorphism.</td>
</tr>
<tr>
<td></td>
<td>4. Write programs using generic programming, exception handling ,templates, file Handling</td>
</tr>
<tr>
<td></td>
<td>5. Apply data structures to solve problems</td>
</tr>
</tbody>
</table>

## LIST OF EXPERIMENTS

1. Basic programs in C++
2. Implement polynomial addition and subtraction using operator overloading concept in C++
3. Implement infix to postfix conversion and evaluation of postfix using stack in C++ using friend function.
4. Implement dynamic memory allocation using circular queue in C++ with inheritance.
5. Implement the following sorting operations using generic data type(template) in C++
   - (a) Shell Sort
   - (b) Heap Sort
   - (c) Merge Sort
   - (d) Quick Sort
6. Implement the following search operations in C++
   - (a) Linear Search
   - (b) Binary search using recursion
   - (c) Hash Search
7. Implement Tree traversal on the given expression tree in C++
8. Implement Binary search Tree with its primitive operations.
9. Implement the algorithm for construction of Minimum spanning Tree (Prim’s & Kruskal) using function overloading.
10. Implement Dijkstra’s algorithm to find out the shortest path of the given graph in C++
SEMESTER III  
MAA 201 – ENGINEERING MATHEMATICS – III  
(Common to AERO, ASP, AUTO, MECH, CSE, IT, CHEM & Bio.Tech Branches)

L T P C  
3 1 0 4

UNIT – I  Partial Differential Equations  
Formation of partial differential equation differential equations by elimination arbitrary constant arbitrary functions – Solution of standard types of first order partial differential equations – Lagrange’s linear equation – Linear partial differential equations of second and higher order with constant coefficients.

UNIT – II  One Dimensional Wave and Heat Flow  
Classification of second order linear partial differential equations – Solutions of one dimensional wave equation – One dimensional heat equation.

UNIT – III  Two Dimensional Heat Flow  
Steady state solution of two dimensional heat equations (Insulated edges excluded) – Fourier series solutions in Cartesian coordinates and Polar coordinates (sector, semicircle, circle and annular regions)

UNIT – IV  Fourier Transform  

UNIT – V  Z – Transform and Difference Equations  

Total: 60

Text Books:


References:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSB201</td>
<td>DESIGN AND ANALYSIS OF ALGORITHMS</td>
<td>12</td>
</tr>
</tbody>
</table>

**Goal**

To provide the students with solid foundations to deal with a wide variety of computational problems, and to provide thorough knowledge of the most common algorithms and data structures.

**Objectives**

The course should enable the students to

1. Learn asymptotic performance of algorithms.
2. Learn the algorithm analysis techniques.
3. Become familiar with the different algorithm design techniques.
4. Understand the limitations of Algorithm design techniques.
5. Learn P & NP problems.

**Outcome**

The students should be able to

1. Understand the basic concepts of algorithm, analysis, notation & various complexity.
2. Solve computing problems using Brute Force and Divide & Conquer strategy.
4. Analyze the various problems using Backtracking & Branch and Bound.
5. Computational complexity of problems solved in polynomial time by some algorithm.

**UNIT I  INTRODUCTION**


**UNIT II  BRUTE FORCE AND DIVIDE-AND-CONQUER**


**UNIT III  DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE**


**UNIT IV  BACKTRACKING AND BRANCH AND BOUND**

UNIT V NP-HARD AND NP-COMPLETE PROBLEMS


TOTAL 60

TEXT BOOK


REFERENCES

To impart skill development in Java programming.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Understand the basic concepts of Java</td>
<td>1. Write basic programs in Java</td>
</tr>
<tr>
<td>2. Understand Packages and Interfaces</td>
<td>2. Create and Use packages and interfaces in Java</td>
</tr>
<tr>
<td>3. Understand exception handling and Multi Threading in Java</td>
<td>3. Use user defined, inbuilt exceptions and multi threaded concepts in Java stream classes.</td>
</tr>
<tr>
<td>4. Understand I/O Streams</td>
<td>4. Use all types of Character and Byte Streams</td>
</tr>
<tr>
<td>5. Understand the GUI part of Java</td>
<td>5. Create GUI based trivial applications</td>
</tr>
</tbody>
</table>

UNIT I  INTRODUCTION  12


UNIT II  INHERITANCE AND PACKAGES  12


Interfaces : Declaring Interfaces - Implementing Interfaces - Using inbuilt interfaces

UNIT III  EXCEPTION HANDLING AND MULTITHREADING  12
Exception Handling : The concept of Exceptions in Java, Types of Exceptions, Exception Objects, Try - Catch and Finally blocks , Multiple Catch blocks - Understanding ‘Throws’ and ‘Throw‘ - Defining Your Own Exceptions.

Multithreading Programming: The Java Thread Model, Understanding Threads, The Main Thread - Creating a Thread, Creating Multiple Threads, Thread Priorities, Synchronization, Inter thread communication- Deadlocks.

UNIT IV  I/O STREAMS  12
Input/Output in Java : I/O Basic, Byte Streams - Character Streams- Stream Chaining – Reading and writing to Console , Reading and Writing on Files - Special Streams – InputStreamReader and OutputStreamWriter – PushbackInputStream
UNIT V WORKING WITH WINDOWS AND GRAPHICS


TOTAL 60

TEXT BOOKS


REFERENCE BOOKS

### CSB203 DATABASE MANAGEMENT SYSTEMS

<table>
<thead>
<tr>
<th>Goal</th>
<th>To learn the fundamentals of data models and to conceptualize and depict a database system using ER diagram.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td>The course should enable the student to</td>
</tr>
<tr>
<td>1. Educate with fundamental concepts of Database management system, Data models and different database languages.</td>
<td></td>
</tr>
<tr>
<td>2. Know DB design and normalize data.</td>
<td></td>
</tr>
<tr>
<td>3. Understand data storage and how query are being processed and executed.</td>
<td></td>
</tr>
<tr>
<td>4. Deal with online transactions, concurrency control and recovery.</td>
<td></td>
</tr>
<tr>
<td>5. Acquire knowledge about advanced topics and can do research.</td>
<td></td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td>The Student should be able to</td>
</tr>
<tr>
<td>1. Explore the basic concepts of database systems and different DataBase languages.</td>
<td></td>
</tr>
<tr>
<td>2. Design relational database, normalization.</td>
<td></td>
</tr>
<tr>
<td>3. Create data storage and Query processing.</td>
<td></td>
</tr>
<tr>
<td>4. Implement transaction management.</td>
<td></td>
</tr>
<tr>
<td>5. Develop Object oriented DB, Distributed DB, XML queries and datawarehousing</td>
<td></td>
</tr>
</tbody>
</table>

### UNIT I INTRODUCTION AND CONCEPTUAL MODELING


### UNIT II RELATIONAL MODEL

SQL – Data definition- Queries in SQL- Updates- Views – Integrity and Security – Relational Database design – Functional dependencies and Normalization for Relational Databases (up to BCNF).

### UNIT III DATA STORAGE AND QUERY PROCESSING


### UNIT IV TRANSACTION MANAGEMENT

UNIT V CURRENT TRENDS


TOTAL 45

TEXT BOOK


REFERENCE BOOKS

UNIT I NUMBER SYSTEMS AND BOOLEAN SWITCHING ALGEBRA


UNIT II COMBINATIONAL LOGIC CIRCUIT DESIGN


UNIT III ARITHMETIC AND STANDARD COMBINATIONAL MODULE

Adders – Subtractors – Binary parallel adders, Parallel subtractors, Parallel adder/subtractors, Binary decoders and encoders – Priority encoders – Multiplexers – MUX as universal combinational modules – Demultiplexers- Introduction to Hardware Description Language (HDL[Arithmetic, Multiplexer. Demultiplexer Module Only])

UNIT IV SEQUENTIAL CIRCUIT


UNIT V MEMORIES AND PROGRAMMABLE LOGIC DEVICES

Classification of memories – RAM organization – Write operation – Read operation – Memory cycle - Timing wave forms – Memory decoding – memory expansion – Static RAM Cell-Bipolar RAM

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS
CSB231 ALGORITHMS LABORATORY

<table>
<thead>
<tr>
<th>Goal</th>
<th>To implement different algorithmic design techniques and to analyze the efficiency of algorithms.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to:</td>
<td>The student will be able to:</td>
</tr>
<tr>
<td>1. Realize the concept of Divide and Conquer algorithm design technique</td>
<td>1. Implement Divide and Conquer algorithm design technique for various applications</td>
</tr>
<tr>
<td>2. Understand the concept of Dynamic Programming algorithm design technique</td>
<td>2. Implement dynamic programming algorithm design technique for various applications</td>
</tr>
<tr>
<td>3. Realize the concept of Greedy algorithm design technique</td>
<td>3. Implement Greedy algorithm design technique for various applications</td>
</tr>
<tr>
<td>4. Understand the concept of Backtracking algorithm design technique</td>
<td>4. Implement backtracking algorithm design technique for various applications</td>
</tr>
</tbody>
</table>

LIST OF EXPERIMENTS
1. Write a program in C to implement Binary Search using Divide and Conquer Method.
2. Write a program in C to implement MaxMin Problem using Divide and Conquer Method.
3. Write a program in C to implement mergesort using Divide and Conquer Method.
4. Write a program in C to implement all pairs shortest path using dynamic programming.
5. Write a program in C to implement travelling salesman problem using dynamic programming.
6. Write a program in C to solve Knapsack Problem using greedy techniques.
7. Write a program to implement tree traversal techniques
   a. Depth First Search
   b. Breadth First Search
8. Write a program in C to solve 8-Queens Problem using Backtracking.
**Aim**
To write and execute programs in JAVA

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to:</td>
<td>The student will be able to:</td>
</tr>
<tr>
<td>1. Practice logical ability to solve the problems.</td>
<td>1. Apply decision and iteration control structures to implement algorithms in Java</td>
</tr>
<tr>
<td>2. Understand java programming development environment, compiling, debugging, linking and executing a program using the development environment</td>
<td>2. Able to implement String and string buffer methods</td>
</tr>
<tr>
<td>3. Understand and apply the in-built functions and customized functions for solving the problems.</td>
<td>3. Implement inheritance, polymorphism and object relationship in java</td>
</tr>
<tr>
<td>4. Study, analyze and understand logical structure of a computer program, and different construct to develop a program in Java Programming language</td>
<td>4. Implement interfaces as programming techniques</td>
</tr>
<tr>
<td></td>
<td>5. Able to implement Packages</td>
</tr>
<tr>
<td></td>
<td>6. Analyze and create Applet Programs</td>
</tr>
<tr>
<td></td>
<td>7. Apply exceptions handling</td>
</tr>
<tr>
<td></td>
<td>8. Able to generate multiple threads</td>
</tr>
</tbody>
</table>

**LIST OF EXPERIMENTS**

1. Write a program to print the individual digits of a 3-digit number.
2. Write a program that asks the user to enter two integers, obtains the numbers from the user, and then prints the larger number followed by the words "is larger." If the numbers are equal, print the message "These numbers are equal."
3. Write a program to read N numbers and find the largest and smallest numbers.
4. Write a program to create a String object. Initialize this object with your name. Find the length of your name using the appropriate String method. Find whether the character ‘a’ is in your name or not; if yes find the number of times ‘a’ appears in your name. Print locations of occurrences of ‘a’.
5. Write a program to create a StringBuffer object and illustrate the following
   - Display the capacity and length of the string buffer.
   - insert characters at the beginning.
   - the append() and reverse() functions
6. Write a program to display total marks of 5 students using student class. Given the following attributes: Regno(int), Name(string), Marks in subjects(Integer Array), Total (int).
7. Write a program in Java with class Rectangle with the data fields width, length, area and colour. The length, width and area are of double type and colour is of string type. The methods are get_length(), get_width(), get_colour() and find_area().
   Create two objects of Rectangle and compare their area and colour. If the area and colour both are the same for the objects then display “Matching Rectangles”, otherwise display “Non-matching Rectangle”.
8. Write a program to create a player class. Inherit the classes Cricket_player, Football_player and Hockey_player form player class.
9. Write a program to show how a class implements two interfaces.
10. Show through a program that fields in an interface are implicitly static and final and methods are automatically public.
11. Write a program to create a package for Book details giving Book Name, Author Name, Price, year of publishing.
12. A color can be created by specifying the red, green, blue values as integer parameters to the constructor of class Color. The values range from 0 to 255. Provide three horizontal scroll bars and ask the user to select the values of the colors by dragging the thumb in the scroll bar. Using the color selected, draw a rectangle.
13. Write a java program to copy the contents of one file to another file.
14. Write a Java program to read input from the standard input and write to a byte array.
15. Create an applet for simple calculator to perform Addition, Subtraction, Multiplication and Division using Button, label and Text field classes.
16. Write a Java program to catch more than two exceptions.
17. Write a Java program to create your own exception subclass that throws exception if the sum of two integers is greater than 99.
18. Write a Java program for generating two threads, one for printing even numbers and other for printing odd numbers.
19. Write a Java program for producer and consumer problem using Thread.
Goal
To design and develop database applications

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to:</td>
<td>1. Populate and query a database using SQL commands.</td>
</tr>
<tr>
<td>1. Define the basics of database and terms used in databases.</td>
<td>2. Declare and enforce integrity constraints on a database using a state-of-the-art RDBMS</td>
</tr>
<tr>
<td>2. Understand SQL Commands.</td>
<td>3. Implementing Indexing on table.</td>
</tr>
<tr>
<td>3. Understand the different constraints on Relational Database.</td>
<td>4. Programming PL/SQL including stored procedures, stored functions, cursors, packages</td>
</tr>
<tr>
<td>4. To understand the method of implementing indexing and PL-SQL</td>
<td>5. Solve basic issues of simple database applications and construct a real time database application using current techniques</td>
</tr>
<tr>
<td>5. To understand the method of implementing simple database Applications.</td>
<td></td>
</tr>
</tbody>
</table>

LIST OF EXPERIMENTS

1. To study Basic SQL commands (create table, use, drop, insert) and execute the following queries using these commands: (CO1)

2. To study the viewing commands (select, update) and execute the following queries using these commands:
   - Find the names of all employees who live in Delhi.
   - Increase the salary of all employees by Rs. 5,000.
   - Find the company names where the number of employees is greater than 10,000.
   - Change the Company City to Gurgaon where the Company name is ‘TCS’.

3. To study the commands to modify the structure of table (alter, delete) and execute the following queries using these commands:
   - Add an attribute named ‘Designation’ to the table ‘Emp’.
   - Modify the table ‘Emp’, Change the datatype of ‘salary’ attribute to float.
• Drop the attribute ‘depttname’ from the table ‘emp’.
• Delete the entries from the table ‘Company’ where the number of employees are less than 500.

4. To study the commands that involve compound conditions (and, or, in , not in, between , not between, like, not like) and execute the following queries using these commands:
   • Find the names of all employees who live in ‘Gurgaon’ and whose salary is between Rs. 20,000 and Rs. 30,000.
   • Find the names of all employees whose names begin with either letter ‘A’ or ‘B’.
   • Find the company names where the company city is ‘Delhi’ and the number of employees is not between 5000 and 10,000.
   • Find the names of all companies that do not end with letter ‘A’.

5. To study the aggregate functions (sum, count, max, min, average) and execute the following queries using these commands:
   • Find the sum and average of salaries of all employees in computer science department.
   • Find the number of all employees who live in Delhi.
   • Find the maximum and the minimum salary in the HR department.

6. To study the grouping commands (group by, order by) and execute the following queries using these commands:
   • List all employee names in descending order.
   • Find number of employees in each department where number of employees is greater than 5.
   • List all the department names where average salary of a department is Rs.10,000.

7. To study the commands involving data constraints and execute the following queries using these commands:
   • Alter table ‘Emp’ and make ‘enumber’ as the primary key.
   • Alter table ‘Company’ and add the foreign key constraint.
   • Add a check constraint in the table ‘Emp’ such that salary has the value between 0 and Rs.1,00,000
   • Alter table ‘Company’ and add unique constraint to column cname
   • Add a default constraint to column ccity of table company with the value ‘Delhi’

8. To study the commands for joins (cross join, inner join, outer join) and execute the following queries using these commands:
   • Retrieve the complete record of an employee and its company from both the table using joins.
   • List all the employees working in the company ‘TCS’.

9. To study the various set operations and execute the following queries using these commands:
   • List the enumber of all employees who live in Delhi and whose company is in Gurgaon or if both conditions are true.
   • List the enumber of all employees who live in Delhi but whose company is not in Gurgaon.

10. To study the various scalar functions and string functions (power, square, substring, reverse, upper, lower, concatenation) and execute the following queries using these commands:
    • Reverse the names of all employees.
• Change the names of company cities to uppercase.
• Concatenate name and city of the employee.

11. To study the commands involving indexes and execute the following queries:
• Create an index with attribute ename on the table employee.
• Create a composite index with attributes cname and ccity on table company.
• Drop all indexes created on table company.

12. To study the conditional controls and case statement in PL-SQL and execute the following queries:
• Calculate the average salary from table ‘Emp’ and print increase the salary if the average salary is less than 10,000.
• Display the deptno from the employee table using the case statement if the deptname is ‘Technical’ then deptno is 1, if the deptname is ‘HR’ then the deptno is 2 else deptno is 3.

13. To study procedures and triggers in PL-SQL and execute the following queries:
• Create a procedure on table employee to display the details of employee to display the details of employees by providing them value of salaries during execution.
• Create a trigger on table company for deletion where the whole table is displayed when delete operation is performed.

14. Consider the tables given below. The primary keys are made bold and the data types are specified.

    PERSON( driver_id:string , name:string , address:string )
    CAR( regno:string , model:string , year:int )
    ACCIDENT( report_number:int , accd_date:date , location:string )
    OWNS( driver_id:string , regno:string )
    PARTICIPATED( driver_id:string , regno:string , report_number:int , damage_amount:int )

a. Create the above tables by properly specifying the primary keys and foreign keys.
b. Enter at least five tuples for each relation.
c. Demonstrate how you
   ➢ Update the damage amount for the car with specific regno in the accident with report number 12 to 25000.
d. Find the total number of people who owned cars that were involved in accidents in the year 2008.
e. Find the number of accidents in which cars belonging to a specific model were involved.
# Semester IV

<table>
<thead>
<tr>
<th>MAA203</th>
<th>Probability and Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal</strong></td>
<td>To impart comprehensive knowledge in probability and queuing theory</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Objectives</strong></th>
<th><strong>Outcome</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The students should be able to</td>
</tr>
<tr>
<td>1. Learn basics of probability, Baye’s theorem. Understands the concept of random variable, moment generating function and their properties.</td>
<td>1. Evaluate the probability using addition and multiplication theorem. Applies Baye’s for practical problems to find the probability. Verifies whether a given function is a probability mass or density function.</td>
</tr>
<tr>
<td>2. Learn standard distributions in discrete and continuous cases.</td>
<td>2. Apply the discrete and continuous distributions for solving practical problems. Evaluates the moments of the distributions using moment generating function.</td>
</tr>
<tr>
<td>3. Learn two dimensional random variable and its characteristics. Understands correlation and regression and the uses of central limit theorem.</td>
<td>3. Evaluate the probability using marginal and conditional distributions. Analyzes the correlation between two variables. Finds the regression equations for the given set of data and their degree of relationship. Applies central limit theorem for practical problems and evaluates the probability of an event.</td>
</tr>
<tr>
<td>4. Learn statistical intervals for a single sample, and tests of hypotheses for a single sample.</td>
<td>4. Construct confidence intervals on parameters for a single sample.</td>
</tr>
<tr>
<td>5. Learns ANOVA for one way and two way classifications.</td>
<td>5. Identify the appropriate hypothesis testing procedure based on type of outcome variable and number of samples.</td>
</tr>
</tbody>
</table>

## UNIT I Probability and Random Variables


## UNIT II Standard Distributions

1. Binomial, Poisson, Geometric, Negative binomial, Uniform, Exponential, Gamma, Weibull and normal distributions and their properties – Functions of Random Variables.
UNIT III TWO-DIMENSIONAL RANDOM VARIABLES 12

Joint distribution – Marginal and conditional distribution - Co-variance – Correlation and Regression – Transformation of Random Variables – Central Limit Theorem.

UNIT IV TESTING OF HYPOTHESIS 12


UNIT V DESIGNS OF EXPERIMENTS 12

Analysis of variance one way classification CRD – Two way classification - RBD – Latin square.

TOTAL 60

TEXT BOOKS


REFERENCE BOOKS

CSB204 OPERATING SYSTEMS

<table>
<thead>
<tr>
<th>Goal</th>
<th>Toprovide basic knowledge on the major functions of operating systems.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td>The course should enable the student to</td>
</tr>
<tr>
<td></td>
<td>1. Learn the structure and function of operating systems</td>
</tr>
<tr>
<td></td>
<td>2. Learn the Process Sheduling and Synchronization concepts.</td>
</tr>
<tr>
<td></td>
<td>3. Understand Deadlock handling &amp; Storage management.</td>
</tr>
<tr>
<td></td>
<td>4. Understand virtual memory &amp; file system.</td>
</tr>
<tr>
<td></td>
<td>5. Learn the concepts of File systems management&amp; Disk scheduling.</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td>The student should be able to</td>
</tr>
<tr>
<td></td>
<td>1. Explain the basic functions and structure of operating systems.</td>
</tr>
<tr>
<td></td>
<td>2. Implement the process scheduling algorithms and process synchronization techniques.</td>
</tr>
<tr>
<td></td>
<td>3. Solve Deadlock problems &amp; to perform memory allocation.</td>
</tr>
<tr>
<td></td>
<td>4. Implement Memory Mangement Techniques.</td>
</tr>
<tr>
<td></td>
<td>5. Illustrate File system and disk I/O techniques.</td>
</tr>
</tbody>
</table>

UNIT I INTRODUCTION 12

UNIT II SCHEDULING 12

UNIT III DEADLOCKS 12

UNIT IV PAGING AND FILE SYSTEM 12

UNIT V FILE MANAGEMENT


TOTAL 60

TEXT BOOKS


REFERENCE BOOKS

UNIT I INTRODUCTION TO MICROPROCESSORS

8086 Microprocessor Architecture: Internal data operations and registers, Pins and signals, Peripheral devices and memory organization, Interrupts.

8086 Microprocessor Instructions: Classification, Format and timing. Instruction set. Programming and debugging, 8 bit and 16 bit instructions.

UNIT II PERIPHERAL INTERFACING AND MICROCONTROLLER

8086 Microprocessor Interfacing: 8259,8257,8255,8253, 8155 ICs and their applications. A/D conversion, Memory, Keyboard and display interface(8279).

8051 Micro controller: Functional Block diagram, Instruction formats and Addressing modes.

UNIT III BASIC STRUCTURE OF COMPUTERS
Organization of the V on Neumann machine; Instruction formats; The fetch/execute cycle, instruction decoding and execution; Registers and register files; Instruction types and addressing modes; Subroutine call and return mechanisms.

UNIT IV ARITHMETIC UNIT AND MEMORY SYSTEM ORGANIZATION 12

Data Representation, Hardware and software implementation of arithmetic unit for common arithmetic operations: addition, subtraction, multiplication, division (Fixed point and floating point).

Memory: Memory systems hierarchy; Main memory organization, Types of Main memories, and its characteristics and performance; Latency, cycle time, bandwidth, and interleaving; Cache memories (address mapping, line size, replacement and write-back policies); Virtual memory systems.

UNIT V INTERFACING AND COMMUNICATION 12

I/O fundamentals: handshaking, buffering; I/O techniques: programmed I/O, interrupt-driven I/O, DMA; Interrupt structures: vectored and prioritized, interrupt overhead, interrupts and reentrant code; Buses: bus protocols, local and geographic arbitration.

TOTAL 60

TEXT BOOK


REFERENCE BOOKS

CSB205 | COMPUTER NETWORKS  
<table>
<thead>
<tr>
<th>L T P C</th>
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</thead>
<tbody>
<tr>
<td>3 0 0 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Goal</th>
<th>To introduce the concepts, terminologies and technologies used in modern data communication and computer networks.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The Student should be able to</td>
</tr>
<tr>
<td>1. Understand the concepts of data communications.</td>
<td>1. Describe various components and categories of data communications, types of connections, topologies, protocols and standards, various transmission media and modems.</td>
</tr>
<tr>
<td>2. Study the functions of the data link layer and to introduce IEEE standards of computer networking.</td>
<td>2. Detect and correct the errors using various algorithmic techniques, be aware of the various Ethernet standards and bridges.</td>
</tr>
<tr>
<td>3. Learn the functions of the network layer and to get familiarized with the different protocols involved.</td>
<td>3. Explain various switching techniques used and implement the various routing and router protocols.</td>
</tr>
<tr>
<td>4. Learn the functions of the transport layer and to get familiarized with the different protocols involved.</td>
<td>4. Illustrate multiplexing and demultiplexing, UDP, TCP protocols and Congestion Control mechanisms.</td>
</tr>
<tr>
<td>5. Understand multiplexing, Domain name space and protocols.</td>
<td>5. Illustrate Network Applications.</td>
</tr>
</tbody>
</table>

UNIT I DATA COMMUNICATIONS 6


UNIT II DATA LINK LAYER9


UNIT III NETWORK LAYER 10

UNIT IV TRANSPORT LAYER


UNIT V APPLICATION LAYER

Domain Name Space (DNS) – SMTP – FTP – HTTP - WWW – Security – Cryptography

TOTAL: 45

CASE STUDIES

2. Wi-Fi Alliance Certifications-Small Business and Teleworker WLAN Security-Basic WLAN Design considerations-Configuration MSSID-Air premier NAP Operation modes-Air premier NAP management-Introduction to unified wireless solution-unified wireless usage
4. Switch Management : Overview of D Link Switches and features - Accessing and configuration the switch - Switch learning process - VLAN and GVRP. Understanding Spanning Tree protocol – Switch life cycle - Basic-Understanding D Link Switching features like DHCP, ACL, LDP and System Maintenance

TEXT BOOK


REFERENCE BOOKS

5. D-Link Materials
<table>
<thead>
<tr>
<th>CSB234</th>
<th>NETWORKING LABORATORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>To simulate the various protocols, develop various applications and study the various network simulators.</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Objectives</strong></td>
<td><strong>Outcome</strong></td>
</tr>
<tr>
<td>The course should enable the student to</td>
<td>The Student should be able to</td>
</tr>
<tr>
<td>1. Provide students with a theoretical and practical base in computer networks issues</td>
<td>1. Implement client and server concepts in Network system.</td>
</tr>
<tr>
<td>2. Pursue his study in advanced networking courses</td>
<td>2. Implement Error correction method in data in flow</td>
</tr>
<tr>
<td>3. Establish basic network connection using TCP/IP protocol.</td>
<td>3. Implement the different protocols.</td>
</tr>
<tr>
<td>4. Learning networking concepts through D-Link</td>
<td>4. Implement the concept of local area networks, their topologies, protocols</td>
</tr>
</tbody>
</table>

**LIST OF EXPERIMENTS**

(All the programs are to be written using C)

1. Simulation of ARP / RARP.
2. Write a program that takes a binary file as input and performs bit stuffing and CRC Computation.
3. Develop an application for transferring files over RS232.
4. Simulation of Sliding-Window protocol.
5. Simulation of BGP / OSPF routing protocol.
6. Develop a Client – Server application for chat.
7. Develop a Client that contacts a given DNS Server to resolve a given host name.
8. Write a Client to download a file from a HTTP Server.
Study of Network Simulators like NS2/Glomosim / OPNET

To access and configure the Switch for basic Switch operations.

Creating static V LAN and configuring Ports.

To configure routing using two different methods: static and dynamic.

To understand the fundamentals of networking and the TCP/IP protocol suite to be learnt.

To understand the fundamentals of networking and the TCP/IP protocol suite to be learnt.

To access and configure the Switch for basic Switch operations.

To create and configure VLANs on the switch and static and Dynamic (GVRP) VLANs

To create and configure a Spanning Tree Protocol (STP).

To configure stacking using two different methods: physical and virtual.

To configure routing using two different methods: static and dynamic.

To configure DHCP, ACL, LLDP, and System Maintenance.

To learn the topologies for the basic WLAN Design

To learn the topology in the basic metropolitan area design

To configure two SSIDs and apply small business and teleworker security

To configure WPA2 PSK and WPA2-EAP Authentication on unified Access points

To configure an Air premier NAP for WDS with AP mode

To perform the IP camera installation, configuration and the settings of Image setup, motion detection, recording

To configure D-View Cam software application

To configure the network Video Recorder (NVR) for basic operations

References: DLink Materials
CSB235 OPERATING SYSTEM LABORATORY L T P C 0 0 3 1

Goal To implement operating system(OS) concepts in LINUX platform and familiarise with low level system programming.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The students should be able to</td>
</tr>
<tr>
<td>1. To understand and implement the basic resource management technique [Processor, Memory]</td>
<td>1. Simulate the principles of resource management [Processor, Memory].</td>
</tr>
<tr>
<td>2. To solve the problems related with synchronization, concurrency related issues</td>
<td>2. Install and use operating systems with an understanding of professional, ethical and social issues. [Windows, Linux etc..]</td>
</tr>
</tbody>
</table>

LIST OF EXPERIMENTS

1. Program to report the behavior of the OS to get the CPU type and model, kernal version.

2. Shell programming
   a. command syntax
   b. write simple functions
   c. basic tests

3. Shell programming
   a. loops
   b. patterns
   c. expansions
   d. substitution

4. Program to get the amount of memory configured into the computer, amount of memory currently available.

5. Implement the various process scheduling mechanisms such as FCFS, SJF, Priority, round – robin.


7. Implement the solution for dining philosopher’s problem.

8. Implement banker’s algorithm.

9. Implement the first fit; best fit and worst fit file allocation strategy.

10. Write a program to create processes and threads.
ITB233  MICROPROCESSOR AND MICROCONTROLLER LABORATORY  L  T  P  C  
0 0 3 1

Goal  To learn the architecture programming and interfacing of microprocessors and Microcontrollers.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Provide training on programming of microprocessors and microcontrollers and understand the interface requirements.</td>
<td>1. Understand and analyse, linear and digital electronic circuits.</td>
</tr>
<tr>
<td></td>
<td>2. Understand and apply computing platform and software for engineering problems.</td>
</tr>
<tr>
<td></td>
<td>3. Design and implement interfacing.</td>
</tr>
<tr>
<td></td>
<td>4. Design and develop projects using microprocessor</td>
</tr>
</tbody>
</table>

**LIST OF EXPERIMENTS**

1. Simple arithmetic operations: addition / subtraction / multiplication / division.


3. Interface Experiments: (i) A/D Interfacing, & D/A Interfacing

4. Traffic light controller.

5. I/O Port / Serial communication

6. Programming Practices with Simulators/Emulators/open source

7. Read a key board interface display(8279)

8. Demonstration of basic instructions with 8051 Micro controller execution, including: (i) Conditional jumps, looping 74 (ii) Calling subroutines.

9. Programming I/O Port 8051 (i) study on interface with A/D & D/A (ii) study on interface with DC & AC motor .

10. Mini project development with processors.
# SEMESTER V

<table>
<thead>
<tr>
<th>MAA301</th>
<th>DISCRETE MATHEMATICS</th>
<th>L T P C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Goal</strong></td>
<td><strong>3 1 0 4</strong></td>
</tr>
</tbody>
</table>

**Goal**

To provide basic knowledge of calculus, set theory, lattices, and groups required for theoretical computation.

<table>
<thead>
<tr>
<th><strong>Objectives</strong></th>
<th><strong>Outcome</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The students should be able to</td>
</tr>
<tr>
<td>1. Learn logical connectives and equivalences in propositions, DeMorgan’s Laws, normal forms, principal normal forms and theory of inference.</td>
<td>1. Verify the equivalence formulae by using truth table method as well as by equivalence rules and find the principal conjunctive and disjunctive normal form and verify the validity of argument using theory of inference.</td>
</tr>
<tr>
<td>2. Learn logical equivalences and implications for quantified statements and the theory of inferences in predicate calculus.</td>
<td>2. Symbolize the given sentence using predicate logic and verify the given predicate formula and validity of the argument using universal specification and generalization and equivalence rules.</td>
</tr>
<tr>
<td>3. Learn basics of set theory, relations and its properties and Hasse diagram.</td>
<td>3. Verify the algebraic statements analytically and graphically, analyze the properties of the given relations and represent the relation using matrix and graph. Be able to analyze whether a relation is equivalence or poset or not.</td>
</tr>
<tr>
<td>4. Learn different types of functions and its classifications with examples. Understands recursive and permutation functions with examples.</td>
<td>4. Evaluates the composition and inverse of the given function and verifies the results. Gives practical examples for one to one, onto and bijective functions. Defines initial, hashing, recursive, primitive recursive and permutation functions.</td>
</tr>
<tr>
<td>5. Be exposed to basic concepts and properties of algebraic structures such as groups, semi groups, monoids, abelian group, normal subgroup and group codes.</td>
<td>5. Be able to analyze between semi group, monoid, group and abelian group with suitable examples. Find the applications of group theory in computer arithmetic, theory of sequential machines and formal languages. Design the fast adders and error correcting codes using group codes.</td>
</tr>
</tbody>
</table>

**UNIT I PROPOSITIONAL CALCULUS**

UNIT II PREDICATE CALCULUS


UNIT III SET THEORY


UNIT IV FUNCTIONS


UNIT V ALGEBRAIC SYSTEMS

Groups, Cyclic Groups, Subgroups, Cosets, Lagrange’s theorem, Normal subgroups – Codes and group codes – Basic notions of error correlation – Error recovery in group codes.

TOTAL 60

TEXT BOOKS


REFERENCE BOOKS


Goal: To provide the knowledge of automata theory to solve the problem.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Introduce Formal Languages, Automata Theory.</td>
<td>1. Apply the theoretical concepts and techniques in designing finite automata.</td>
</tr>
<tr>
<td>2. Learn Abstract models of Computation and Computability, Computational complexities and NP–Completeness.</td>
<td>2. Convert regular expressions to FA and minimize Automata.</td>
</tr>
<tr>
<td>3. Gain knowledge in computational theory.</td>
<td>3. Write context free Grammar and design PDA for the Grammar.</td>
</tr>
<tr>
<td></td>
<td>4. Design turing machine and identify recursively enumerable languages.</td>
</tr>
<tr>
<td></td>
<td>5. Define undecidability and identify class P and NP problems.</td>
</tr>
</tbody>
</table>

**UNIT I AUTOMATA**

12


**UNIT II REGULAR EXPRESSIONS AND LANGUAGES**

12

Regular Expression – FA and Regular Expressions – Proving languages not to be regular – Closure properties of regular languages – Equivalence and minimization of Automata.

**UNIT III CONTEXT-FREE GRAMMAR AND LANGUAGES**

12

Context-Free Grammar (CFG) – Parse Trees – Ambiguity in grammars and languages – Definition of the Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG, Deterministic Pushdown Automata- Pumping Lemma for CFL

**UNIT IV TURING MACHINES**

12

Turing Machines – Programming Techniques for TM.- A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine.

**UNIT V UNDECIDABILITY**

12

Post’s Correspondence Problem - The classes P and NP. Halting problem, Computability-Enumerability, Decidability-The Church-Turing thesis-Properties of language combinations (concatenation, union, intersection, quotient, etc)-Diagonalization

**TOTAL 60**
TEXT BOOKS


REFERENCE BOOKS


Goal
To provide the basics of web technology and to develop various server side and client side scripting languages.

Objectives
The course should enable the student to
1. Understand basic internet concepts and HTML tags.
2. Understand DHTML and client side validation using scripting.
3. Learn the advanced features of HTML5.
4. Learn server side programming using Servlets
5. Learn Database Connectivity and Web Standards.

Outcomes
The students should be able to
1. Describe the basic concepts of Internet and create a HTML pages and forms.
2. Write scripts JavaScript and apply designing using CSS to the pages.
3. Create web pages using HTML5 features.
4. Develop applications using Servlets along with SSI and AJAX
5. Develop Servlets with Database connectivity. Analyse the technology and characteristics of Web 2.0, Web 3.0

UNIT I - INTRODUCTION

UNIT II - SCRIPTING & CLIENT SIDE VALIDATION
Introduction to XML Introduction to XHTML– DHTML -Cascading Style Sheets - Scripting language- Java Script: variables - Control statements, Functions, Arrays, Objects – Events. Writing Client side validation scripts.

UNIT III - RICH INTERNET APPLICATION & HTML5
AJAX enabled rich internet applications-HTML review, Feature detection, The HTML5 new Elements, Canvas, Video and audio, Web storage, Geolocation, Offline Webpages, Microdata, HTML5 APLS, Migrating from HTML4 to HTML5, CSS3

UNIT IV - SERVER SIDE PROGRAMMING
UNIT V - DATABASE CONNECTIVITY AND WEB STANDARDS

DATABASE CONNECTIVITY: Java Data Base Connectivity - Introduction - Drivers - Establishing connection – Types of Statements - Result Sets - Introduction to Java Server Pages.

WEB STANDARDS - WEB 2.0 – History, characteristics, technologies, concepts, usage, web2.0 in education, philanthrophy, social work. Web 3.0 – Theory and history understanding basic web artifacts and applications, implementation

TOTAL 45

TEXT BOOKS
3. http://www.w3schools.com
5. www.tutorailrepublic.com

REFERENCE BOOKS
4. Jeremy Keith, “HTML5 for web designers”.

TOTAL 45
CSB304 | SYSTEM SOFTWARE | L T P C  
---|---|---
Goal | To provide a thorough knowledge in the design of assembler, loader, linker, macroprocessor text editors, 4GL and 5GL. | 3 1 0 4

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The Student should be able to</td>
</tr>
<tr>
<td>1. Learn the different kinds of machine architecture.</td>
<td>1. Explain the basic architecture of a hypothetical machine.</td>
</tr>
<tr>
<td>2. Learn different types of assemblers and data structures that will help in the design of assembler</td>
<td>2. Study the concept of two pass and single pass assembler algorithms.</td>
</tr>
<tr>
<td>3. Understand the concept and design of loader and various kinds of linker.</td>
<td>3. Describe loader and linker functionalities.</td>
</tr>
<tr>
<td>4. Understand the concept and design of macro processor and the system software tools.</td>
<td>4. Apply Macro functions in assembly languages and illustrate text editors, debugging techniques.</td>
</tr>
<tr>
<td>5. Study the basics of 4GL and python programming.</td>
<td>5. Write programs using 4GL.</td>
</tr>
</tbody>
</table>

UNIT I INTRODUCTION  
System software and machine architecture – The Simplified Instructional Computer (SIC) & SIC/XE - Machine architecture - Data and instruction formats - addressing modes - instruction sets - I/O and programming

UNIT II ASSEMBLERS  

UNIT III LOADERS AND LINKERS  
UNIT IV MACRO PROCESSORS AND SYSTEM SOFTWARE TOOLS


UNIT V 4GL AND PYTHON

Fourth Generation Programming Language-Types-General use/versatile -Database Query languages-Report Generators-Data manipulation, analysis, and reporting languages-GUI creators – Database driven GUI application development-Domain Specific Programming Languages-Rapid Application Development-Fifth generation Programming Languages-python interpreter-program execution-executing code from a file-Interpreter and compiler-Python compiler internals.

TOTAL 60

TEXT BOOK


REFERENCE BOOKS

**Goal**
To design and develop web application

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Learn the different layers of Web Technology.</td>
<td>1. Create simple three tier applications</td>
</tr>
<tr>
<td>2. Understanding HTML and DHTML</td>
<td>2. Create Simple web pages using HTML &amp; DHTML</td>
</tr>
<tr>
<td>4. Learn and understand new concepts in HTML5</td>
<td>4. Create Web pages using HTML5 tags</td>
</tr>
<tr>
<td>5. Understand and learn Java Servlets</td>
<td>5. Create Web applications using Java Servlets</td>
</tr>
</tbody>
</table>

1. Create a web page with the following.
   a. Cascading style sheets.
   b. Embedded style sheets.
   c. Inline style sheets.
   Use our college information for the web pages.

2. Create a HTML form for reading Name, Age, Gender, Address, Payment Options, Phone number, Email address, preferred user name, various Area of Interest etc from the user.

3. Write a JavaScript program to validate the data including the email id entered by the user in the above form are in correct format. Display error message if input is not in correct format. Call the script when the page is submitted.

4. Create web page to display the rule and regulations for University Examination. Include the content from a separate file. Also display the information like last modified time size of file. Use SSI concept for the above task.

5. Create a HTML form with the following HTML5 controls – (Color–Date–Email–Month – Range- Number (with inputs from 1 to 100) –URL).

6. A. Using Canvas in HTML5 write a program to draw line, arc, rectangle and circle. Fill colors using gradient style.
   B. Draw the same shapes using SVG in HTML5

7. Create a Webpage and insert Audio and Video using “embed” and “object” element.
8. Write a simple Java Servlet Program to read the values entered using HTML form controls and display the same.

9. Create a Java Servlet program for finding the biggest of three numbers. Use AJAX to display the result without loading the entire page.

10. Create a three-tier applications using servlets for displaying student mark list. Fetch the results from the database using the entered register number.

11. Create a three-tier applications using servlets for conducting on-line examination. Create a login page and verify the user name and password before allowing for examination. Use Session key management for the same.
CSB332 | SYSTEM SOFTWARE LABORATORY
---|---
Goal | To design and develop various System Software.

**Objectives**

<table>
<thead>
<tr>
<th>The course should enable the students to</th>
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<tbody>
<tr>
<td>1. Learn the data structures used in the design of system software.</td>
</tr>
<tr>
<td>2. Learn the design process of pass 1 and pass 2 of the two pass assembler.</td>
</tr>
<tr>
<td>3. Learn the design of loaders, linkers, macro processors and editors</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>The students should be able to</td>
</tr>
<tr>
<td>1. Implement datastructures required for the design of System Software.</td>
</tr>
<tr>
<td>2. Implement pass 1 and pass 2 algorithms of assemblers.</td>
</tr>
<tr>
<td>3. Implement a macroprocessor</td>
</tr>
<tr>
<td>4. Implement relocatable and direct linking loader</td>
</tr>
<tr>
<td>5. Implement text editor</td>
</tr>
</tbody>
</table>

**LIST OF EXPERIMENTS – SYSTEM SOFTWARE**

Demonstrate the following using C language.

1. Implement a symbol table with functions to create, insert, modify, search, and display.
2. a. Implement pass one of a two pass assembler.  
   b. Implement pass two of a two pass assembler.
3. Implement a single pass assembler.
4. Implement a macro processor.
5. Implement an absolute loader.
6. Implement a relocating loader.
7. a. Implement pass one of a direct-linking loader.  
   b. Implement pass two of a direct-linking loader.
8. Implement a simple text editor with features like insertion / deletion of a character, word, and sentence.
UNIT I
Listening and typing – Listening and sequencing of sentences – Filling in the blanks – Listening and answering the questions - Filling in the blanks - Cloze Exercises – Vocabulary building – Reading and answering questions.

UNIT II
Phonetics: Intonation – Ear Training – Correct Pronunciation – Sound recognition exercises - Common Errors in English - Conversations: Face to Face Conversation - Telephone conversation – Role play activities (Students take on roles and engage in conversation)

UNIT III
Resume / Report presentation / Letter writing - Structuring the resume / report – Letter writing / E-mail communication Samples, Presentation Skills - Elements of an effective presentation – Structure of a presentation – Presentation tools – Voice Modulation – Audience analysis – Body Language – Video Samples

UNIT IV

UNIT V
Interview Skills - Kinds of Interviews – Required key Skills – Corporate culture – Mock Interviews – Video Samples

REFERENCE BOOKS


CD’s

1. Communication skills Software by Globarena
3. 21 Steps to Personality Development by SP software (P) Ltd, Hyderabad.

Mode of Examination: Online examination, Group Discussion and Presentation
<table>
<thead>
<tr>
<th>CSB305</th>
<th>PRINCIPLES OF COMPILER DESIGN</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

**Goal**

To understand, design and implement a lexical analyzer, parser, code generation, code optimization and program verification phases of compiler.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The students should be able to</td>
</tr>
<tr>
<td>1. Understand the basic principles of the compiler, Compiler construction tools and lexical analysis.</td>
<td>1. Differentiate the various phases of a compiler.</td>
</tr>
<tr>
<td>2. Learn the Concept of Context Free Grammars, Parsing and various Parsing Techniques.</td>
<td>2. Apply parsing techniques and able to write Context Free Grammars for various languages.</td>
</tr>
<tr>
<td>3. Learn the process of intermediate code generation.</td>
<td>3. Understand and apply parsing technique.</td>
</tr>
<tr>
<td>4. Learn the process of Code Generation and various Code optimization techniques.</td>
<td>4. Understand code generator and apply code optimization techniques.</td>
</tr>
<tr>
<td>5. Understand need of Program verification and Lambda calculus in verification.</td>
<td>5. Apply Lambda Calculus to verify programs.</td>
</tr>
</tbody>
</table>

**UNIT I  INTRODUCTION**

9


**UNIT II  SYNTAX ANALYSIS**

9


**UNIT III  INTERMEDIATE CODE GENERATION**

9


**UNIT IV  CODE GENERATION AND CODE OPTIMIZATION**

12


**UNIT V  PROGRAM VERIFICATION**

6

Introduction to Program Verification-Functional programming-Application of Lambda Calculus.

**TOTAL 45**
TEXT BOOK

REFERENCE BOOKS
8. Techniques for Program Verification www.eecs.berkeley.edu/~necula/Papers/nelsonthesis.pdf
UNIT I SOFTWARE ENGINEERING PROCESSES

Introduction – S/W Engineering Paradigm – life cycle models (water fall, incremental, spiral, WINWIN spiral, evolutionary, prototyping, object oriented) – system engineering – Overview of modern software engineering processes and practices (SCRUM, ADP) – verification – validation – system engineering

UNIT II SOFTWARE REQUIREMENTS AND DESIGN CONCEPTS

Software Requirements

Design Concepts

UNIT III SOFTWARE CONSTRUCTION

UNIT IV SOFTWARE TESTING AND MAINTENANCE


UNIT V SOFTWARE CONFIGURATION MANAGEMENT


TOTAL 60

TEXT BOOK


REFERENCE BOOKS

<table>
<thead>
<tr>
<th>CSB335</th>
<th>COMPILER DESIGN LABORATORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>To design and develop a compiler.</td>
</tr>
</tbody>
</table>

**OBJECTIVES**

The course should enable the student
1. Design and implement lexical analyzers, parsers, and code generation using C, LEX, YACC.

**OUTCOMES**

The students should be able to
1. Design and implement lexical analyser using C and LEX.
2. Design and implement syntactic analysis phase using C and LEX.
3. Design and implement Intermediate code generation phase
4. Design and apply semantic rules using YACC.
5. Design and implement front and back end of a compiler using ‘C’.

**LIST OF EXPERIMENTS**

1. Implement a lexical analyzer in “C”.
2. Use LEX tool to implement a lexical analyzer.
3. Implement a recursive descent parser for an expression grammar that generates arithmetic expressions with digits, + and *.
4. Use YACC and LEX to implement a parser for the same grammar as given in problem 3.
5. Write semantic rules to the YACC program in problem 4 and implement a calculator that takes an expression with digits, + and * and computes and prints its value.
6. Implement the front end of a compiler that generates the three address code for a simple language with: one data type integer, arithmetic operators, relational operators, variable declaration statement, one conditional construct, one iterative construct and assignment statement.
7. Implement the back end of the compiler which takes the three address code generated in problem 6, and produces the 8086 assembly language instructions that can be assembled and run using a 8086 assembler. The target assembly instructions can be simple move, add, sub, jump. Also simple addressing modes are used.
<table>
<thead>
<tr>
<th>CSB336</th>
<th>SOFTWARE ENGINEERING LAB</th>
<th>L T P C</th>
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</thead>
<tbody>
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</table>

**Goal**

To explore various techniques in modern software engineering

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The students should be able to</td>
</tr>
<tr>
<td>1. Understand, design and develop software and also perform testing through test cases</td>
<td>1. Write a requirement for a business model.</td>
</tr>
<tr>
<td></td>
<td>2. Design business model using UML</td>
</tr>
<tr>
<td></td>
<td>3. Write test cases for the models.</td>
</tr>
<tr>
<td></td>
<td>4. Validate business model using testing tools</td>
</tr>
<tr>
<td></td>
<td>5. Write project documentation and project manual.</td>
</tr>
</tbody>
</table>

**LIST OF EXPERIMENTS**

*Every student must be given one unique business problem/customer requirement to work on the practical using modern software engineering.*

1. Application of traditional software engineering process for a case study to develop a model for the business requirement
2. Application of SCRUM for a case study to develop a software model
3. Application of ADP for a case study to develop a software model
4. Come up with system design – UI & Database Design
5. Develop User defined types, exception handlers and concurrency control mechanisms
6. Implement the code / software product based on the requirement
7. Debugging and Testing of the code using manual and automated testing tools
8. SCCS and MAKE File to create builds
SEMESTER VII

<table>
<thead>
<tr>
<th>CSB401</th>
<th>DATA WAREHOUSING AND DATA MINING</th>
<th>L  T  P  C</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

**Goal**
Understand the fundamentals of data mining and its application in various business and social domains.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Understand the fundamentals of data mining and its functionalities</td>
<td>1. Illustrate the concepts of data mining and data warehousing concepts and techniques.</td>
</tr>
<tr>
<td>2. Obtain knowledge in different data mining techniques and algorithms</td>
<td>2. Apply data mining techniques</td>
</tr>
<tr>
<td>3. Discuss about various application domains of data mining</td>
<td>3. Implement data mining techniques and algorithms</td>
</tr>
<tr>
<td>4. Understand advanced mining</td>
<td>4. Illustrate advanced mining techniques</td>
</tr>
<tr>
<td>5. Apply on different case studies</td>
<td>5. Implement data warehouse</td>
</tr>
</tbody>
</table>

**UNIT I** **INTRODUCTION**
9
Data Mining Tasks, Data mining Issues, Decision Support System, Dimensional Modeling, Data warehousing, OLAP & its tools, OLTP.

**UNIT II** **MINING TECHNIQUES: CLASSIFICATION**
9
Introduction, statistical Perspective of data mining, Decision tree, Neural networks, Genetic algorithms, Issues in classification, Statistical based algorithm(regression), Distance based algorithm(simple approach), Decision Tree based algorithm(C4.5), Neural network based (propagation).

**UNIT III MINING TECHNIQUES : CLUSTERING AND ASSOCIATION RULES**
9
Introduction to clustering, Similarity and distance measures, Hierarchical algorithm(divisive clustering), partitional algorithm (Minimum Spanning tree, nearest neighbour), Clustering large database(CURE), Introduction to association, basic algorithm(Apriori), parallel & distributed(data parallelism), Incremental rules, Association rule techniques(Generalized, multiple level)

**UNIT IV ADVANCED MINING**
9
Web mining, Web content mining, Introduction to Spatial mining & its primitives, spatial classification algorithm (ID3 extension), Spatial clustering algorithm (SD), Introduction to temporal mining, Time series, Temporal association rule.

**UNIT V DATA MINING ENVIRONMENT**
9
Case study in building business environment, Application of data mining in Government National data warehouse and case studies.

**TOTAL 45**

112
TEXT BOOKS
1. Margaret H. Dunham, S. Sridhar "Data Mining Introductory & Advance Topics" - 2006(Unit - 1,2,3,4)

REFERENCE BOOKS
Goal
To impart knowledge on various aspects of mobile computing

Objectives
The course should enable the student to
1. Learn mobile computing architecture.
2. Learn various mobile technologies.
3. Learn GPRS and WAP technologies.
4. Learn 3G and other latest technologies.
5. Learn platforms for Mobile Application development.

Outcomes
The students should be able to
1. Understand the various mobile architectures.
2. Understand mobile application through telephony.
3. Understand various messaging environment in mobile environments.
4. Acquire knowledge on 3G and latest technology.
5. Understand various mobile application platforms its architecture.

UNIT I  INTRODUCTION


UNIT II  MOBILE COMPUTING THROUGH TELEPHONY


UNIT III  SMS, GPRS AND WAP

Short Message Service (SMS): Mobile Computing over SMS – SMS – Value Added Services through SMS –Accessing the SMS Bearer.


UNIT IV 3G AND OTHER TECHNOLOGIES 9


Internet Networks and Interworking: Introduction – Fundamentals of Call Processing – Intelligence in the Networks – SS#7 Signaling – IN Conceptual Model – Softswitch – Programmable Networks – Technologies and Interfaces for IN.

UNIT V MOBILE APPLICATION PLATFORMS 9


TOTAL45

TEXT BOOK


REFERENCE BOOKS


Degree: Master of Science in Computer Science

Course: CSB432 - DATA MINING LABORATORY

<table>
<thead>
<tr>
<th>CSB432</th>
<th>DATA MINING LABORATORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>To understand and demonstrate the basic concepts of data mining using open source tools.</td>
</tr>
<tr>
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</tbody>
</table>

**Objectives**  
1. Learn a data mining tool.  
2. Apply data mining tools for various phases of data mining.  
3. Apply the OLAP, rollup, drill down operation  
4. Understand about generalization and summarization technique  
5. Apply association rule for mining  
6. Apply the clustering technique  
7. Apply Naïve Bayes classifier.  
8. Design a decision tree.  

**Outcomes**  
1. Explain the features of selected tool.  
2. Implement various data mining techniques using the selected tool.  
3. Implement the OLAP, rollup, drill down operation.  
4. Implement generalization and summarization technique  
5. Implement association rule for mining  
6. Implement the clustering technique  
7. Implement Naïve Bayes classifier.  
8. Construct a decision tree.  

**LIST OF EXPERIMENTS**

1. Evolution of data management technologies, introduction to data warehousing concepts.  
2. Develop an application to implement defining subject area, design of fact dimensionable, data mart.  
3. Develop an application to implement OLAP, roll up, drill down, slice and dice operation  
4. Develop an application to construct a multidimensional data.  
5. Develop an application to implement data generalization and summarization technique.  
6. Develop an application to extract association rule of data mining.  
7. Develop an application for classification of data.  
8. Develop an application for one clustering technique  
9. Develop an application for Naïve Bayes classifier.  
10. Develop an application for decision tree.
PROFESSIONAL ELECTIVES

SEMESTER VI

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
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<tbody>
<tr>
<td>CSC351</td>
<td>ARTIFICIAL INTELLIGENCE</td>
<td>3</td>
<td>0</td>
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<td>3</td>
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</tbody>
</table>

**Goal**

To provide the basic exposition to goals and methods of Artificial Intelligence

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The students should be able to</td>
</tr>
<tr>
<td>1. Understand the representation of agents and agent environments.</td>
<td>1. Develop a basic understanding of the building blocks of AI</td>
</tr>
<tr>
<td>2. Understand the searching techniques</td>
<td>2. Understand the main approaches to artificial intelligence such as heuristic search, game and search.</td>
</tr>
<tr>
<td>3. Know the knowledge representation, perception and reasoning</td>
<td>3. Recognize problems that may be solved using artificial intelligence and implement artificial intelligence algorithms for hands-on experience.</td>
</tr>
<tr>
<td>4. Enable the students to apply these techniques in application which involves machine learning</td>
<td>4. Understand machine learning, neural networks and natural language processing.</td>
</tr>
<tr>
<td>5. Know the features of probabilistic language models and expert systems</td>
<td>5. Develop expert systems for an application.</td>
</tr>
</tbody>
</table>

**UNIT I INTRODUCTION**


**UNIT II SEARCHING TECHNIQUES**


**UNIT III KNOWLEDGE REPRESENTATION**

First order logic – representation revisited – Syntax and semantics for first order logic – Using first order logic – Knowledge engineering in first order logic - Inference in First order logic – prepositional versus first order logic – unification and lifting – forward chaining – backward
chaining - Resolution - Knowledge representation - Ontological Engineering - Categories and objects – Actions - Simulation and events - Mental events and mental objects,

UNIT IV FORMS OF LEARNING 9

UNIT IV APPLICATIONS AND EXPERT SYSTEM 9

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS
**CSB352**  
**COMPUTER GRAPHICS AND MULTIMEDIA**  
<table>
<thead>
<tr>
<th>L</th>
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**Goal**  
To provide the fundamental knowledge in developing interactive graphics and handling multimedia devices.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
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</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The students should be able to</td>
</tr>
<tr>
<td>1. Learn the rules and algorithms in generating graphical outputs.</td>
<td>1. Develop algorithms to draw fundamental drawings</td>
</tr>
<tr>
<td>2. Learn 3-dimensional objects using suitable transformations.</td>
<td>2. Develop real-time rendering graphics</td>
</tr>
<tr>
<td>3. Understand the architecture for design of multimedia system.</td>
<td>3. Create 2D and 3D images</td>
</tr>
<tr>
<td>4. Realize the issues related to multimedia file handling.</td>
<td>4. Have an understanding on the basics of creating multimedia applications</td>
</tr>
<tr>
<td>5. Understand hypermedia standards in developing multimedia applications.</td>
<td>5. Design and Develop multimedia applications</td>
</tr>
</tbody>
</table>

**UNIT I OUTPUT PRIMITIVES**  
9

**UNIT II THREE-DIMENSIONAL CONCEPTS**  
9

**UNIT III MULTIMEDIA SYSTEMS DESIGN**  
9
UNIT IV MULTIMEDIA FILE HANDLING


UNIT V HYPERMEDIA


TOTAL 45

TEXT BOOKS


REFERENCE BOOKS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC 353</td>
<td>CRYPTOGRAPHY AND NETWORK SECURITY</td>
<td>3</td>
</tr>
</tbody>
</table>

**Goal:** To understand the principles of encryption algorithms, conventional and public key cryptography, detailed knowledge of authentication, hash functions and application level security mechanisms.

**Objectives:**

1. Know conventional methods of encryption, the use of block cipher principles to obtain cipher text and the working of DES and AES techniques in encryption.
2. Understand the basic concepts of number theory and encrypt and decrypt numbers using public key cryptography.
3. Understand the importance of confidentiality, authentication and digital signature in encryption and provide them using various authentication functions including Hash Function.
4. Know different network security tools and authentication applications by which encryption and decryption techniques are implemented in a network.
5. Understand security threats encountered by a system and the techniques by which system level security is provided.

**Outcomes:**

The student should be able to:

1. Identify and classify computer and security threats and develop a security model to prevent, detect and recover from attacks.
2. Encrypt and decrypt messages using various DES and AES techniques.
3. Demonstrate authentication techniques using digital signatures.
4. Program cryptographic algorithms or generate an analysis report on any existing secured product.
5. Protect cipher space against security threats using modern applications and tools.

**UNIT I INTRODUCTION**

UNIT II PUBLIC KEY CRYPTOGRAPHY

UNIT III AUTHENTICATION AND HASH FUNCTION

UNIT IV NETWORK SECURITY

UNIT V SYSTEM LEVEL SECURITY

TOTAL 45

TEXT BOOK

REFERENCE BOOKS
CSC354  OBJECT ORIENTED SYSTEM DESIGN  L  T  P  C  
3  0  0  3

**Goal**  To learn the methodologies of object oriented system design.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The students should be able to</td>
</tr>
<tr>
<td>1. Learn the Object oriented life cycle.</td>
<td>1. Acquire knowledge of OOSD.</td>
</tr>
<tr>
<td>2. Know how to identify objects, relationships, Services and attributes through UML.</td>
<td>2. Demonstrate the design concepts using UML diagrams.</td>
</tr>
<tr>
<td>3. Understand the Use case diagrams.</td>
<td>3. Practice through object oriented life cycle.</td>
</tr>
<tr>
<td>4. Understand object oriented system design</td>
<td>4. Draw UML diagrams</td>
</tr>
<tr>
<td>5. Know and apply the object oriented design process, software quality and usability.</td>
<td>5. Able to design application using OOSD tools.</td>
</tr>
</tbody>
</table>

**UNIT I INTRODUCTION**


**UNIT II OBJECT ORIENTED METHODOLOGIES**


**UNIT III OBJECT ORIENTED ANALYSIS**

Identifying use cases - Object Analysis - Classification – Identifying Object relationships - Attributes and Methods.
UNIT IV OBJECT ORIENTED DESIGN


UNIT V SOFTWARE QUALITY AND USABILITY


TEXT BOOKS


REFERENCE BOOKS

<table>
<thead>
<tr>
<th><strong>CSC355</strong></th>
<th><strong>TCP/IP DESIGN AND IMPLEMENTATION</strong></th>
<th><strong>L T P C</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal</strong></td>
<td>To impart networking knowledge and make the students to understand experimental methodology.</td>
<td><strong>3 0 0 3</strong></td>
</tr>
</tbody>
</table>
| **Objectives** | The course should enable the student to  
1. Understand networking concepts and basic communication model.  
2. Understand the usage of IP addressing and routing protocols.  
3. Understand the interactions among the protocols in the protocol stack.  
4. Study about routing protocols  
5. Learn about sockets and application layer. | **Outcomes**  
At the end of the course the student should be able to  
1. Understand computer network basics, network architecture, TCP/IP and OSI reference models.  
2. Have understanding about the implementation of supernets and various internet addressing schemes and protocols.  
3. Learn and exercise the IP implementation.  
4. Demonstrate various protocols and their interactions in the protocol stack.  
5. Acquire knowledge of application protocol standard and socket. |

**UNIT I  INTRODUCTION TO COMPUTER NETWORK, DATA COMMUNICATION, STANDARDS**

technology, Switch, Bridge, Router, repeater, Hub, Ethernet, gigabyte Ethernet, frame format, Under layer technology, ADSL, Modem, WLAN.

UNIT II IP ADDRESSES, ROUTING, ARP AND RARP 9
IP addressing methods, Classful addressing, Class A,B,C,D,E, Issues of IP addressing, Subneting , Subnet masking, Superneting, CIDR, Routing, various types of forwarding techniques, Routing Table, Architecture of Router, ARP input module, output module, cache module, ARP package, RARP.

UNIT III IP, ICMP, TGMP AND UDP 9
IP datagram format – Fragmentation, option field, checksum, IP package, ICMP messages, type of messages, message format, ICMP package, IGMP messages, type of messages, Message format, IGMP operation, joining, leaving from group, IGMP package, UDP packet format, operation, UDP package.

UNIT IV TCP, UNICAST AND MULTICAST ROUTING PROTOCOLS 9
Flow control, sliding window protocol, silly window syndrome, Slow start algorithm, Error control, TCP packet format, operation, TCP packages, State transition diagram of TCP protocol, Unicast routing protocol, RIP, OSPF, BGP, Multicast routing protocol, MOSPF, CBT, PIM.

UNIT V APPLICATION LAYER, SOCKETS 9
Client server model, Concurrency, socket, byte ordering, Socket system calls, Socket programming and primitives, TCP, UDP client server program, BOOTP, DHCP, DNS Name space, Type of records, mode of operation, Rlogin.

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS
<table>
<thead>
<tr>
<th>CSC 356</th>
<th>SOFTWARE TESTING</th>
<th>L T P C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TO MAKE STUDENTS UNDERSTAND THE PRINCIPLES OF SOFTWARE TESTING.</td>
<td>3 0 0 3</td>
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</table>

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOME</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The students should be able to</td>
</tr>
<tr>
<td>1. Explain the basics of software testing.</td>
<td>1. Understand the of basics software testing life cycle and testing process.</td>
</tr>
<tr>
<td>2. Highlight the Test Design Techniques.</td>
<td>2. Understand test design techniques and apply to write test cases.</td>
</tr>
<tr>
<td>3. Stress the need for Test and Defect Management.</td>
<td>3. Test the defects.</td>
</tr>
<tr>
<td>4. Highlight the need for Test data Management.</td>
<td>4. Able to create test data by understanding data management.</td>
</tr>
<tr>
<td>5. Learn the automation testing.</td>
<td>5. Test and create sample test data using automated testing tools.</td>
</tr>
</tbody>
</table>

UNIT I  INTRODUCTION TO TESTING  8
Why is testing necessary, What is testing, Role of Tester, Testing and Quality, Overview of STLC, Software Testing Life Cycle - V model, SDLC vs STLC, different stages in STLC, document templates generated in different phases of STLC, different levels of testing, different types of testing.

UNIT II  TEST DESIGN TECHNIQUES  8
Static Testing, Static techniques, reviews, walkthroughs, Basics of test design techniques, Various test categories, test design techniques for different categories of tests, Designing test cases using MS-Excel.

UNIT III  TEST AND DEFECT MANAGEMENT  11
Test management, Documenting test plan and test case, effort estimation, configuration management, project progress management. Use of Testopia for test case documentation and test management. Defect management - Test Execution, logging defects, defect lifecycle, fixing / closing defects. Use of Bugzilla for logging and tracing defects.

UNIT IV  TEST DATA MANAGEMENT  6

UNIT V  AUTOMATION TESTING  12
Introduction to automation testing, why automation, what to automate, tools available for automation testing. Basics of Automation testing using Selenium - Introduction to Selenium, Using
Selenium IDE for automation testing, Using Selenium Web driver for automation testing, Understanding Testing framework with Selenium Web driver for automation testing.

TOTAL 45

REFERENCE BOOKS
2. Dorothy Graham, Erik van Veenendaal, Isabel Evans, Rex Black, Foundations of software testing.
3. Implementing Automated Software Testing: How to Save Time and Lower Costs While Raising Quality - By: Elfriede Dustin
4. Selenium.org - [http://docs.seleniumhq.org/docs/](http://docs.seleniumhq.org/docs/)
   - Need following .XPI and .jar files to be downloaded from [http://www.seleniumhq.org/download/](http://www.seleniumhq.org/download/)
     - Selenium-ide.xpi (latest current version)
     - Selenium-java.jar (latest current version)
     - Firebug.xpi (latest current version)
     - Firepath.xpi (latest current version)
     - IEDriverServer.exe (latest current version)
     - Jxl.jar (latest current version)
UNIT I INTRODUCTION TO PERL AND SCRIPTING

Scripts and Programs, Origin of Scripting, Scripting Today, Characteristics of Scripting Languages, Uses for Scripting Languages, Web Scripting, and the universe of Scripting Languages. PERL- Names and Values, Variables, Scalar Expressions, Control Structures, arrays, list, hashes, strings, pattern and regular expressions, subroutines.

UNIT II ADVANCED PERL

Finer points of looping, pack and unpack, file system, eval, data structures, packages, modules, objects, interfacing to the operating system, Creating Internet ware applications, Dirty Hands Internet Programming, security Issues. PHP Basics PHP Basics- Features, Embedding PHP Code in your Web pages, Outputting the data to the browser, Data types, Variables, Constants, expressions, string interpolation, control structures, Function, Creating a Function, Function Libraries, Arrays, strings and Regular Expressions.

UNIT III ADVANCED PHP PROGRAMMING

PHP and Web Forms, Files, PHP Authentication and Methodologies -Hard Coded, File Based, Database Based, IP Based, Login Administration, Uploading Files with PHP, Sending Email using PHP, PHP Encryption Functions, the Mcrypt package, Building Web sites for the World.

UNIT IV JAVASCRIPT


UNIT V PYTHON

The Objective is to familiarize students with the latest trends and advancements in Scripting Languages which are used in industries

OBJECTIVES

The course should enable the student to:
1. Familiarize students with the coding of Perl
2. Familiarize students with the coding of Python
3. Familiarize students with the coding of PHP
4. Familiarize students with the coding of Javascript

OUTCOMES

The students should be able to:
1. Apply the concepts studies in various coding languages
2. Code in Perl, Python, PHP and Javascript
3. Compare and contrast the differences between different languages

TOTAL 45

TEXT BOOKS
1. The World of Scripting Languages, David Barron, Wiley Publications.

REFERENCES
1. SAMs teach yourself HTML, CSS & Javascript
CSC451  SOFT COMPUTING  L  T  P  C  3  0  0  3

Goal  To provide knowledge about soft computing techniques.

Objectives  Outcomes
The course should enable the students to  The student should be able to
1. Learn the concepts of fuzzy sets, fuzzy logic and heuristics based on human experience.
2. Understand neural network techniques.
3. Learn the mathematical background for carrying out optimization associated with neural network learning.
4. Learn genetic algorithms and random search procedures.
5. Learn the methodologies to illustrate the intelligent behaviour of programs based on soft computing

UNIT I FUZZY SET THEORY  9

UNIT II OPTIMIZATION  9

UNIT III NEURAL NETWORKS  9

131
UNIT IV NEURO FUZZY MODELING

UNIT V APPLICATIONS OF COMPUTATIONAL INTELLIGENCE

TOTAL 45

TEXT BOOK

REFERENCE BOOKS
### CSC452 .NET FRAMEWORK AND PROGRAMMING

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</table>

#### Goal
To learn the fundamental concepts in .NET framework and programming.

#### Objectives
The course should enable the student to

1. Gain knowledge in the concepts of the .NET framework as a whole and the technologies that constitute the framework.
2. Write Programs in C# and ASP.Net, both in basic and advanced levels.
3. Build sample applications.

#### Outcomes
At the end of the course the student should be able to

1. Learn the basis of .Net framework.
2. Understand object oriented Aspects of C# and ASP.Net.

---

**UNIT I INTRODUCTION TO .NET**

What is .NET, Why .NET, Advantages of .NET, Architecture of .NET, Introduction to CLR, CLR architecture, Just-in-time compiler(JIT), Microsoft Intermediate Language(MSIL), Understanding IL with ILDASM, .NET Framework, common class library, common type system(CTS), common language specifications(CLS), Languages under .NET, Working with Microsoft Visual studio IDE.

**UNIT II OBJECT ORIENTED PROGRAMMING USING C#**

Explain features and phases of the object-oriented approach, Write and execute C# programs, Use decision-making constructs and loop constructs, Implement structures, enumerations, arrays, and collections, Implement polymorphism and overload functions and operators, Explain and use delegates and events, Use various stream classes to implement file handling.

**UNIT III GUI APPLICATIONS DEVELOPMENT USING .NET FRAMEWORK**

Work with the Windows Forms and controls, Perform validation of controls using classes and controls, Work with Dialog Boxes, Menus and MDI Application, Implement Printing and Reporting Functionality in a Windows Forms Application, Package and deploy applications.

**UNIT IV DEVELOPING DATABASE APPLICATIONS USING ADO.NET**

Create and manage connections using ADO.NET, Identify the disconnected and connected environment in ADO.NET, Create datasets and data tables, Retrieve and store large binary data, Perform bulk copy operations, Execute SQL notification maintain and update a cache, Read, write, validate, and modify XML data using XML reader and writer classes.
UNIT V DEVELOPING WEB APPLICATIONS USING ASP.NET

Create a Web Application, Program a Web Application, Add and Configure Server Controls, Create a Common Layout by Using Master Pages, Manage State for a Web Application, Access and Display Data, Control Access to a Web Application, Deploy a Web Application, Build Dynamic Web Applications, Create Controls for Web Applications, ASP.NET MVC.

TOTAL 45

REFERENCE BOOKS

**CSC453 GRID COMPUTING**

<table>
<thead>
<tr>
<th>Goal</th>
<th>To impart knowledge on genesis and applications of Grid technology.</th>
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<tbody>
<tr>
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<td><strong>Objectives</strong></td>
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<td><strong>Outcomes</strong></td>
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<td>The course should enable the student to</td>
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<tr>
<td></td>
<td>1. Understand the genesis of grid computing</td>
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<td>2. Know Web services.</td>
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<td>3. Understand Open Grid Services Infrastructure.</td>
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<td>4. Understand OGSA services</td>
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<td>5. Understand Globus toolkit architecture and programming model.</td>
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<td>The student should be able to</td>
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<tr>
<td></td>
<td>1. Explain the Grid fundamentals.</td>
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<tr>
<td></td>
<td>2. Describe web services and messaging.</td>
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<tr>
<td></td>
<td>3. Explain basics of Open Grid Services Infrastructure.</td>
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<tr>
<td></td>
<td>4. Illustrate OGSA services.</td>
</tr>
<tr>
<td></td>
<td>5. Implement globus toolkit.</td>
</tr>
</tbody>
</table>

**UNIT I INTRODUCTION**


**UNIT II MESSAGING**


**UNIT III OPEN GRID SERVICES**

Open Grid Services Architecture (OGSA): Some Sample Use cases that drive the OGSA, CDC, NFS, Online Media and Entertainment. OGSA Platform Components.


**UNIT IV OGSA BASIC SERVICES**

OGSA Basic Services: Common Management Model (CMM), Service domains, Policy Architecture, Security Architecture, Metering and Accounting, Common distributed Logging, Distributed Data Access and Replication.
UNIT V    GLOBUS TOOLKIT

GLOBUS TOOLKIT: Architecture: GT3 software Architecture Model.
GLOBUS TOOLKIT: Programming Model - Introduction, Service Programming Model.
GLOBUS TOOLKIT: A Sample Implementation, Acme Search Service Implementation in a Top-
down Approach.

TOTAL 45

TEXT BOOK


REFERENCE BOOKS

Goal
Understand the architecture of Cloud and industry frameworks.

Objectives
The course should enable the student to
1. Study about migrating into cloud.
2. Study IAS and enterprise cloud.
3. Study data in cloud and integration of cloud.
4. Study the security aspects of the cloud
5. Understand intercloud environment

Outcomes
The student should be able to
1. Understand migration.
2. Explain issues for enterprise application.
3. Understand data in cloud and integration of cloud.
4. Understand the security aspects of the cloud
5. Understand issues in inter cloud environment like load balancing, optimization and reconfiguration.

UNIT I CLOUD COMPUTING
9
Introduction to Cloud Computing, Definition, Characteristics, Components, Cloud provider, SAAS, PAAS, IAAS and Others, Organizational scenarios of clouds, Administering & Monitoring cloud services, benefits and limitations, Deploy application over cloud, Comparison among SAAS, PAAS, IAAS

UNIT II CLOUD TECHNOLOGY
9
Introduction to Cloud Technologies, Study of Hypervisors Compare SOAP and REST Webservices, AJAX and mashups-Web services: SOAP and REST, SOAP versus REST, AJAX: asynchronous ‘rich’ interfaces, Mashups: user interface services Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization.
Multitenant software: Multi-entity support, Multi-schema approach, Multi-tenance using cloud data stores, Data access control for enterprise applications.

UNIT III DATA IN THE CLOUD
9
Data in the cloud: Relational databases, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo.
Map-Reduce and extensions: Parallel computing, The map-Reduce model, Parallel efficiency of Map-Reduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-
UNIT IV CLOUD SECURITY  

Cloud security fundamentals, Vulnerability assessment tool for cloud, Privacy and Security in cloud.


UNIT V INTERCLOUD ENVIRONMENTS  

Issues in cloud computing, Implementing real time application over cloud platform.

Issues in Intercloud environments, QOS Issues in Cloud, Dependability, data migration, streaming in Cloud. Quality of Service (QoS) monitoring in a Cloud computing environment.


TEXT BOOKS


REFERENCE BOOKS

### Goal
To learn specification and design techniques of a realtime systems.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcomes</th>
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</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Know about the specification and design techniques of a Real Time System.</td>
<td>1. Explain the basic concepts, design and integration of Real Time Systems.</td>
</tr>
<tr>
<td>2. Understand real time task communication and synchronization</td>
<td>2. Demonstrate the working of realtime systems.</td>
</tr>
<tr>
<td>3. Have a vast knowledge of queuing models and Real Time System integration.</td>
<td>3. Explain inter task communication and synchronization</td>
</tr>
<tr>
<td>4. Understand queuing models</td>
<td>4. Demonstrate queuing models</td>
</tr>
<tr>
<td>5. Understand integrating of hardware and software</td>
<td>5. Integrate hardware and software</td>
</tr>
</tbody>
</table>

### UNIT I BASIC REAL TIME CONCEPTS
Basic computer architecture – some terminology - real time design issues – example real time systems – input and output – other devices – language features.

### UNIT II REAL TIME SPECIFICATION AND DESIGN TECHNIQUES

### UNIT III INTERTASK COMMUNICATION AND SYNCHRONIZATION

### UNIT IV QUEUING MODELS
Goals of real time system integration – tools - methodology - software Heinsbergun certainty principle – real time applications.

TOTAL 45

TEXT BOOKS

2. C.M.Krishna and Kang G Shin, "Real time systems", TMH, 2010

REFERENCE BOOKS

### CSC456 PARALLEL PROGRAMMING

<table>
<thead>
<tr>
<th>Goal</th>
<th>Tounderline the purpose of parallel programming; to learn the techniques that are involved in the design of parallel programming; to develop codes using the tools available for high performance computing; and to know to analyze the performance of the parallel algorithms developed.</th>
</tr>
</thead>
</table>

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<tr>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Understand the fundamental principles in parallel programming, parallel algorithm design and to survey on some fundamental parallel algorithms</td>
<td>1. Explain the language design issues related to parallel programming</td>
</tr>
<tr>
<td>2. Know the approaches used in high performance computing and program construction.</td>
<td>2. Apply the best practices while designing algorithms for parallel programming</td>
</tr>
<tr>
<td>3. Undertake an in-depth study of four parallel programming tools: Compositional C++ (CC++), Fortran M (FM), and High Performance Fortran (HPF), and the Message Passing Interface (MPI) library.</td>
<td>3. Implement the parallel programming using C++, FORTRAN M, HPF.</td>
</tr>
<tr>
<td>4. Learn and practice the data transformation and visualization tools for transaction oriented applications</td>
<td>4. Analyze the performance of the algorithm designed for Parallel processing.</td>
</tr>
</tbody>
</table>

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**UNIT I DESIGN OF PARALLEL ALGORITHMS**

Parallel Computers and Computation - A Parallel Machine Model - A Parallel Programming Model - Parallel Algorithm Examples - Partitioning – Communication – Agglomeration – Mapping - Load-

UNIT II APPROACHES TO PERFORMANCE MODELING

UNIT III PARALLEL COMPUTING DEVELOPMENT TOOLS -I

UNIT IV PARALLEL COMPUTING DEVELOPMENT TOOLS -II

UNIT V ADD-ON TOOLS FOR DEVELOPMENT

TEXTBOOK
1. Ion Foster, Designing and Building Parallel Programs, Addison Wesley, 2003

REFERENCE BOOKS
   Online: http://ebooks.cambridge.org/ebook.jsf?bid=CBO9781139084796
<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>CSC457</td>
<td>SOCIAL MOBILE ANALYTICS &amp; CLOUD</td>
<td>3 0 0 3</td>
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**Objective**

The course should enable the student to

1. Familiarize with the concepts of SMAC
2. Know the principles behind social media
3. Develop mobile application
4. Study about data analytics
5. Learn about the cloud services/models and benefits of cloud

**Outcome**

The students should be able to

1. Describe the components of SMAC
2. Enumerate all the social media components
3. Design and develop mobile apps and appreciate the advantage of social media
4. Explain the tools and use of data analytics
5. Illustrate various cloud service and deployment models

**UNIT I INTRODUCTION TO SMAC**


**UNIT II SOCIAL MEDIA**

Objectives, Social Media - Overview, Online Networking, Social Media Marketing, Impact of Social Media on Business - Emerging Trends and Challenges in Social Media - Future of Social Media - Case Studies - Social Media - Opportunities

**UNIT III MOBILE TECHNOLOGY**


**UNIT IV ANALYTICS**

Objectives - Characteristics of Big Data - Digital Footprint - Categories of Digital Footprint - Big Data Analytics - Analytics in Industries - Emerging Trends and Challenges in Analytics - Future of Analytics, Case Studies - Analytics –Opportunities

**UNIT V CLOUD COMPUTING**


**TOTAL 45**

**REFERENCE BOOKS**


CSC458 MACHINE LEARNING

Goal
To impart knowledge on Machine Learning

Objects | Outcomes
--- | ---
The course should enable the students to | At the end of the course the students will be able to
1. Understand the concepts of machine learning | 1. Explain the concepts of Machine Learning.
2. Learn supervised and unsupervised learning and their applications | 2. Apply suitable supervised learning tool to an application.
3. Understand the theoretical and practical aspects of Probabilistic Graphical Models | 3. Use a tool to implement typical clustering algorithms for different types of applications
5. Learn aspects of computational learning theory

UNIT I INTRODUCTION
Machine Learning - Machine Learning Fundamentals – applications - Types of machine learning - basic concepts in machine learning - Examples of Machine Learning

UNIT II SUPERVISED LEARNING

UNIT III UNSUPERVISED LEARNING

UNIT IV PROBABILISTIC GRAPHICAL MODELS - I

145
UNIT V PROBABILISTIC GRAPHICAL MODELS-II

- Undirected graphical models
- Markov random fields
- Conditional independence properties
- Parameterization of MRFs
- Examples
- Learning
- Conditional random fields (CRFs)
- Structural SVMs
- Sampling
- Basic sampling methods
- Monte Carlo
- Reinforcement Learning
- K-Armed Bandit
- Elements
- Model-Based Learning
- Value Iteration
- Policy Iteration.

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS
<table>
<thead>
<tr>
<th>Goal</th>
<th>To gain knowledge on Computer Vision and its applications.</th>
</tr>
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<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td><strong>Outcomes</strong></td>
</tr>
<tr>
<td>The course should enable the student to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Understand the various recognition methodologies.</td>
<td>1. Explain various recognition methodologies.</td>
</tr>
<tr>
<td>2. Learn the binary machine vision techniques.</td>
<td>2. Describe the binary machine vision techniques.</td>
</tr>
<tr>
<td>3. Know the binary area extraction and region analysis.</td>
<td>3. Apply mathematical concepts for area extraction.</td>
</tr>
<tr>
<td>4. Classify the shapes and to match the images.</td>
<td>4. Elaborate the techniques to recognize various objects and image matching.</td>
</tr>
<tr>
<td>5. Learn the various frameworks for matching and to know the knowledge representation of vision.</td>
<td>5. Describe the frameworks for matching and knowledge representation.</td>
</tr>
</tbody>
</table>

**UNIT IRECOGNITION METHODOLOGY**

Recognition Methodology: Conditioning, Labeling, Grouping, Extracting, and Matching. Edge detection, Gradient based operators, Morphological operators, Spatial operators for edge detection. Thinning, Region growing, region shrinking, Labeling of connected components.

**UNIT II BINARY MACHINE VISION**


**UNIT IIIBINARY AREA EXTRACTION AND REGION ANALYSIS**

Area Extraction: Concepts, Data structures, Edge, Line Linking, Hough transform, Line fitting, Curve fitting (Least square fitting). Region Analysis: Region properties, External points, Spatial moments, Mixed spatial gray level moments, Boundary analysis: Signature properties, Shape numbers.

**UNIT IV OBJECT MODEL RECOGNITION AND MATCHING**


**UNIT VGENERAL FRAMEWORKS AND KNOWLEDGE BASED VISION**

147
General Frame Works For Matching: Distance relational approach, Ordered structural matching, View class matching, Models database organization.

Knowledge Based Vision: Knowledge representation, Control-strategies, Information Integration.

TOTAL 45

TEXT BOOKS


REFERENCE BOOKS

# PROFESSIONALELECTIVE COURSES FOR SPECIALIZATION PROGRAMMES

**SEMESTER – VI**

<table>
<thead>
<tr>
<th><strong>CSC357</strong></th>
<th><strong>INFORMATION ARCHITECTURE</strong></th>
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**Goal**
To understand the core principles of Information architecture (IA) as they apply to intranets, online communities, software, books and other mediums of information, to develop usability and structural aesthetics.

<table>
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<tr>
<th><strong>Objectives</strong></th>
<th><strong>Outcomes</strong></th>
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<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The student should be able to</td>
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<tr>
<td>1. Understand the basic information architecture concepts with web 2.0.</td>
<td>1. Articulate the art and science of creating a model for information.</td>
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<tr>
<td>2. Identify the research issues in information architecture</td>
<td>2. Take up research to resolve existing issues in Information Architecture</td>
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<tr>
<td>3. Learn interaction design</td>
<td>3. Design an interactive Information Architecture</td>
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<tr>
<td>4. Know enterprise Information Architecture</td>
<td>4. Apply the Information Architecture practice to address an information design problem.</td>
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<tr>
<td>5. Understand Global Information Architecture</td>
<td>5. Develop Information Architecture for different target groups, demographics and business objectives.</td>
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**UNIT I  INFORMATION ARCHITECTURE AND WEB 2.0  9**
Information architecture concepts - Definition- The evolution of the web and web design, Information architecture and web 2.0 - Changing the web world wide web -generations of web -web 2.0

**UNIT II  INFORMATION ARCHITECTURE AND RESEARCH  9**
Challenges and opportunities of IA and design community - Information architecture Research - Design and evaluation ,Organisation - Logical organisation - Semantic Organisation

**UNIT III  INTERACTION DESIGN  9**
Navigation systems - User information behavior and design implications - Understanding user needs and information behavior - Theories and principles - Design implications, Design Components - Interaction design principles - Personalisation and customization

**UNIT IV  ENTERPRISE IA AND IA IN PRACTICE  9**
Enterprise information architecture - Online workspace aggregation - Practising information architecture

**UNIT V  GLOBAL INFORMATION ARCHITECTURE  9**
The need for internationalisation and Localisation - Cross culture theories and localisation - Guidelines for global IA and user experience design , The future of information architecture, The IA community- Challenges in IA architects
TEXT BOOKS


CSC358 DATABASE SECURITY

Goal
To learn Database security that concerns the use of a broad range of information security controls to protect databases, the database applications or stored functions, the database systems, the database servers and the associated network links against compromises of their confidentiality, integrity and availability.

OBJECTIVES

This course enables the students to

1. Understand various security issues in databases and the different security models available for distributed databases.
2. Learn security models for flow control conclusion and the various security mechanisms
3. Understand the methodology used for secured software design.
4. Study various security attacks and discovery methods.
5. Learn various protection models for new generation database systems.

OUTCOMES

The students should be able to

1. identify the security issues and solve them using appropriate security models.
2. implement security mechanisms in a database system and provide a secured information flow.
3. design a secured software using the methodological approach.
4. identify and discover security attacks through statistical inference and discovery methods.
5. develop new generation DBMS through protection models.

UNIT I INTRODUCTION


UNIT II SECURITY MODELS AND MECHANISMS


UNIT III SECURITY SOFTWARE DESIGN

UNIT IV STATISTICAL DATABASE PROTECTION & INTRUSION DETECTION SYSTEMS

Introduction Statistics Concepts and Definitions Types of Attacks Inference Controls evaluation Criteria for Control Comparison IDES System RETISS System ASES System Discovery.

UNIT V MODELS FOR THE PROTECTION OF NEW GENERATION DATABASE SYSTEMS


TOTAL 45

TEXT BOOKS


REFERENCE BOOK

**CSC460**  
**SOFTWARE AND APPLICATION SECURITY**  
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**Goal**  
To impart knowledge on web application security and to develop a secure application through secure coding

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<tr>
<td>The course should enable the student to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Understand the security fundamentals</td>
<td>1. Possess the knowledge of the fundamental concepts of security and to develop threat models.</td>
</tr>
<tr>
<td>2. Learn Network Security Programming</td>
<td>2. Securely program servers and clients</td>
</tr>
<tr>
<td>3. Understand web application security and learn various security attacks.</td>
<td>3. Capture packets and analyze the packets for security attacks</td>
</tr>
<tr>
<td>4. Learn secure coding in C, C++, Java.</td>
<td>4. Develop a secure code in C, C++, Java</td>
</tr>
</tbody>
</table>

**UNIT I SECURITY FUNDAMENTALS**  
9  

**UNIT II NETWORK SECURITY PROGRAMMING**  
9  

**UNIT III WEB APPLICATION SECURITY**  
9  
Web Servers and Client scripting - Web Application Fuzzers - Scraping Web Applications – HTML and XML file analysis - Web Browser Emulation - Attacking Web Services - Application Proxies and Data Mangling - Automation of attacks such as SQL Injection, XSS.

**UNIT IV SECURITY CODING IN C**  
9  
Character strings- String manipulation errors – String Vulnerabilities and exploits – Mitigation strategies for strings - Pointers – Mitigation strategies in pointer based vulnerabilities – Buffer Overflow based vulnerabilities.

**UNIT V SECURITY CODING IN C++ AND JAVA**  
9  
Dynamic memory management- Common errors in dynamic memory management- Memory managers- Double –free vulnerabilities –Integer security- Mitigation strategies

**TOTAL 45**

**REFERENCE BOOKS**
CSC461 | NETWORK SECURITY | L T P C
--- | --- | --- | --- | ---
Goal | To impart knowledge on Network security and to design IDS and firewall for network security. | 3 | 0 | 0 | 3

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Understand the network security fundamentals.</td>
<td>1. Model network security.</td>
</tr>
<tr>
<td>2. Understand and acquire knowledge of several Cryptographic Algorithms</td>
<td>2. Apply cryptographic algorithm.</td>
</tr>
<tr>
<td>3. Learn the architecture types and techniques for designing IDS</td>
<td>3. Design Intrusion Detection System</td>
</tr>
<tr>
<td>4. Learn the principles and configuration of firewalls and trusted systems.</td>
<td>4. Design and configure a firewall</td>
</tr>
<tr>
<td>5. Learn SEIM &amp; Logs</td>
<td>5. Do log analysis</td>
</tr>
</tbody>
</table>

UNIT I INTRODUCTION


UNIT II CRYPTOGRAPHIC ALGORITHMS

Number Theory - Modern Block Ciphers: DES, 3DES, AES, Blowfish, IDEA, CAST-128 - Stream Cipher - Public Key Cryptography: RSA, Diffie-Hellman, Elgamal, ECC.

UNIT III INTRUSION DETECTION SYSTEM

Architecture - Types - Soft Computing and data mining techniques for the design of IDS - SNORT.

UNIT IV FIREWALL AND TRUSTED SYSTEMS


UNIT V SEIM & LOGS

Basic concepts - Types - MIB - Log formats - Mobile transaction Logs - Log tools

TOTAL 45

REFERENCE BOOKS

Goal
To learn the governance risk and compliance of an organisation

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Understand the security governance, risk, compliance and internal</td>
<td>1. Have an understanding about the fundamentals of GRC</td>
</tr>
<tr>
<td>2. Learn strategic metrics and security architecture</td>
<td>2. Have an understanding on security architecture.</td>
</tr>
<tr>
<td>3. Understand security risk management</td>
<td>3. Do risk management</td>
</tr>
<tr>
<td>4. Learn security strategies</td>
<td>4. Apply compliance technology and tools</td>
</tr>
<tr>
<td>5. Learn Security Metrics</td>
<td></td>
</tr>
</tbody>
</table>

UNIT I INTRODUCTION

UNIT II STRATEGIC METRICS & SECURITY ARCHITECTURE

UNIT III RISK MANAGEMENT

UNIT IV SECURITY STRATEGY

UNIT V SECURITY METRICS

REFERENCE BOOKS
## DISTRIBUTED ARCHITECTURE OF ENTERPRISE APPLICATIONS

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSC359</td>
<td>Distributed Architecture of Enterprise Applications</td>
<td>3 0 0 3</td>
</tr>
</tbody>
</table>

### Goal
To be competent to build and implement Enterprise Architecture.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Acquire the principles of business engineering.</td>
<td>1. Understand the use of business engineering in information technology</td>
</tr>
<tr>
<td>2. Learn the guidelines for ERP implementation.</td>
<td>2. Apply ERP implementation technology</td>
</tr>
<tr>
<td>3. Learn business modeling and ERP implementation.</td>
<td>3. Select the ERP models for the application.</td>
</tr>
<tr>
<td>5. Learn SAP architectures and its uses</td>
<td>5. Develop small applications using SAP.</td>
</tr>
</tbody>
</table>

### UNIT I INTRODUCTION TO ERP

### UNIT II BUSINESS MODELLING FOR ERP

### UNIT III ERP AND THE COMPETITIVE ADVANTAGE

### UNIT IV COMMERCIAL ERP
Description – Multi-Client Server Solution – Open Technology – User Interface- Application Integration.

### UNIT V SAP ARCHITECTURE

### TOTAL
45

### REFERENCE BOOKS
To create the awareness and comprehensive knowledge in Engineering Mathematics.

OBJECTIVES

The course should enable the students to

1. Understand Multi-tier concept in web application, creation and deployment of web application.
2. Understand programming using Servlet and JSP.
3. Understand Modular enterprise application development using EJB.
4. Understand the concept of struts framework.
5. Understand Database connection using Hibernate and creating web applications using Eclipse IDE

OUTCOMES

The students should be able to

1. Conceptually ready to create and deploy web applications.
2. Write web applications using Servlet and JSP.
3. Create simple business logic for enterprise applications using EJB.
5. Create and deploy web applications using eclipse IDE and create Database connectivity using Hibernate.

UNIT I CORE JAVA EE


UNIT II SERVLETS & JSP


UNIT III ENTERPRISE JAVA BEANS


UNIV IV STRUTS

UNIT V HIBERNATE AND IDE


TOTAL 45

REFERENCE BOOKS

<table>
<thead>
<tr>
<th>CSC463</th>
<th>DISTRIBUTED DATABASE MANAGEMENT SYSTEMS</th>
<th>L T P C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3 0 0 3</td>
</tr>
</tbody>
</table>

**Goal**
To learn information management design and system issues related to distributed database systems.

**Objectives**
The course should enable the students to
1. Identify the issues in distributed database design
2. Learn the design of distributed database
3. Learn the integration of DDB
4. Learn the distributed query processing
5. Understand distributed transaction management

**Outcomes**
The course should enable the students to
1. Acquire knowledge of issues and challenges faced in distributed database.
2. Understand the fundamental principles of distributed database
3. Familiar with the integration of DDB
4. Apply the distributed query processing
5. Design a multi database system.

---

**UNIT I INTRODUCTION**


**UNIT II DISTRIBUTED DATABASE DESIGN**


**UNIT III DISTRIBUTED DATABASE INTEGRATION**

UNIT IV DISTRIBUTED QUERY PROCESSING


UNIT V DISTRIBUTED TRANSACTION MANAGEMENT


TOTAL 45

TEXT BOOK

REFERENCE BOOKS
CSC454  CLOUD COMPUTING  

Goal  Understand the architecture of Cloud and industry frameworks.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>At the end of the course the student should be able to</td>
</tr>
<tr>
<td>1. Study about migrating into cloud.</td>
<td>1. Understand migration.</td>
</tr>
<tr>
<td>2. Study IAS and enterprise cloud.</td>
<td>2. Explain issues for enterprise application.</td>
</tr>
<tr>
<td>3. Study data in cloud and integration of cloud.</td>
<td>3. Understand data in cloud and integration of cloud.</td>
</tr>
<tr>
<td>4. Study the security aspects of the cloud.</td>
<td>4. Understand security aspects of the cloud</td>
</tr>
<tr>
<td>5. Understand intercloud environments</td>
<td>5. Understand issues in intercloud environment like load balancing, optimization and reconfiguration.</td>
</tr>
</tbody>
</table>

UNIT I CLOUD COMPUTING  

Introduction to Cloud Computing, Definition, Characteristics, Components, Cloud provider, SAAS, PAAS, IAAS and Others, Organizational scenarios of clouds, Administering & Monitoring cloud services, benefits and limitations, Deploy application over cloud, Comparison among SAAS, PAAS, IAAS


UNIT II CLOUD TECHNOLOGY  

Introduction to Cloud Technologies, Study of Hypervisors Compare SOAP and REST Webservices, AJAX and mashups-Web services: SOAP and REST, SOAP versus REST, AJAX: asynchronous 'rich' interfaces, Mashups: user interface services Virtualization Technology: Virtual machine technology, virtualization applications in enterprises, Pitfalls of virtualization.

Multitenant software: Multi-entity support, Multi-schema approach, Multi-tenance using cloud data stores, Data access control for enterprise applications.

UNIT III DATA IN THE CLOUD  

Data in the cloud: Relational databases, Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo.

Map-Reduce and extensions: Parallel computing, The map-Reduce model, Parallel efficiency of Map-Reduce, Relational operations using Map-Reduce, Enterprise batch processing using Map-Reduce, Introduction to cloud development, Example/Application of Mapreduce, Features and comparisons among GFS,HDFS etc, Map-Reduce model.

UNIT IV CLOUD SECURITY
Cloud security fundamentals, Vulnerability assessment tool for cloud, Privacy and Security in cloud.


UNIT V INTERCLOUD ENVIRONMENTS

Issues in cloud computing, Implementing real time application over cloud platform.

Issues in Intercloud environments, QOS Issues in Cloud, Dependability, data migration, streaming in Cloud. Quality of Service (QoS) monitoring in a Cloud computing environment.


TOTAL 45

TEXT BOOKS


REFERENCE BOOKS

To provide an insight into the impact of Service Oriented Architecture (SOA) on software quality, efficiency, security, performance and flexibility

**OBJECTIVES**

The course should enable the students to

1. Learn the fundamentals of SOA and Web Services.
2. Understand the basics of web services policy and framework.
3. Learn the SOA life cycle model.
4. Learn service oriented design principles and be exposed to build applications based on XML.
5. Understand the web service security.

**OUTCOMES**

The student should be able to

1. Demonstrate an understanding of software oriented architectures and service composition.
2. Have an understanding of the model of SOA management.
3. Possess the comprehensive knowledge and broad perspective of this trend in software engineering and ability to implement service oriented applications.
4. Develop and deploy web services using different design tools.
5. Know web service security

**UNIT I SOA AND WEB SERVICES FUNDAMENTALS**

Fundamentals of SOA - Characteristics - Common misperception - Benefits - Pitfalls of adopting SOA - Transition from XML to web service to SOA - Reshaping of XML and web service through SOA - Standards for SOA - Comparison of SOA vs Past architecture - Web services framework – Service description - Messaging with SOA.

**UNIT II SECOND GENERATION WEB SERVICES**


**UNIT III SERVICE ORIENTATION**

Service oriented architecture - Components - Common principles of service - Orientation - Interrelationship among principles - Service orientation versus object orientation - Service layers - Different services layers - Configuration scenarios of service layers. SOA delivery life cycle phases - Agile strategy - SOA analysis - Service modeling - guidelines - Classifications of service models.

**UNIT IV TECHNOLOGIES AND DESIGN FOR SOA**


**UNIT V SERVICE DESIGN AND SECURITY**

Service design - Guidelines - Business process design - WS - BPEL language basics - WS - BPEL elements - WS co ordination - Service oriented process design - WS addressing language and
messaging basis - WS - Meta data exchange - Security language basis - WSOA platform - SOA support in J2EE and .NET.

TOTAL 45

REFERENCE BOOKS
### Goal
To provide a sound technical exposure to the concepts, principles, methods, and best practices in software architecture and software design.

### OBJECTIVES
The course should enable the student to

1. Learn the challenges of advanced software design and the issues associated with large-scale software architectures, frameworks, patterns and components.
2. Learn the tools and techniques that may be used for the automatic analysis and evaluation of software.
3. Understand design and documentation
4. Learn architecture analysis methods.
5. Understand software product lines

### OUTCOMES
The student should be able to

1. Conceptualize and coordinate designs, addressing technological aspects of architecture.
2. Produce "software architects" with sound knowledge and superior.
3. Build robust, scalable, and reliable software intensive systems.
4. Recognize and analyze the Architecture.
5. Apply and integrate computer technology in design processes and products.

### UNIT I ARCHITECTURE BUSINESS CYCLE
9

### UNIT II CREATING AN ARCHITECTURE
9

### UNIT III DESIGN AND DOCUMENTATION
9
Designing the Architecture – Architecture in the life cycle, Designing the Architecture, Forming the Team Structure, Creating the Skeletal System. Documenting Software Architectures, Uses of Architectural Documentation, Views, Choosing the relevant views, Documenting a view, Documentation across views.
UNIT IV ANALYZING ARCHITECTURE


UNIT V SOFTWARE PRODUCT LINES


REFERENCE BOOKS

5. Rumbaugh, James, Object Oriented Modeling and design, Pearson Education, 2005.
Goal
To learn middleware technologies that makes it easier for software developers to perform communication and input/output, so that they can focus on the specific purpose of their application.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Understand the basic client server concepts.</td>
<td>1. Have learnt the different types of server client concepts</td>
</tr>
<tr>
<td>2. Understand EJB architecture</td>
<td>2. Learn the design of EJB architecture</td>
</tr>
<tr>
<td>3. Know EJB applications and understand how middleware facilitates the development of distributed applications in heterogeneous environments.</td>
<td>3. Deploy EJB for specific applications</td>
</tr>
<tr>
<td>4. Learn the object oriented middleware basics through the example of the following CORBA objects.</td>
<td>4. Build an application using CORBA</td>
</tr>
<tr>
<td>5. Learn COM</td>
<td>5. Build an application using COM</td>
</tr>
</tbody>
</table>

UNIT I CLIENT / SERVER CONCEPTS

UNIT II EJB ARCHITECTURE
EJB architecture – Overview of EJB software architecture – View of EJB – Conversation – Building and deploying EJB – Roles in EJB.

UNIT III EJB APPLICATIONS
EJB session beans – EJB entity beans – EJB clients – EJB deployment – Building an application with EJB.

UNIT IV CORBA

UNIT V COM
TEXT BOOKS

REFERENCE BOOKS
CSC466  ERP AND ENTERPRISE DOMAINS  L T P C 3 0 0 3

**Goal**

To learn the concepts of ERP, Architectures and implementation.

**Objectives**

The course should enable the student to learn
2. The guidelines for ERP implementation.
3. Understand ERP usage in industry.
4. ERP modules and interface
5. SAP architectures and its uses

**Outcomes**

The student should be able to
1. Understand how business engineering goes with information technology
2. Apply ERP implementation technology
3. Understand how to increase the productivity.
4. Develop client-server modules using open technology and easy interface.
5. Develop small applications using SAP.

---

**UNIT I INTRODUCTION TO ERP**


**UNIT II BUSINESS MODELLING FOR ERP**


**UNIT III ERP AND THE COMPETITIVE ADVANTAGE**


**UNIT IV COMMERCIAL ERP**

Description – Multi-Client Server Solution – Open Technology – User Interface- Application Integration.

**UNIT VSAP ARCHITECTURE**


---

**REFERENCE BOOKS**


**TOTAL 45**
Goal
To learn software design and system integration for enterprise systems

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Learn the basic concepts of program and project planning</td>
<td>1. Develop project plan</td>
</tr>
<tr>
<td>2. Learn the system engineering plan and to identify the software requirements</td>
<td>2. Understand system engineering plan and identify its requirements</td>
</tr>
<tr>
<td>3. Study the design of software</td>
<td>3. Understand design of software and process involved</td>
</tr>
<tr>
<td>4. Learn effective methods for software integration</td>
<td>4. Understand software integration concepts and methods</td>
</tr>
<tr>
<td>5. Learn the quality aspects of software delivery</td>
<td>5. Understand how software system delivery is done</td>
</tr>
</tbody>
</table>

UNIT I  INTRODUCTION, PROGRAM & PROJECT PLANNING  9
Introduction : Software and system integration methods - program and project planning - System Design - Software requirements - Software Design and development - Software implementation - Integration - Program and Project Planning: Program - Project - Planning - Senior Management - Senior Management - Program and project planning - Planned schedules - development plan - Team work - Team code of conduct.

UNIT II  SYSTEM DESIGN & SOFTWARE REQUIREMENTS  9
Systems Design : Definition - System Engineering plan - Software architecture evaluation - Software requirements: Definition - Requirements documentation - Managing a requirements tool - released software requirements.

UNIT III  SOFTWARE DESIGN AND IMPLEMENTATION  9

UNIT IV  SOFTWARE AND SYSTEM INTEGRATION  9

UNIT V  SOFTWARE SUBCONTRACTOR & SYSTEM DELIVERY  9
Software Subcontractor - Software and system delivery : Software media and data delivery - Product evaluation.

TOTAL  45
TEXT BOOK

REFERENCE BOOK
1. Enterprise Integration by Fred A.Cummins, John Wiley and Sons 2002
Goal
To introduce an integrated approach to software development incorporating quality management methodologies.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td></td>
</tr>
<tr>
<td>1. Understand Software quality models, Quality measurement and metrics</td>
<td></td>
</tr>
<tr>
<td>2. Understand Quality plan, implementation and documentation</td>
<td></td>
</tr>
<tr>
<td>3. Understand Quality tools including CASE tools, Quality control and reliability of quality process</td>
<td></td>
</tr>
<tr>
<td>4. Understand Quality management system model and Complexity metrics and Customer Satisfaction</td>
<td></td>
</tr>
<tr>
<td>5. Understand International quality standards – ISO, CMM</td>
<td></td>
</tr>
<tr>
<td>The student should be able to</td>
<td></td>
</tr>
<tr>
<td>1. Have gained knowledge about Software quality models</td>
<td></td>
</tr>
<tr>
<td>2. Should be able to implement Quality plan, and documentation.</td>
<td></td>
</tr>
<tr>
<td>3. Keep track of quality by using quality control tools</td>
<td></td>
</tr>
<tr>
<td>4. Apply the concepts of quality management system and do’s &amp; don’t’s</td>
<td></td>
</tr>
<tr>
<td>5. Must be able to understand quality standards and follow</td>
<td></td>
</tr>
</tbody>
</table>

UNIT I INTRODUCTION TO SOFTWARE QUALITY
Software Quality – Hierarchical models of Boehm and McCall – Quality measurement – Metrics measurement and analysis – Gilb’s approach – GQM Model

UNIT II SOFTWARE QUALITY ASSURANCE

UNIT III QUALITY CONTROL AND RELIABILITY

UNIT IV QUALITY MANAGEMENT SYSTEM

UNIT V QUALITY STANDARDS

TOTAL 45

TEXT BOOKS

REFERENCE BOOKS
ENGINEERING ELECTIVES
SEMESTER III

CSD 251  BASICS OF OBJECT ORIENTED PROGRAMMING

<table>
<thead>
<tr>
<th>Goal</th>
<th>This course advances students knowledge in problem solving and programming principles for scientific and technical applications through the presentation of object-oriented programming in the C++ language.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>The students should be able to</td>
</tr>
<tr>
<td>The students should be able to learn</td>
<td>1. Explain Object oriented Concepts.</td>
</tr>
<tr>
<td>2. History and Basics of C++ programming language.</td>
<td>3. Create Simple Class and function templates.</td>
</tr>
<tr>
<td>4. Understand Exceptions and Exception handling</td>
<td>5. Explain the current status of C++.</td>
</tr>
<tr>
<td>5. Recent advancement in C++.</td>
<td></td>
</tr>
</tbody>
</table>

UNIT I OBJECT ORIENTED PROGRAMMING


UNIT II INTRODUCTION TO C++

History of C++ - Structure of C++ program - Difference between C and C++ - Basics of C++ - Simple programs - Declaration of Classes and creation of Objects – Member functions - Constructors- Access modifiers- Implementation of Friend functions, Compile time and runtime polymorphism, Inheritance.

UNIT IIIGENERIC PROGRAMMING & TEMPLATES

Introduction to Generic Programming - Function templates - class templates – Generic Functions with implementation of sorting algorithm.

UNIT IV EXCEPTION HANDLING

Principles of Exception Handling – Mechanism – Throwing Exception - Try & Catch Blocks – Multiple Catch blocks.

UNIT V RECENT ADVANCEMENT IN C++
REFERENCE BOOKS

To provide an in-depth knowledge in JAVA programming.

<table>
<thead>
<tr>
<th><strong>Goal</strong></th>
<th>To provide an in-depth knowledge in JAVA programming.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objectives</strong></td>
<td>The course should enable the students to</td>
</tr>
<tr>
<td>1. Understand the basic programming in Java</td>
<td>1. Write basic program in Java</td>
</tr>
<tr>
<td>2. Basic OOPs concept in Java</td>
<td>2. Write simple programs using Classes and Methods.</td>
</tr>
<tr>
<td>3. Understand Packages and Interfaces</td>
<td>3. Create and Use packages and interfaces in java</td>
</tr>
<tr>
<td>4. Understand Files, IO streams and exception handling</td>
<td>4. Access files and implement user defined and inbuilt exceptions</td>
</tr>
<tr>
<td>5. Understand the GUI part of Java.</td>
<td>5. Create GUI based trivial applications.</td>
</tr>
<tr>
<td><strong>Outcomes</strong></td>
<td>The student should be able to</td>
</tr>
</tbody>
</table>

UNIT I INTRODUCTION


UNIT II OBJECT ORIENTED PROGRAMMING IN JAVA - I


UNIT III OBJECT ORIENTED PROGRAMMING IN JAVA – II


Interfaces : Declaring Interfaces - Implementing Interfaces - Using inbuilt interfaces

UNIT IV FILES & IO STREAMS AND EXCEPTION HANDLING


Exception Handling : The concept of Exceptions in Java, Types of Exceptions, Exception Objects, Try - Catch and Finally blocks , Multiple Catch blocks - Understanding ‘Throws’ and ‘Throw‘ - Defining Your Own Exceptions.

UNIT V WORKING WITH WINDOWS AND GRAPHICS

Working AWT Classes - AWT Controls – getter and setter methods, Event Handling interfaces – Adapter Classes.


**TOTAL 45**

**TEXT BOOKS**


**REFERENCE BOOKS**

Goal  To gain knowledge in technical tools and techniques necessary to build dynamic websites and applications

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Understand the importance of the web as a medium of communication.</td>
<td>1. Explore markup languages features and create interactive web pages using them</td>
</tr>
<tr>
<td>2. Understand the principles of creating an effective web page, including an in-depth consideration of information architecture.</td>
<td>2. Learn and design Client side validation using scripting languages 3. Acquire knowledge about Open source JavaScript libraries 4. Able to design front end web page and connect to the back end databases</td>
</tr>
<tr>
<td>3. Learn the language of the web: HTML and CSS.</td>
<td>5. Explore the features of various platforms and frameworks used in web applications development</td>
</tr>
<tr>
<td>4. Understand and practice embedded dynamic scripting on client side Internet Programming</td>
<td></td>
</tr>
<tr>
<td>5. Understand and practice mark up languages.</td>
<td></td>
</tr>
</tbody>
</table>

UNIT I   UI DESIGN


UNIT II  INTRODUCTION TO JAVASCRIPT

Introduction - Core features - Data types and Variables - Operators, Expressions, and Statements - Functions - Objects - Array, Date and Math related Objects - Document Object Model - Event Handling - Controlling Windows & Frames and Documents - Form handling and validations.

UNIT III  ADVANCED JAVASCRIPT

Browser Management and Media Management – Classes – Constructors – Object-Oriented Techniques in JavaScript – Object constructor and Prototyping - Sub classes and Super classes – JSON - jQuery : Selectors, DOM Manipulation with jQuery, AJAX with jQuery, and AJAX - Other Javascript Frameworks

UNIT IV  PHP


UNIT V  LAMP STACK
Overview of Lamp Stack - Features of Lamp Stack – Installing and Using the LAMP Stack - Understanding Python Understanding LAMP and Its Effect on Web Development - Managing LAMP with PHPMyAdmin

TOTAL 45

REFERENCE BOOKS

CS D 254 PYTHON PROGRAMMING

<table>
<thead>
<tr>
<th>Goal</th>
<th>To study about programming using python.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Learn the fundamental concepts of Python</td>
<td>1. Understand the Preliminary Concepts of Programming Language &amp; syntax and Semantics methods</td>
</tr>
<tr>
<td>2. Learn about strings, Lists, Functions &amp; methods</td>
<td>2. Understand the Strings, Lists, Functions &amp; methods</td>
</tr>
<tr>
<td>3. Learn the Python Scripts.</td>
<td>3. Understand the Sub Python Scripts &amp; able to write the Simple File Programs</td>
</tr>
<tr>
<td>4. Learn about Exception Handling mechanisms</td>
<td>4. Understand the Exception handling mechanisms</td>
</tr>
<tr>
<td>5. Learn the OOPs Technology.</td>
<td>5. Understand the OOPs concepts</td>
</tr>
</tbody>
</table>

UNIT I INTRODUCTION

Python Introduction, History of Python, Python features, Python Installation, Python Environment Variables, Running Python, Simple Programs, Python Identifiers, Reserved words, Lines and Indentation, Multi line statements, Quotation in Python, Comments in Python, Command line arguments, Assigning values to the variables, Multiple assignment, Standard data types, Type Conversion, Operators in Python, Operators Precedence, Decision Making, Looping, Loop Control statement, Mathematical functions- Random number function, Trigonometric functions, Mathematical Constants.

UNIT II STRINGS & LISTS

UNIT III  PYTHON SCRIPTS  
Import statements, Locating modules, Namespace, dir(), global(), local(), reload(), Packages in python, I/O function, Opening and closing files, file object attribute, manipulations of the files, Directories in python, File and Directory related methods.

UNIT IV  EXCEPTION HANDLING  
Exception, Handling Exception, example programs, try-finally, Argument of an Exception, Raising an Exception, User-defined exceptions.

UNIT V  OOPS TERMINOLOGY  
OOPs Concepts -Class, class variable, Data member, Objects, methods, Instance, Function Overloading, Instance variable, Inheritance

TOTAL 45

TEXT BOOKS
1. Introduction to Python Programming, Povel Solin, Martin Novak, 2012
2. Introduction to Python Programming, Jacob Fredslund, 2007

REFERENCE BOOKS
1. An Introduction to Python, John C. Lusth, 2011
2. Introduction to Python, Dave Kuhlman, 2008.
## CS D 255 XML AND WEB SERVICES

**Goal**
To impart knowledge and training on XML and web services.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The students should be able to</td>
</tr>
<tr>
<td>1. Create a XML application using structure and presentation technologies.</td>
<td>1. Apply XML concepts to develop Web application.</td>
</tr>
<tr>
<td>2. Use XML manipulation technologies such as XSLT, XPath, XLink and XQuery.</td>
<td>2. Create SOAP application using XML and Web Services.</td>
</tr>
<tr>
<td>3. Perform Program Manipulation and Dynamic access through DOM architecture.</td>
<td>3. Acquire information from the web sites using XML programming.</td>
</tr>
<tr>
<td>4. Understand web services and ensure security.</td>
<td>4. Implement XML in e-business</td>
</tr>
<tr>
<td>5. Understand role of metadata in web content</td>
<td>5. Develop web services and ensure security</td>
</tr>
</tbody>
</table>

### UNIT I XML TECHNOLOGY FAMILY


### UNIT II ARCHITECTING WEB SERVICES


### UNIT III WEB SERVICES BUILDING BLOCK


### UNIT IV IMPLEMENTING XML IN E-BUSINESS


### UNIT V XML AND CONTENT MANAGEMENT

TEXT BOOKS

REFERENCE BOOKS
GOAL
The Objective is to familiarize students with the issues and technologies involved in developing various mobile applications.

OBJECTIVES
The course should enable the student to:
1. Familiarize students with the mobile platforms and landscape
2. Know the principles behind mobile application development
3. Develop mobile application using android programming
4. Study about testing a mobile apps
5. Learn about distributing apps in arket

OUTCOME
The students should be able to:
1. Have knowledge of Mobility landscape
2. Familiarize with Mobile apps development aspects
3. Design and develop mobile apps, using Android as development platform,
4. Know the hardware play, location awareness, graphics, and multimedia.
5. Perform testing, signing, packaging and distribution of mobile apps

UNIT I GETTING STARTED WITH MOBILITY
Mobility landscape, Mobile platforms, Mobile apps development, Overview of Android platform, setting up the mobile app development environment along with an emulator, a case study on Mobile app development

UNIT II BUILDING BLOCKS OF MOBILE APPS
App user interface designing – mobile UI resources (Layout, UI elements, Draw-able, Menu), Activity- states and life cycle, interaction amongst activities- App functionality beyond user interface - Threads, Async task, Services – states and life cycle - Notifications, Broadcast receivers - Telephony and SMS APIs - Native data handling – on-device file I/O, shared preferences, mobile databases such as SQLite, and enterprise data access

UNIT III SPRUCING UP MOBILE APPS
Graphics and animation – custom views, canvas, animation APIs, multimedia – audio/video playback and record, location awareness, and native hardware access - sensors such as accelerometer and gyroscope

UNIT IV TESTING MOBILE APPS
Debugging mobile apps - White box testing - Black box testing - Test automation of mobile apps - JUnit for Android, Robotium, MonkeyTal, Beta Testing

UNIT V TAKING APPS TO MARKET
Versioning, signing and packaging mobile apps - distributing apps on mobile market place

TEXT BOOKS

TOTAL 45
# SEMESTER V

<table>
<thead>
<tr>
<th>CS D 351</th>
<th>DIGITAL IMAGE PROCESSING</th>
<th>L T P C</th>
</tr>
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<tbody>
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</tbody>
</table>

**Goal**

To learn Image fundamentals and various Image enhancement, restoration and compression techniques.

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>At the end of the course the student should be able to</td>
</tr>
<tr>
<td>1. Study the image fundamentals and mathematical transforms necessary for image processing. 2. Study the image enhancement techniques 3. Study image restoration procedures. 4. Study the image compression procedures. 5. Study the image segmentation and representation techniques.</td>
<td>1. Understand the concepts and application areas of digital image processing, 2. Understand the theory and predominant algorithms used in digital image processing systems, 3. Implement from first principles any of the standard algorithms commonly used in image processing systems, and 4. Solve a real-world digital image processing problem by designing an appropriate system and implementing the theory and algorithms of this course.</td>
</tr>
</tbody>
</table>

## UNIT I IMAGE FUNDAMENTALS


## UNIT II FREQUENCY DOMAIN, IMAGE RESTORATION AND


UNIT III COLOUR IMAGE PROCESSING 9


UNIT IV IMAGE COMPRESSION 9

UNIT V IMAGE SEGMENTATION AND REPRESENTATION 9

Representation and Description: Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Relational Descriptors

TOTAL 45

TEXT BOOK

REFERENCE BOOKS
CS D 352  SYSTEM MODELLING AND SIMULATION  L T P C

3 0 0 3

Goal
To build knowledge on system modelling and system study on various applications

Objectives

1. Provide a strong foundation on concept of simulation and modelling.
2. Understand the techniques of random number generations and simulation of physical systems using a range of mathematical formulations.
3. Understand the techniques of testing randomness.
4. Design simulation models for various case studies like Manufacturing and Material Handling Simulations.
5. Practice on simulation tools and impart knowledge on building simulation systems.

Outcomes

1. Characterise a given engineering system in terms of its essential elements, that is, purpose, parameters, constraints, performance requirements, subsystems, interconnections and environmental context.
2. Understand the techniques of generation of random number.
3. Understand the simulation models for case studies Manufacturing and Material Handling Simulations, Inventory systems using simulation languages.
4. Build simulation systems with impart knowledge.
5. Interpret the simulation results of an engineering system model, within the context of its capabilities and limitations, to address critical issues in an engineering project.

UNIT I  INTRODUCTION TO SIMULATION, EXAMPLES, PRINCIPLES AND SOFTWARE

UNIT II  STATISTICAL AND QUEUING MODELS IN SIMULATION  


UNIT III RANDOM NUMBER AND VARIATE GENERATION  


UNIT IV  INPUT MODELLING AND VERIFICATION AND VALIDATION OF SIMULATION MODEL  

Input Modelling: Data Collection, Identifying the Distribution of data, Parameter estimation, Goodness of fit tests, Selection input model without data, Multivariate and Time series input models. Verification and Validation of Simulation Model: Model building, Verification, and Validation, Verification of simulation models, Calibration and Validation of models.

UNIT V  OUTPUT ANALYSIS FOR A SINGLE MODEL, COMPARISON AND EVALUATION OF ALTERNATIVE SYSTEM DESIGN AND CASE STUDIES  


TOTAL 45

REFERENCE BOOKS


SEMESTER VI

<table>
<thead>
<tr>
<th>CSD353</th>
<th>ADHOC AND SENSOR NETWORKS</th>
<th>L</th>
<th>T</th>
<th>P</th>
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<tbody>
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</tr>
</tbody>
</table>

**Goal**
To provide diverse literature on ad-hoc/sensor networks and the fundamental issues in designing and analyzing ad-hoc/sensor network systems.

**Objectives**
The course should enable the students to
1. Understand the major issues associated with ad-hoc networks.
2. Learn various protocols for adhoc routing and TCP.
4. Realize issues in WSN routing localisation and QOS.
5. Learn mesh network architecture and different configuration in WSN.

**Outcomes**
The student should be able to
1. Apply the knowledge of Adhoc MAC protocol.
2. Design the routing protocols by considering network resources.
3. Understand the architecture of sensor.
4. Able to design WSN routing with QOS.
5. Understand the mesh network architecture and various mesh models.

UNIT I ADHOC MAC

UNIT II ADHOC NETWORK ROUTING AND TCP
UNIT III WSN -MAC

UNIT IV WSN ROUTING, LOCALIZATION AND QOS

UNIT V MESH NETWORKS

TOTAL 45

REFERENCE BOOKS
CSD354 | CYBER SECURITY

<table>
<thead>
<tr>
<th>Goal</th>
<th>To provide the knowledge about the Cyber security</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>Outcomes</td>
</tr>
<tr>
<td>The course should enable the students to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Learn the basic concepts of Cyber security mechanisms.</td>
<td>1. Paraphrase the basic concepts of Cyber security mechanisms.</td>
</tr>
<tr>
<td>2. Impart knowledge about network security, access control and Intrusion Detection.</td>
<td>2. Illustrate the network security, access control and Intrusion Detection.</td>
</tr>
<tr>
<td>3. Expose with application and system security.</td>
<td>3. Use application and system security.</td>
</tr>
<tr>
<td>4. Enumerate the principles and policies for effective security management</td>
<td>4. Enumerate the principles and policies for effective security management</td>
</tr>
<tr>
<td>5. Learn about cyber defense techniques and cyber warriors.</td>
<td>5. Explain about cyber defense techniques and cyber warriors.</td>
</tr>
</tbody>
</table>

UNIT I  SECURITY CONCEPTS AND MECHANISMS


UNIT II  NETWORK SECURITY

### UNIT III  SYSTEM AND APPLICATION SECURITY

- Security Architectures and Models
- Designing Secure Operating Systems
- Controls to enforce security services
- Information flow model and Biba model
- System Security
- Web security
- Web Authentication
- Secure Socket Layer (SSL)
- Secure Electronic Transaction (SET)
- OS Security
- OS Security Vulnerabilities, updates and patches
- OS integrity checks
- Anti-virus software
- Design of secure OS and OS hardening
- Configuring the OS for security
- Trusted OS

### UNIT IV  SECURITY MANAGEMENT

- Security Management Practices
- security policies, procedures and guidelines
- Risk Management
- Business continuity Planning and Disaster Recovery Management
- Risk Management
- Change Management
- Privilege Management
- Security Laws and Standards
- Security Assurance
- Security Laws
- Security Audit
- International standards

### UNIT V  CYBER DEFENSE TECHNIQUES

- E-Mail Security
- Web security
- Web Injection Attack
- Cross Site Scripting (XSS)
- Secure Software Development
- Cyber crime and cyber terrorism
- Cyber operations and Defense Techniques
- Phases of a cyber attack
- Information warfare and surveillance
- Steganography
- Security Engineering
- Computer Forensics
- Legal Issues and Ethics
- Case studies

### TOTAL

**45**

### TEXT BOOKS


### REFERENCE BOOKS


UNIT I INTRODUCTION

UNIT IIDATA ANALYSIS

UNIT III MINING DATA STREAMS

UNIT IV FREQUENT ITEMSETS AND CLUSTERING
Mining Frequent Itemsets - Market Based Model – Apriori Algorithm – Handling Large Data Sets in Main Memory – Limited Pass Algorithm – Counting Frequent Itemsets in a Stream –
UNIT V  FRAMEWORKS AND VISUALIZATION
MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed File Systems – Visualizations - Visual Data Analysis Techniques - Interaction Techniques; Systems and Analytics Applications - Analytics using Statistical packages-Approaches to modeling in Analytics – correlation, regression, decision trees, classification, association-Intelligence from unstructured information-Text analytics-Understanding of emerging trends and technologies-Industry challenges and application of Analytics

TOTAL 45

TEXT BOOKS

SEMESTER VII
CYBER FORENSICS

CSD451

Goal
To provide the knowledge of cyber law and practices, digital forensics.

OBJECTIVES
The course should enable the student to

1. Learn the overview of cybercrime.
2. Learn the issues of cybercrime.
3. Learn the various methods to investigate cybercrime.
4. Learn about digital forensics.
5. Understand the cyber laws and acts practices

OUTCOME
The student should be able to

1. State the basic concepts of Cyber crime.
2. Paraphrase the issues in Cyber security.
3. Use Cyber Investigation.
4. Demonstrate the Digital Forensics.
5. Explain the Cyber laws and Practices.

UNIT I INTRODUCTION

UNIT II CYBER CRIME ISSUES

UNIT III INVESTIGATION

UNIT IV DIGITAL FORENSICS

UNIT V LAWS AND ACTS
TOTAL 45

TEXT BOOKS


REFERENCE BOOKS

<table>
<thead>
<tr>
<th>CSD452</th>
<th>ETHICAL HACKING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>To provide the knowledge about Ethical hacking</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the student to</td>
<td>The students should be able to</td>
</tr>
<tr>
<td>1. Understand the Basic concepts of Ethical hacking.</td>
<td>1. Explain the basic concepts of Ethical Hacking.</td>
</tr>
<tr>
<td>2. Expose with the system hacking</td>
<td>2. Use various system hacking techniques</td>
</tr>
<tr>
<td>3. Expose with web server hacking</td>
<td>3. Use various server hacking techniques</td>
</tr>
<tr>
<td>4. Expose Wireless hacking</td>
<td>4. Use various Wireless hacking techniques</td>
</tr>
<tr>
<td>5. Expose with penetration hacking</td>
<td>5. Use various penetration hacking techniques</td>
</tr>
</tbody>
</table>

UNIT I INTRODUCTION TO ETHICAL HACKING 9
Introduction-Ethical hacking Terminology-types of hacking technologies-phases of ethical hacking-Footprinting-Social Engineering-Scanning and enumeration.

UNIT II SYSTEM HACKING 9
Understanding the password hacking techniques-Rootkits-Trojans-Backdoors-Viruses and worms-sniffers-denial of service-Session hijacking.

UNIT III WEB SERVER HACKING 9

UNIT IV WIRELESS HACKING 9

UNIT V PENETRATION TESTING 9
Cryptography-overview of MD5, SHA, RC4-penetration testing methodologies- steps- pen test legal framework-penetration testing tools.

REFERENCE BOOKS
3. The Basics of Hacking and Penetration Testing: Ethical Hacking and Penetration Testing Made Easy (Syngress Basics Series) [Paperback]
4. Hands-On Ethical Hacking and Network Defense [Print Replica] [Kindle Edition]
CSD453  IT INFRASTRUCTURE  L T P C 3 0 0 3

Goal  To provide wide knowledge on IT infrastructure landscape.

<table>
<thead>
<tr>
<th>OBJECTIVES</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>The course should enable the students to</td>
<td>The student should be able to</td>
</tr>
<tr>
<td>1. Understand the Database and storage concepts</td>
<td>1. Have gained good knowledge of Database.</td>
</tr>
<tr>
<td>2. Learn server technologies.</td>
<td>2. Have learnt Server Technologies.</td>
</tr>
<tr>
<td>3. Learn directory services.</td>
<td>3. Design Directory services for the server.</td>
</tr>
<tr>
<td>security.</td>
<td>5. Have learnt some middleware technologies used.</td>
</tr>
<tr>
<td>5. Learn middleware concepts.</td>
<td></td>
</tr>
</tbody>
</table>

UNIT I  DATABASE& STORAGE OVERVIEW  9
Understanding Database types, SQL, JDBC, Indexing, Database clustering replication, Storage Networking Technology, Types of storage system, FC-AL, FABRIC, Storage Area Networks, Zones, Storage virtualization

UNIT II  SYSTEMS OVERVIEW  9
Server Technology (Rack, Blades, Enterprise, HPC), Operating systems, Virtualization (Hypervisors, Partitioning, VMs, I/O Virtualization), Server Deployment (Physical and Virtual), Server Management console, Server Availability concepts and techniques. Server workloads

UNIT III  DIRECTORY SERVICES OVERVIEW  9
Directory Server concepts, LDAP protocol, LDAP replication topologies, LDIF data exchange

UNIT IV  NETWORK& SECURITY OVERVIEW  9

UNIT V  APPLICATION AND MIDDLEWARE OVERVIEW  9
Introduction to common Messaging Systems (MQSeries), Web tiered deployment, Application Servers & Clustered deployment, E-mail (Lotus Notes / exchange). Understanding Datawarehouse concepts, Data Warehouse Architectures, Logical Design, Physical Design.

TOTAL 45

REFERENCE BOOKS

1. IT Infrastructure & Its Management by Gupta, Tata McGraw-Hill Education, 2010


3. IT Infrastructure Management by Anita Sengar, 2012