B. Tech.
COMPUTER SCIENCE AND ENGINEERING
(B.Tech Syllabus)

Department of Computer Science and Engineering
(B. Tech. CSE Programme Accredited by NBA)

VELAGAPUDI RAMAKRISHNA
SIDDHARTHA ENGINEERING COLLEGE
(An Autonomous, ISO 9001:2015 Certified Institution)
(Approved by AICTE, Accredited by NAAC with ‘A’ Grade, Affiliated to JNTUK, Kakinada)
(Sponsored by Siddhartha Academy of General & Technical Education)
Kanuru, Vijayawada
Andhra Pradesh - 520007, INDIA.
www.vrsiddhartha.ac.in
INSTITUTE VISION
To nurture excellence in various fields of engineering by imparting timeless core values to the learners and to mould the institution into a centre of academic excellence and advanced research.

INSTITUTE MISSION
To impart high quality technical education in order to mould the learners into globally competitive technocrats who are professionally deft, intellectually adept and socially responsible. The institution strives to make the learners inculcate and imbibe pragmatic perception and pro-active nature so as to enable them to acquire a vision for exploration and an insight for advanced enquiry.

DEPARTMENT VISION
The department vision is clearly defined and is in line with the college’s vision. The vision of the department is:

"To evolve as a centre of academic excellence and advanced research in Computer Science and Engineering discipline."

DEPARTMENT MISSION
This mission of the Department is concise and supports the College’s mission. The mission of the Computer Science and Engineering Department is:

"To inculcate students with profound understanding of fundamentals related to discipline, attitudes, skills, and their application in solving real world problems, with an inclination towards societal issues and research."
Program Educational Objectives (UG)

We have program educational objectives for our Computer Science and Engineering Program. Program educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

Our Computer Science and Engineering program objectives are:

I. The graduates of the Program will have solid foundation in the principles and practices of computer science, including mathematics, science and basic engineering.

II. The graduates of the Program will have skills to function as members of multi-disciplinary teams and to communicate effectively using modern tools.

III. The graduates of the Program will be prepared for their careers in the software industry or pursue higher studies and continue to develop their professional knowledge.

IV. The graduates of the program will practice the profession with ethics, integrity, leadership and social responsibility.
PROGRAM OUTCOMES

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design
documentation, make effective presentations, and give and receive clear instructions.

**PO11:** Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**PO12:** Lifelong learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

**PROGRAM SPECIFIC OUTCOMES**

**PSO1:** Develop software applications/solutions as per the needs of Industry and society

**PSO2:** Adopt new and fast emerging technologies in computer science and engineering.
# VELAGAPUDI RAMAKRISHNA
SIDDHARTHA ENGINEERING COLLEGE
B.Tech. COMPUTER SCIENCE AND ENGINEERING
SCHEME OF INSTRUCTION [VR17]

### SEMESTER I
Contact Hours: 26

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L – Lecture, T – Tutorial, P – Practical, C – Credits  
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### List of Humanities Electives

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### Semester IV

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L – Lecture, T – Tutorial, P – Practical, C – Credits<br>CE – Continuous Evaluation, SE - Semester-end Evaluation, T – Total Marks

*Students can opt any one of the self-learning courses prescribed by the department. Students should register and complete the opted course in the approved MOOCS platform on or before the Last Instruction Day of V Semester. They have to submit the certificate before the Last Instruction Day of V Semester.*
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L – Lecture, T – Tutorial, P – Practical, C – Credits
CE - Continuous Evaluation, SE - Semester-end Evaluation, T – Total Marks

*Students will go to the society(Villages/Hospitals/Towns etc..) to identify the problem and survey the literature for a feasible solution. The work will be carried out during summer vacation after IV Semester. The students are encouraged to take up the real life problems leading to innovative model building.

**Only students belonging to branches except for CSE and IT are eligible to opt for this course
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L – Lecture, T – Tutorial, P – Practical, C – Credits  
CE - Continuous Evaluation, SE - Semester-end Evaluation, T – Total Marks

*Could be done in a group of students; involves working under a faculty member and carrying out a detailed feasibility study, literature survey and preparing a work plan for major project.
### Semester VIII

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**Contact Hours: 19**

L – Lecture, T – Tutorial, P – Practical, C – Credits
CE - Continuous Evaluation, SE - Semester-end Evaluation, T – Total Marks

*Open Elective- V may also opt as self-learning course. Students should register and complete the opted course in approved MOOCS platform on or before Last Instruction Day of VIII Semester. They have to submit the certificate before the last Instruction Day of VIII Semester. Students who have not opted as a self-learning are required to attend for the class work and internal assessment as per the regular theory course.

**Major project involves continuation of Mini Project. The objective is to complete the work as per the prepared work plan and prepare a detailed project report.
SEMESTER - I
17MA1101
MATRICES AND DIFFERENTIAL CALCULUS

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Determine Eigen values, Eigen vectors of a matrix.

CO2 Estimate Maxima and Minima of Multi Variable Functions.

CO3 Solve the Linear differential equations with constant coefficients.

CO4 Solve the Linear differential equations with variable coefficients.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I

UNIT II
Differential Calculus: Rolle’s Theorem, Lagrange’s Mean Value Theorem, Cauchy’s Mean Value Theorem, Taylor’s Theorem, Maclaurin’s Series.

Application: Curvature, Radius of Curvature.

Functions of two or more Variables: Partial Derivatives, Change of Variables, Jacobians, Taylor’s Theorem for Function of two Variables, Maxima and Minima of Functions of two Variables, Lagrange’s Method of Undetermined Multipliers.

UNIT III
Differential Equations of First Order: Formation of a Differential Equation, Solution of a Differential
Equation, Linear Equations, Bernoulli’s Equation, Exact Differential Equations, Equations Reducible to Exact Equations.

**Applications:** Orthogonal Trajectories, Newton’s Law of Cooling.


**UNIT IV**
Linear Dependence of Solutions, Method of Variation of Parameters, Method of Undetermined Coefficients, Equations Reducible to Linear Equations with Constant Coefficients: Cauchy’s Homogeneous Linear Equation, Legendre’s Linear Equation, Simultaneous Linear Differential Equations with Constant Coefficients.

**Applications:** L-C-R Circuits.

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

[2] nptel.ac.in/courses/122104017
[3] nptel.ac.in/courses/111105035
   www.3.ul.ie/~mlc/support/Loughborough%20website/
17PH1102B
APPLIED PHYSICS

Course Category: Institutional Core
Course Type: Theory
Credits: 3
Lecture -Tutorial-Practice: 3 - 0 - 0
Prerequisites: Basics of Classical Mechanics
Continuous Evaluation: 
Semester end Evaluation: 
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the importance of quantum mechanics.
CO2 Analyse and understand various types of lasers and their applications.
CO3 Elaborate different types of optical fibers and understand holography.
CO4 Understand the fabrication of nanomaterials and carbon Nanotubes.

Contribution of Course Outcomes towards achievement of Program Outcomes (1- Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT-I
Quantum Mechanics: Dual nature of light, Matter waves and Debroglie’s hypothesis, G. P. Thomson experiment, Heisenberg’s uncertainty principle and its applications (Non existence of electron in nucleus, Finite width of spectral lines), One dimensional time independent Schrödinger’s wave equation, physical significance of wave function, Particle in a box (One dimension).

UNIT-II
Lasers: Introduction, Characteristics of laser, absorption, spontaneous emission, stimulated emission, pumping, population inversion, cavity resonance, Einstein’s coefficients, different types of lasers: solid-state lasers (Ruby, Neodymium), gas lasers (He-Ne, CO₂), dye lasers, applications of lasers in science, engineering and medicine.

UNIT- III
Fibre Optics: Introduction, Fundamental of optic fibre, Propagation of light through optical fiber, Types of optical fibers, Numerical aperture, Fractional Refractive Index change, V- number and cut-off Parameters of fibres, Fibre attenuation (losses), Fiber optics in communication and its advantages.

Holography: Basic Principle of Holography, construction of the hologram, reconstruction of the image, applications of holography.

UNIT-IV
Nanotechnology: Basic concepts of Nanotechnology, Nano scale, Introduction to nano materials, Surface to

TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

17CS1103
PROBLEM SOLVING METHODS

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

| CO1 | Understand the Computer problem solving approaches, efficiency and analysis of algorithms |
| CO2 | Apply the factoring methods to solve the given problem |
| CO3 | Apply the array techniques to find the solution for the given problem |
| CO4 | Solve the problems using MATLAB |

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT - I
Introduction to Computer Problem Solving: Programs and Algorithms, characteristics of an algorithm, Requirements for solving problems by computer; Flowchart, pseudo-code The Problem – Solving Aspect: Problem definition phase, Getting started on a problem, Similarities among problems, Working backwards from the solution, General problem-solving strategies; Top-Down design: Breaking a problem into sub-problems, Construction of loops, Establishing initial conditions for loops, Finding the iterative construct, Termination of loops;
The Efficiency of Algorithms: Redundant Computations, Referencing array elements, Inefficiency due to late termination, Early detection of desired output conditions, Trading storage for efficiency gains;
Analysis of Algorithms: Computational complexity, The order notation, Worst and average case behavior.

UNIT - II
Fundamental Algorithms: Problem, Algorithm Development, Algorithm Description - Exchanging values of two variables, Counting, Summation of a set of numbers, Factorial computation, Generation of Fibonacci sequence, Reversing the digits of an Integer. Using pseudo-codes and flowcharts to represent fundamental algorithms.
Factoring Methods: Finding the Square Root of a number: Smallest Divisor of an Integer, GCD of two
Integers, Generating Prime numbers, Computing the Prime Factors of an Integer, Raising a Number to a Large Power, Pseudo random number generation, Computing $n^{th}$ Fibonacci number.

UNIT – III


Merging, Sorting and Searching: Sorting By Selection, Sorting By Exchange, Linear Search, Binary search;

UNIT – IV

MATLAB Environment: User Interface, Syntax and Semantics Operators, Variables and constants: Simple arithmetic calculations. Data types, Control Structures: if…then, loops, Functions, Matrices and Vectors: Matrix manipulations and operations

MATLAB Programming: Reading and writing data, file handling, MATLAB Graphic functions.

TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

17EE1104
BASICS OF ELECTRICAL ENGINEERING

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

| CO1 | Analyze Electric Circuit fundamentals. |
| CO2 | Understand the basic concepts of Alternating Quantities and Magnetic Circuits |
| CO3 | Analyze the basic concepts of Electric Machines |
| CO4 | Understand Measuring Instruments & Solar Photo Voltaic System concepts |

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I

Network Analysis: Network sources-Ideal independent voltage source, Ideal independent current source, Dependent sources, Practical voltage and current sources, Source conversion, Voltage and Current division rule, series and parallel connection of R, L and C, Star-Delta or, Delta- Star transformation. Mesh and Nodal Analysis (with independent sources only).

UNIT II
Alternating Quantities: Introduction; Generation of a.c. voltages, Waveforms and Basic Definitions, Relationship between frequency, speed and number of poles, Root Mean Square and Average values of alternating current and voltages. Form Factor and Peak Factor, Phasor representation of alternating quantities.

Magnetic Circuits: Introduction, Magnetic Circuits, Magnetic Field Strength (H), Magneto motive Force, Permeability, Reluctance, Analogy between Electric and Magnetic Circuits, Magnetic potential drop, Magnetic...
UNIT III

UNIT IV
Solar photovoltaic Systems: Solar cell fundamentals, characteristics, classification, module, panel and array construction, Maximizing the solar PV output and load matching, Maximum Power Point Tracker(MPPT), Balance of system components, solar PV systems and solar PV applications.

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
17HS1105
TECHNICAL ENGLISH & COMMUNICATION SKILLS

<table>
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<td>Basic understanding of the language skills ,viz Listening, Speaking, Reading and Writing, including Sentence construction abilities</td>
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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1** Develop administrative and professional compilations including web related(On-line) communication with felicity of expression
- **CO2** Demonstrate Proficiency in Interpersonal Communication, in addition to standard patterns of Pronunciation
- **CO3** Apply the elements of functional English with sustained understanding for authentic use of language in any given academic and/or professional environment
- **CO4** Execute tasks in Technical communication with competence

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT 1

**Professional Writing Skills:**
- **Professional Letters:**
  Business, Complaint and Transmittal – Purpose, Style and format with special reference to Block Format and Modified Block Format
- **Essay Writing:**
  Descriptive and Analytical with illustrations
- **Administrative and On-line drafting skills:**
  Minutes- Purpose, Scope and Illustrations
Web notes including Basics of e-mail- Chat-room interaction, Written Response to web-content, Basics of Format and etiquette for e-mail

UNIT II
Phonetics and Interpersonal Communication Skills

➢ Transcription using International Phonetic Alphabet
➢ Word Stress (Primary) and Rhythm with practice
➢ Speech/Conversational acts- Extending Invitation, Reciprocation, Acceptance, Concurrence, Disagreeing without being disagreeable-

Written Form: Discourse/dialogue development and identification of inconsistencies in pre-prepared dialogues
Spoken Form: Role play

UNIT III
Vocabulary and Functional English

➢ Root words (A Representative collection of 50 )
➢ Vocabulary for Competitive examinations ( A list of 500 High frequency words) - Direct meaning, Matching and Cloze test
➢ Verbal analogies(Single Unit) – Synonym Relation, Antonym relation, Object- Operator relation, Object-Obstacle/obstruction relation, Sequence Relation, Place-Monument Relation, Science- area of activity relation, Profession- Tool relation, Gender relation, Diminutive relation, etc
➢ Confusables- Homonyms, Homophones and nearer words (A Representative collection of 100 )
➢ Idiomatic expressions- Myth-based, Folklore based, life-based- Meanings, along with sentential illustrations
➢ Phrasal Collocations- Representative collection of 50 -Meanings, along with sentential illustrations
➢ Exposure through Reading Comprehension- Skimming, Scanning and tackling different kinds of questions including interpretation of graphs and statistical data
➢ Functional Grammar with special reference to Tense, Concord, Articles, pronoun-referent, Prepositions, use of Gerund,Parallelism etc ( A Representative collection of 100 sentences)

UNIT IV
Technical Communication skills:

➢ Technical Proposal writing- Characteristics, Proposal Superstructure, Checklist , Formal Proposal
➢ Technical Vocabulary- Basic explanations and Description
➢ Introduction to Executive summary – Purpose and illustration
➢ Technical Report writing- Informational Reports and Feasibility Report- Types, Components, Style and Formats

TEXT BOOKS


“Eclectic Learning materials offered by the Department”

REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL
    www.natcorp.ox.ac.uk/Wkshops/Materials/specialising.xml?ID=online Accessed on 15th June 2017
# 17PH151B

**ENGINEERING PHYSICS LABORATORY**

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1**: Use function generator, spectrometer and travelling microscope in various experiments
- **CO2**: Test optical components using principles of interference and diffraction of light
- **CO3**: Determine the V-I characteristics of solar cell and photo cell and appreciate the accuracy in measurements

## Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

1. Photo cell-Study of V-I Characteristics, determination of work function
3. Compound pendulum-Measurement of ‘g’
4. LCR circuit- Study Resonance
5. AC Sonometer –Verification of vibrating laws
6. Solar cell–Determination of Fill Factor
7. Diffraction grating-Wavelength of laser light
8. Optical fiber- Study of attenuation and propagation characteristics
10. Hall effect –Hall coefficient measurement
11. Figure of merit of a galvanometer
12. Variation of magnetic field along the axis of current-carrying circular coil

## TEXT BOOKS


## E-RESOURCES
VIRTUAL LAB REFERENCES

17CS1152
COMPUTING AND PERIPHERALS LABORATORY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand and Apply MS Office tools
CO2 Configure the components on the motherboard and install different operating systems
CO3 Understand and configure different storage media
CO4 Perform Networking, troubleshooting and system administration tasks

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

CYCLE - I: Word Processing, Presentations and Spread Sheets

1. Word Processing:
   a) Create personal letter using MS Word.
   b) Create a resume using MS Word.
   c) Creating project abstract: Features to be covered:- Table of Content, List of Tables, Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check,Track Changes.
   d) Creating a Newsletter: Features to be covered:- Table of Content, List of figures, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphsand Mail Merge in word.

2. Spread Sheets:
   a) Create a worksheet containing pay details of the employees.
   b) Creating a Scheduler: Features to be covered:- Gridlines, Format Cells, Summation, auto fill,Formatting Text
   c) Create a worksheet which contains student results: .Features to be covered:- Cell Referencing, Formulae in excel – average, Charts, Renaming and Inserting worksheets, Hyper linking, Count
function, LOOKUP/VLOOKUP, Sorting, Conditional formatting
d) Create a worksheet importing data from database and calculate sum of all the columns.

3. Presentations:
a) Create a presentation using themes.
b) Save, edit, print and import images/videos to a presentation.
c) Create a power Point presentation on business by using master layouts, adding animation to a presentation and see the presentation in different views.

4. MS Access:
a) Create simple table in MS Access for results processing.
b) Create a query table for the results processing table.
c) Create a form to update/modify the results processing table.
d) Create a report to print the result sheet and marks card for the result.

CYCLE - II: Hardware Experiments
2. Install and Configure a DVD Writer or a Blu-ray Disc writer.
3. Install windows operating system and check if all the device (graphics, sound, network etc.) drivers are installed.
4. Install Linux operating system and check the working of all devices (graphics, sound, network etc.) in the computer.
5. Assemble a Pentium IV or Pentium Dual Core Pentium Core2 Duo system with necessary peripherals and check the working condition of the PC.
6. PC system layout: Draw a Computer system layout and Mark the positions of SMPS, Mother Board, FDD, HDD, and CD-Drive/DVDDrive add on cards in table top / tower model systems.
7. Mother Board Layout: Draw the layout of Pentium IV or Pentium Dual Core or Pentium Core2 DUO motherboard and mark Processor, Chip set ICs. RAM, Cache, cooling fan, I/O slots and I/O ports and various jumper settings.
8. Configure BIOS setup program to change standard and advanced settings to troubleshoot typical problems.
9. Install and configure Printer/Scanner/Web cam/Cell phone/bio-metric device with system. Troubleshoot the problems

CYCLE – III : Networking
1. Prepare an Ethernet/UTP cable to connect a computer to network switch. Crimp the 4 pair cable with RJ45 connector and with appropriate color code.
2. Manually configure TCP/IP parameters (Host IP, Subnet Mask and Default Gateway) for a computer and verify them using IPCONFIG command. Test connectivity to a server system using PING command.
3. Creating a shared folder in the computer and connecting to that folder using Universal Naming Convention (UNC) format. (Ex: computername sharename)
4. Connects computers together via Switch/ Hub
5. Connect different devices via Switch/Hub
6. Statically configure IP address and subnet mask for each computer
7. Examine non-existent IP address and subnet conflicts
8. Configure a computer to connect to internet (using college internet settings) and troubleshoot the problems using PING, TRACERT and NETSTAT commands.
10. Configure DNS to establish interconnection between systems and describe how a name is mapped to IP Address.
12. Installation Antivirus and configure the antivirus.
13. Introducing Ethereal, a packet capture tool.

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] Numerical Methods and Programming by Prof. P.B. Sunil Kumar, Department of Physics, IIT Madras
https://www.youtube.com/watch?v=zjyR9e-#1D4&list=PLC5DC6AD60D798FB7 Last accessed on 01-06-2017

17ME1153
BASIC WORKSHOP

Course Category:    Engineering Sciences
Course Type:        Laboratory
Prerequisites:      -

Credits: 1.5
Lecture -Tutorial-Practice: 0 - 0 - 3
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Model and develop various basic prototypes in the Carpentry trade.
CO2 Develop various basic prototypes in the trade of Welding.
CO3 Model and develop various basic prototypes in the trade of Tin Smithy.
CO4 Familiarize with various fundamental aspects of house wiring.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
Carpentry:
   a. Study of tools & operations and various carpentry joints.
   b. Practice of open bridle joint, Cross half lap joint, Half LapT Joint, and Dove tail joint
   c. Simple group exercise like preparation of single widow frame.

UNIT II
Welding:
   a. Study of tools and operations of Gas welding and arc welding.
   b. Practice of various joints like weld layer practice, V- Butt Joint, Double parallel fillet joint, T-Joint, and Corner Joint.

UNIT III
Tin Smithy:
   a. Study of tools & operations
   b. Practice of various joints like Saw Edge, Wired Edge, Lap Seam, and Grooved Seam.
   c. Simple exercise like Fabrication of square tray.

UNIT IV
House Wiring:
   a. To connect one lamp with one switch.
b. To connect two lamps with one switch.
c. To connect a fluorescent Tube.
d. Stair case wiring.
e. Godown wiring.
f. Study of single phase wiring for a office room.
g. Nomenclature & measurement of wire gauges and cables.
h. Estimation of cost of indoor wiring for a wiring diagram (plan of a building).
i. Test procedure for continuity of wiring in a electric installation.
j. Measurement of electric energy by using meter.

**TEXT BOOKS**


**REFERENCE BOOKS**

# 17MC1106A
TECHNOLOGY AND SOCIETY

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

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<th>Understand the origins of technology and its role in the history of human progress.</th>
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<td>Know the Industrial Revolution and its impact on Society</td>
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<td>CO3</td>
<td>Interpret the developments in various fields of technology till Twentieth Century.</td>
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<td>CO4</td>
<td>Distinguish the impacts of Technology on the Environment and achievements of great scientists.</td>
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### Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

**UNIT – I**


**UNIT - II**

**Industrial revolution:** The social and political background, The technical background, Steam: The power behind the Indristrial Revolution, The revolution in Textile Industry, The Impaact of Industriul Revolution on Society.

**UNIT - III**

**The Flowering of modern technology:** Manufacturing Technologies, Prime Movers, Internal Combustion engines, Production of Metals and Alloys, The Birth of Electrical Technology, Twentieth Century: The
Flowering of modern technology

UNIT - IV
Achievements of famous scientists:

TEXT BOOKS


REFERENCE BOOKS

SEMESTER - II
17MA1201
LAPLACE TRANSFORMS AND INTEGRAL CALCULUS

Course Category: Institutional Core
Course Type: Theory
Prerequisites: Vectors, Curve Tracing.

Credits: 4
Lecture -Tutorial-Practice: 3 - 1 - 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Solve Linear Differential Equations using Laplace Transforms.
CO2 Examine the nature of the Infinite series.
CO3 Evaluate areas and volumes using Double, Triple Integrals.
CO4 Convert Line Integrals to Area Integrals and Surface Integrals to Volume Integrals.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I

UNIT II

UNIT III
**Special Functions**: Beta Function, Gamma Function, Relation between Beta and Gamma Function, Error Function.

**UNIT IV**

**Vector Calculus**: Scalar and Vector point functions, Del applied to Scalar point functions, Del applied to Vector point functions, Physical interpretation of Divergence, Del applied twice to point functions, Del applied to products of point functions. Integration of Vectors, Line Integral, Surface Integral, Green’s Theorem in a plane, Stokes’s Theorem, Volume Integral, Gauss Divergence Theorem, Irrotational Fields.

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

[2] nptel.ac.in/courses/122104017  Last accessed on 01-06-2017
[3] nptel.ac.in/courses/111105035  Last accessed on 01-06-2017
17CH1202A
ENGINEERING CHEMISTRY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Analyze various water treatment methods and boiler troubles.

CO2 Apply the principles of spectroscopic techniques to analyse different materials and apply the knowledge of conventional fuels for their effective utilisation.

CO3 Apply the knowledge of working principles of conducting polymers, electrodes and batteries for their application in various technological fields.

CO4 Evaluate corrosion processes as well as protection methods.

Contribution of Course Outcomes towards achievement of Program Outcomes (1-Low, 2-Medium, 3-High)

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COURSE CONTENT

UNIT I
Water technology-I: WHO standards - Water treatment for drinking purpose - sedimentation, coagulation, filtration, disinfection by chlorination, breakpoint chlorination and its significance - Desalination of brackish water - principle and process of electrodialysis and reverse osmosis, advantages and disadvantages.

Water technology-II: Boiler troubles - scales-formation, disadvantages and internal conditioning methods - phosphate conditioning, calgon conditioning and sodium aluminate, caustic embrittlement- reasons, mechanism and its control, and boiler corrosion – causes and control.

UNIT II

Fuel Technology: Fuel-definition, calorific value- lower and higher calorific values, analysis of coal – proximate analysis and ultimate analysis, refining of petroleum, flue gas analysis by Orsat’s apparatus, numericals based on calculation of air required for combustion

UNIT III
**Electrochemistry:** Construction and working of Calomel electrode, silver-silver chloride electrode and principle, construction and working of glass electrode, determination of pH using glass electrode - Chemistry of modern batteries - Li/SOCl₂ battery and Li₃C/LiCoO₂ battery - construction, working and advantages, Chemistry of H₂-O₂ fuel cell-advantages.

**UNIT IV**

**Corrosion principles:** Introduction, definition, reason for corrosion, examples – electrochemical theory of corrosion, types of electrochemical corrosion - hydrogen evolution and oxygen absorption – corrosion due to dissimilar metals, galvanic series – differential aeration corrosion – pitting corrosion and concept of passivity.

**Corrosion control methods:** Cathodic protection- principle and types - impressed current method and sacrificial anode method, anodic protection-principle and method, corrosion inhibitors – types and mechanism of inhibition – principle, process and advantages of electroplating and electroless plating.

**TEXT BOOKS**


**REFERENCE BOOKS:**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

[3] [http://nopr.niscair.res.in/bitstream/123456789/5475/1/JSIR%2063%289%29%20715-728.pdf](http://nopr.niscair.res.in/bitstream/123456789/5475/1/JSIR%2063%289%29%20715-728.pdf) Last accessed on 01-06-2017
17CS1203
PROGRAMMING IN C

Course Category: Institutional Core
Course Type: Theory
Credits: 3
Prerequisites: Problem Solving Methods.
Lecture -Tutorial-Practice: 3 -0 – 0
Continuous Evaluation: Semester end Evaluation:
Total Marks: 30
70
100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the fundamentals and structure of a C programming language

CO2 Apply the loops, arrays, functions and string concepts in C to solve the given problem.

CO3 Apply the pointers and text input output files concept to find the solution for the given applications.

CO4 Use the Enumerated, Datatypes, Structures and Unions.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT - I
Introduction to the C Language: Background, C Programs, Identifiers, Types, Variables, Constants, Input/Output, Programming Examples.
Structure of a C Program: Expressions, Precedence and Associatively, Evaluating Expressions, Type Conversion, Statements, Sample Programs.
Selection: Storage Class, Logical Data and Operators, Two -Way Selection, Multiway Selection, More Standard Functions

UNIT - II
Repetition: Concept of a Loop Loops In C, Loop Examples, Recursion, The Calculator Program.
Strings: String Concepts, C Strings, String Input/Output Functions, Arrays of Strings, String Manipulation Functions, String- Data Conversion.
UNIT - III
**Pointers:** Introduction, Pointers For Inter Function Communications, Pointers to Pointers, Compatibility, Lvalue and Rvalue.

**Pointer Applications:** Arrays and Pointers, Pointer Arithmetic and Arrays, Passing an Array to a Function, Memory Allocations Functions, Array of Pointers.

**Text Input/output:** Files, Streams, Standard Library Input/Output Functions, Formatting Input/output Functions and Character Input/Output Functions, Command-Line Arguments.

UNIT - IV

**Enumerations:** The Type Definition(Typedef) , Enumerated Types: Declaring an Enumerated Type , Operations on Enumerated Types, Enumeration Type Conversion, Initializing Enumerated Constants, Anonymous Enumeration: Constants, Input/Output Operators.

**Structures:** Structure Type Declaration, Initialization, Accessing Structures, Operations on Structures, Complex Structures, Structures and Functions, Sending the Whole Structure, Passing Structures through Pointers.

**Unions:** Referencing Unions, Initializers, Unions and Structures, Internet Address, Programming Applications.

TEXT BOOKS


REFERENCE BOOKS

17EC1204A
BASIC ELECTRONIC ENGINEERING

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1** Gain Knowledge about the Fundamentals of electronic components, devices, transducers
- **CO2** Understand and apply Principles of digital electronics
- **CO3** Get familiar to the basic communication systems.

**Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)**

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COURSE CONTENT

**UNIT I**

**UNIT II**
Transducers: Transducers - Instrumentation - general aspects, classification of transducers, basic requirements of transducers, passive transducers - strain gauge, thermistor, Hall-Effect transducer, LVDT, and active transducers - piezoelectric and thermocouple.

**UNIT III**
Digital Electronics: Number systems - binary codes - logic gatesBoolean algebra, laws & theorems - simplification of Boolean expression - Implementation of Boolean expressions using logic gates – standard forms of Boolean expression.

**UNIT IV**
Communication Systems: Block diagram of a basic communication system - frequency spectrum - need for modulation - methods of modulation - principles of AM, FM, pulse, analog and pulse digital modulation - AM / FM transmitters & receivers (block diagram description only).

TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL


## 17ME1205
### ENGINEERING GRAPHICS

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### COURSE OUTCOMES:

Upon successful completion of the course, the student will be able to:

| CO1 | Understand the Scales, conics and Cycloidal curves. |
| CO2 | Draw Orthographic projections of points, Lines, Planes and Solids |
| CO3 | Understand Sectional views of Solids, Development of surfaces and their representation |
| CO4 | Construct isometric scale, isometric projections, isometric views and convert pictorial views to orthographic projections |

#### Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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### COURSE CONTENT

#### UNIT – I

**Introduction to Engineering Drawing:** Principles of Engineering Graphics and their Significance  
**Scales:** Construction of plain and diagonal Scales  
**Conic Sections:** Construction of ellipse, parabola and hyperbola (Treatment is limited to Eccentricity or General method only)  
**Engineering Curves:** Cycloidal curves - Cycloid, Epicycloid and Hypocycloid

#### UNIT – II

**Orthographic Projections:** Principles of Orthographic Projections – Projections of Points, Lines (Treatment is limited to First Angle Projection) and Projections of Plane regular geometric figures (Up to Plane Inclined to both of the Reference planes)

#### UNIT – III

**Projections of Solids:** Projections of simple solids such as Cubes, Prisms, Pyramids, Cylinders and Cones with varying positions (Limited to Solid Inclined to one of the Reference planes)  
**Sections of Solids:** Sections of solids such as Cubes, Prisms, Pyramids, Cylinders and Cones. True shapes of sections (Limited to the solids perpendicular to one of the Principal Planes)

#### UNIT – IV

**Development of Surfaces:** Lateral development of cut sections of Cubes, Prisms, Pyramids, Cylinders and Cones  
**Isometric Projections:** Isometric Projection and conversion of isometric views into Orthographic Projections (Treatment is limited to simple objects only)  
**Conventions Auto CAD:** Basic principles only (Internal assessment only)

### Text Books


Reference Books


E-Resources and other digital material


17CH1251
ENGINEERING CHEMISTRY LABORATORY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Analyze quality parameters of water samples from different sources

CO2 Perform quantitative analysis using instrumental methods.

CO3 Apply the knowledge of mechanism of corrosion inhibition, metallic coatings and photochemical reactions.

Contribution of Course Outcomes towards achievement of Program Outcomes
(1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

List of Experiments:

1. Determination of total alkalinity of water sample
2. Determination of chlorides in water sample
3. Determination of hardness of water sample
4. Determination of available chlorine in bleaching powder
5. Determination of copper in a given sample
6. Determination of Mohr’s salt – Dichrometry
7. Determination of Mohr’s salt – Permanganometry
8. Determination of purity of boric acid sample
9. Conductometric determination of a strong acid using a strong base
10. pH metric titration of a strong acid vs. a strong base
11. Determination of corrosion inhibition efficiency of an inhibitor for mild steel
12. Chemistry of Blue Printings
13. Preparation of Urea-Formaldehyde resin

REFERENCE BOOKS
17CS1252
COMPUTER PROGRAMMING LABORATORY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Implement the use of programming constructs in a structured oriented programming language

CO2 Analyze and implement user defined functions to solve real time problems

CO3 Implement the usage of pointers and file operations on data

CO4 Implement the user defined data types via structures and unions to solve real life problems

Contribution of Course Outcomes towards achievement of Program Outcomes
(1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

CYCLE – I: PROGRAMMING CONSTRUCTS AND CONTROL STRUCTURES

1. Introduction to C Programming:
   a) Use of Turbo C IDE
   b) The Structure of C Program with Sample program

2. Data Types and Variables:
   a) Programs to usage of keywords and identifiers in c
   b) Programs on declaration of variables, rules for naming a variable, constants and different type of constants, data types
   c) Programs to perform on various operators in C

3. Branching and Selection:
   a) To specify the conditions under which a statement or group of statements should be executed.
   b) To choose exactly one out of two statements (possibly compound statements) to be executed; specifies the conditions under which the first statement is to be executed and provides an alternative statement to execute if these conditions are not met.
   c) To choose one statement (possibly compound) to be executed from among a group of state- ments (possibly compound); specifies the conditions under which each statement may be executed and
may contain a default statement (in an else clause at the end) to be executed if none of these conditions are met. Note that in the absence of a final else clause, it may be the case that none of the statements are executed.

4. Unconditional control Transfer statements in C:
   a) Design and develop programs that use of goto Statement
   b) Design and develop programs that the use of Break Statement
   c) Design and develop programs that use of Continue Statement

5. Looping constructs:
   Design and develop programs based on
   a) Iterative loops using While, Do While, For, Nested For
   b) Selection Statement using the switch-case Statement
   c) Multiple way selections that will branch into different code segments based on the value of a variable or expression

6. Arrays
   a) Design and develop programs which illustrates the implementation of single-dimensional arrays and Multi-dimensional arrays

7. Strings
   a) Create programs to initialize strings and usage of them for various input, output operations.
   b) Design and develop programs to handle String functions

CYCLE II: ADVANCED PROGRAMMING CONSTRUCTS

1. Concept of user defined functions
   a) Design and develop programs depending on functions both user defined and standard library functions in C with different approaches.

2. File handling operations
   a) FILE structure
   b) Opening and closing a file, file open modes
   c) Reading and writing operations performed on a file
   d) File Pointers: stdin, stdout and stderr
   e) FILE handling functions: fgetc(), fputc(), fgets() and fputs() Functions

3. Pointers:
   a) Programs on declaration of pointers and their usage in C
   b) Programs to relate between arrays and pointers and use them efficiently in a program
   c) To pass pointers as an argument to a function, and use it efficiently in program

4. Command Line Arguments
   a) Design and develop programs that accept arguments from command line to perform different kinds of operations

5. Structures and Unions
   a) Programs to define, declare and access structure and union variables
   b) Design and develop programs to work with pointers to access data within a structure

Programs to pass structure as an argument to a function

TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] Introduction to Programming C: http://nptel.ac.in/courses/106104128/
   C-Programming - IIT Kharagpur lectures  Last accessed on 01-06-2017
[2] https://www.youtube.com/watch?v=S47aSEqm_0I&list=PLeCxvb23g7hrw27XlekHtfigUTQ0TmFfP  
Last accessed on 01-06-2017

[3] Numerical Methods and Programming by Prof. P.B. Sunil Kumar, Department of Physics, IIT Madras  
https://www.youtube.com/watch?v=zjyR9e-N1D4&list=PLC5DC6AD60D798FBF7  
Last accessed on 01-06-2017
17MC1206B
PROFESSIONAL ETHICS & HUMAN VALUES

Course Category: Mandatory Learning  Credits: -
Course Type: Theory  Lecture -Tutorial-Practice: 2 - 0 - 0
Prerequisites: -  Continuous Evaluation: 100
  Semester end Evaluation: 0  Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

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<td>Know the moral autonomy and uses of ethical theories.</td>
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<td>CO2</td>
<td>Understand morals, Honesty and character.</td>
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<tr>
<td>CO3</td>
<td>Understand about safety, risk and professional rights.</td>
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<tr>
<td>CO4</td>
<td>Know the ethics regarding Global issues related to Environment, Computers and weapon’s development.</td>
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Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I

UNIT II

UNIT III
Engineering as Social Experimentation: Engineering as experimentation – engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study, Safety, Responsibilities and Rights: Safety and risk - assessment of safety and risk - risk benefit analysis and reducing

UNIT IV
Global Issues: Multinational corporations- Environmental ethics- computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral leadership-sample code of Ethics (Specific to a particular Engineering Discipline).

TEXT BOOKS

REFERENCE BOOKS
SEMESTER - III
# 17MA1301B
## PROBABILITY AND STATISTICS

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

| CO1       | Understand random variables, Probability distributions. |
| CO2       | Apply random phenomena of sample to test the Hypothesis concerning means. |
| CO3       | Test the Hypothesis concerning variance and proportions. |
| CO4       | Analyze Quality improvement, control charts and reliability to improve Statistical skills. |

## Contribution of Course Outcomes towards achievement of Program Outcomes (1- Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

### UNIT I

**Probability Distributions:** Random Variables (discrete and continuous), Expectation, Variance and Standard deviation of discrete random variable, Binomial distribution, Poisson distribution.

**Probability Densities:** Expectations, Variance and standard deviation of continuous random variables, Normal distribution, Normal approximation to the Binomial distribution, Other probability densities - Uniform distribution, Log normal distribution, Gamma distribution, Beta distribution, Weibull distribution.

### UNIT II

**Sampling Distributions:** Introduction, Populations and Samples

**Inferences Concerning Mean:** Point Estimation- Interval Estimation

Test of Hypothesis – Null Hypothesis and Tests of Hypothesis – Hypothesis concerning one mean – Relation between tests and Confidence intervals – Operating characteristic curves - Inferences concerning two means.

### UNIT III

**Inferences Concerning Variances:** Estimation of variances- Hypothesis concerning one variance- Hypothesis
concerning two variances.

**Inference Concerning Proportions**: Estimation of Proportions - Hypothesis concerning one Proportion - Hypothesis concerning several Proportions – The Analysis of r x c Tables - Goodness of fit.

**UNIT IV**

**The Statistical Content of Quality Improvement Programs**: Quality Control - Control Charts for Measurements - Control Charts for Attributes.

**Applications to Reliability and Life Testing**: Reliability - Failure – Time Distributions – The Exponential Model in Reliability.

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] probweb.berkeley.edu/teaching.html  Last accessed on 01-06-2017


[3] video lectures.nptel.iitm.ac.in  Last accessed on 01-06-2017
# 17CS3302
## OBJECT ORIENTED PROGRAMMING USING JAVA

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| Lecture -Tutorial-Practice: | 3 - 0 - 0 |
| Continuous Evaluation:      | 30        |
| Semester end Evaluation:    | 70        |
| Total Marks:                | 100       |

## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

| CO1  | Understand the concepts of object oriented programming. |
| CO2  | Implement multiple inheritance through interfaces.    |
| CO3  | Apply exception, thread capabilities and Collections framework. |
| CO4  | Develop Graphical user interface applications using Applet |

## Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

### UNIT I
Introduction to Java: Java history, java features, how java differs from C and C++.
Data Types, variables and arrays: Java keywords, Primitive types, Integers, Floating-Point Types, Characters, Booleans, Variables, Type Conversion, casting and Arrays.
Classes and objects: Class fundamentals, declaring objects, assigning object reference variables, introducing methods, constructors, this keyword, Garbage collection, overloading methods, using objects as parameters, returning objects, static and final keywords, nested and inner classes.

### UNIT II
String Handling: The String Constructors, String Buffer Class, String Tokenizer class.
Inheritance: Inheritance basics, using super, multilevel hierarchy, method overriding, dynamic method dispatch, using abstract classes, final with inheritance.
Packages & Interfaces: Defining a package, finding package and CLASSPATH. Access protection, importing packages, Defining an interface, implementing interfaces, nested interfaces, applying interfaces, variables in interfaces.

UNIT III
Exception handling: Exception handling fundamentals, exception types, uncaught exceptions, using try and catch, multiple catch clauses, throw, throws, finally, creating your own exception subclasses.

UNIT – IV
Event Handling: The delegation event model- Events, Event Sources, Event Listeners. Event Classes, Event Listener Interfaces, Using the delegation Event Model, Adapter Classes.

TEXT BOOKS

REFERENCE BOOKS

E- RESOURCES AND OTHER DIGITAL MATERIAL
### 17CS3303
**DATA STRUCTURES**

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#### COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1**: Apply linear data structures to different applications.
- **CO2**: Solve problems using linked list.
- **CO3**: Implement operations on binary trees and binary search trees.
- **CO4**: Implement different searching and sorting algorithms.

#### Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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#### COURSE CONTENT

**UNIT I**

**Introduction**: Basic Concepts, Algorithm Specification, Data Abstraction, Performance Analysis-Time complexity, Space complexity, Asymptotic Notations, **Searching**: Linear Search and Binary Search Techniques and their complexity analysis.


**Queues**: Queue and its Sequential Representation, Queue as an abstract data type, Types of Queue: Simple Queue, Circular Queue, Operations on each types of Queues: Algorithms.

**UNIT II**

**Linked lists**: Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list; Linked representation of Stack and Queue, Doubly linked list: operations and algorithms; Circular Linked Lists: all operations their algorithms. Polynomials: Addition, Multiplication.

**UNIT III**

**Trees**: **Introduction**: Terminology, Representation of Trees
**Binary Trees:** Properties of binary trees, binary tree representation, Complete Binary Tree, Applications of Binary Trees, Expression trees construction and evaluation.

**Binary Tree Traversals:** Inorder, Preorder and Postorder – recursive and non-recursive.

**Threaded Binary Tree:** Threads, Inorder Traversal of Threaded Binary Tree, Inserting a Node into a Threaded Binary Tree

**Binary Search Trees:** Definition, searching a Binary Search Tree (BST), Insertion into a binary search tree, Deletion from a binary search tree.

**UNIT IV**

**Sorting:** Insertion Sort, Selection Sort, Bubble Sort, Quick Sort, Merge Sort, Radix Sort.

**Hashing**

**Static Hashing:** Hash Tables, Hash Functions, Overflow Handling

**Dynamic Hashing:** Motivation for Dynamic Hashing, Dynamic Hashing using Directories, Directory less Dynamic Hashing

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**


# 17CS3304
## DIGITAL LOGIC DESIGN

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1** Apply Boolean laws & theorems to digital Logic functions.
- **CO2** Simplify the Boolean functions to the minimum number of literals.
- **CO3** Design different types of combinational logic circuits.
- **CO4** Design clocked sequential logic circuits using flip flops.
- **CO5** Design different types of Counters, Registers and Programmable Logic Devices.

## Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

### UNIT I

**Boolean algebra And Logic Gates:**

**Simplification Of Boolean Functions:**
UNIT II


**Combinational Logic with MSI and LSI**: Binary Parallel Adder, Decimal Adder, Magnitude Comparator, Decoders, demultiplexers, encoders, Multiplexers.

UNIT III

**Sequential Logic**: Sequential circuits, Classification, Latches, Flip Flops, Triggering of Flip-Flops, Master slave flip-flop, Flip-Flop Excitation tables, flip-flop direct inputs.

**Analysis of Clocked Sequential Circuits**: State table, State diagram, state equations, State Reduction and Assignment, Design Procedure, design with unused states, Design of Counters.

UNIT IV

**Registers, Counters**: Registers, Shift Registers, Asynchronous Counters, Synchronous Counters, Ring Counter, Johnson Counter, Timing Sequences.

**Programmable Logic**: Read only memory (ROM), Programmable read only memory (PROM), Programmable Logic Array (PLA), Programmable Array Logic (PAL), Introduction to FPGA.

TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL


17HS2305A
YOGA & MEDITATION

Course Category: Humanities Elective
Course Type: Practical
Prerequisites: -

Credits: 1
Lecture -Tutorial-Practice: 1-0-0
Continuous Evaluation: 100
Semester end Evaluation: -
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Equip better attitude and behaviour.
CO2 Imbibe set of values enabling a balanced life focused on an ethical material life.
CO3 Develop levels of concentration through meditation
CO4 Apply conscience for the missions of life

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
Understanding Yoga: Orientation, Introduction to Values, The positive impact of yoga, Application of Values in real life, Universal values
(Lec-demo pattern with illustrations representing Yogic Postures and value system related pictorial is followed)

UNIT II
Yogic Practices: Yoga, Self and Ultimate goal of yoga, Introduction to various types of yoga, Integration of values in Yoga.
(Activity based processes with Assasanas and Pranayama are implemented)

UNIT III
Practice of Meditation: Art of Meditation, Observation, Introspection, Contemplation, Meditation and Concentration
(Activity based processes involving Mediation sessions followed by demonstrations are implemented)

UNIT IV
Towards professional excellence through Yoga and meditation: Stress Management, Choices we make, Excellence and Integration
(Lec-demo pattern is followed)

TEXT BOOKS

[1] Common Yoga protocol, Ministry of Ayush, Govt of India

REFERENCE BOOKS

[1] Lectures from Colombo to Almora, Swami Vivekakanada, 2010 Ramakrishna Mission

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] www.heartfulness.org accessed on 27th April 2018
# 17HS2305D

**PHILOSOPHY**

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1** Understand major philosophical issues.
- **CO2** Appreciate the philosophical doctrines of western thinkers.
- **CO3** Understand the eminence of Indian classical thought.
- **CO4** Appreciate relation between science and values.

### Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

**UNIT I**  
What’s Philosophy: Definition, Nature, Scope and Branches

**UNIT II**  
Introduction to Western Philosophy: Ancient Greek and Modern philosophy

**UNIT III**  
Introduction to Indian Thought: Six systems – Modern philosophers

**UNIT – IV**  
Philosophy of Science & Technology: Human values and professional Ethics
**TEXT BOOKS**


**REFERENCE BOOKS**

[1] “Six systems of Indian Philosophy”, DH Dutta  
# 17HS2305 12
**FOREIGN LANGUAGE - GERMAN**

| **Course Category:** | Humanities Elective | **Credits:** | **1**
|----------------------|--------------------|-------------|------|
| **Course Type:**     | Theory             | **Lecture -Tutorial-Practice:** | **1-0-0**
| **Prerequisites:**   | -                  | **Continuous Evaluation:**     | **100**
|                      |                    | **Semester end Evaluation:**   | **-**
|                      |                    | **Total Marks:**               | **100**

## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1**: Learn basics of German Language.
- **CO2**: Write German Writing
- **CO3**: Understand German Hearing
- **CO4**: Form sentence in Present, Past and Future tense

### Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

### UNIT I
- Alphabets, Numbers, Exact articles and not exact Articles

### UNIT II
- Prepositions, Present Tense

### Unit -III
- Past Tense and about family

### UNIT – IV
- Future Tenses

## TEXT BOOKS

17HS2305J
PSYCHOLOGY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1: Relate biological and socio-cultural factors in understanding human Behaviour.

CO2: Understand the nature of sensory processes, types of attentions.

CO3: Explain different types of learning and procedures, distinguishes between different types of memory.

CO4: Demonstrate an understanding of some cognitive processes involved in Problem solving and decision-making.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
Introduction: Psychology as a scientific study of behaviour. Biological and sociocultural bases of behaviour, fields of psychology.

UNIT II
Sensory and perceptual processes: Sensation, attention and perception.

UNIT III
Cognition and Affect: Learning and memory. Emotion and motivation.

UNIT – IV
Thinking, problem solving and decision making, Personality and intelligence.
TEXT BOOKS


REFERENCE BOOKS

# 17TP1306
**LOGIC AND REASONING**

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

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<tr>
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<th>Think reason logically in any critical situation</th>
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<td>Analyze given information to find correct solution</td>
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<td>CO3</td>
<td>To reduce the mistakes in day to day activities in practical life</td>
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<td>CO4</td>
<td>Develop time-management skills by approaching different shortcut methods</td>
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<td>CO5</td>
<td>Use mathematical based reasoning to make decisions</td>
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<tr>
<td>CO6</td>
<td>Apply logical thinking to solve problems and puzzles in qualifying exams in any competitive exam</td>
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## Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

### UNIT I:

1. Series Completion,
2. Coding-Decoding,
3. Blood Relations,
4. Puzzles test
UNIT II:
1. Direction sense test,
2. Logical Venn diagrams,
3. Number test, ranking test,
4. Mathematical operations

UNIT III:
1. Arithmetical Reasoning,
2. Inserting missing character,

UNIT IV: Non – Verbal:
1. Water images,
2. Mirror images,
3. Paper folding,
4. Paper cutting,
5. Embedded Figures,
6. Dot situation,
7. Cubes & Dice

TEXT BOOKS

17CS3351
OBJECT ORIENTED PROGRAMMING LABORATORY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the concepts of object oriented programming.

CO2 Implement multiple inheritance through interfaces.

CO3 Apply exception, thread capabilities and Collections framework.

CO4 Develop Graphical user interface applications using Applet

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT/TASK

Task 1: Implement the concept of classes and objects.

Task 2: Implement Arrays to a given application.

Task 3: Develop Java Application using inheritance.

Task 4: Use String and String Tokenizer classes and develop a java application.

Task 5: Use interfaces and develop a java application.

Task 6: Create a package and access members from a package.

Task 7: Develop Java Application using Method overloading and method overriding.

Task 8: Create a java application to copy content from one file to another using IO streams.

Task 9: Implement Exception handling to a given application.

Task 10: Develop java application using Multithreading.

Task 11: Develop java application using collections.

Task 12: GUI Application using applets.

PROJECTS

1. Design and develop an automated ballot vote system.

2. Design and develop a banking application.
TEXT BOOKS


REFERENCE BOOKS


E- RESOURCES AND OTHER DIGITAL MATERIAL

   Available: http://www.learnjavaonline.org/
17CS3352
DATA STRUCTURES LABORATORY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Apply linear data structures to different applications.

CO2 Solve problems using linked list.

CO3 Implement operations on binary trees and binary search trees.

CO4 Implement different searching and sorting algorithms.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT/TASKS

Task 1
Operations on stacks.

Task 2
Stack applications

Task 3
Operations on queues and circular queues.

Task 4
Operations on singly linked list and doubly linked list.

Task 5
Circular linked list operations.

Task 6
Linked List Applications : Polynomial addition, Polynomial Differentiation

Task 7
Binary Search Tree Operations and tree traversal techniques using recursion.
Binary Search Tree Operations and tree traversal techniques using non recursion.
Task 8
Searching techniques: Liner Search, Binary Search
Sorting Techniques: Bubble Sort, Selection Sort, Shell Sort
Sorting Techniques: Insertion Sort, Quick Sort and Merge Sort

Task 9
Hashing Techniques

Task 10
Lab Projects
Simulation of linear data structures
Simulation of sorting and searching

TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

17HS1353
COMMUNICATION SKILLS LABORATORY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Execute rational pronunciation of speech sounds including accentuation.

CO2 Apply elements of listening comprehension in professional environments.

CO3 Develop the abilities of rational argumentation and skills of public speaking.

CO4 Demonstrate proficiency in the elements of professional communication including the competitive examination

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT/TASK

UNIT I: Elements of Spoken Expression and processes of Listening Comprehension:
- Speech Mechanism
- Articulation of vowels and consonants
- Patterns of Accentuation

Types and processes of Listening comprehension

UNIT II: Patterns of Substantiation and Refutation in Public Speaking:
- Group Discussion (Open and Monitored)
- Pyramid Discussion
- PNI

Seminar Talk and Power Point Presentation

UNIT III: Professional Communication:
- Self Affirmation
- Advanced Composition including Memo and e-mail
- Résumé Preparation
Corporate ethic of Non-Verbal Communication

UNIT IV: Life Skills and Vocabulary for Competitive Examinations:
- Select Life Skills (50)
- Select Logies, Isms, Phobias and Manias (25 each)
- Sentence Completion and Double Unit Verbal Analogies (50 items)

Fundamentals of Syllogisms (Descriptive and Pictorial)

TEXT BOOKS


REFERENCE BOOKS

[2] Eclectic Learning Materials offered by the Department

E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] ODll Language Learner’s Software, 27-6-2012 Orell Techno Systems
17CS3354
DIGITAL LOGIC DESIGN LABORATORY

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### COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

**CO1** Apply Boolean laws & theorems to digital Logic functions.

**CO2** Simplify the Boolean functions to the minimum number of literals.

**CO3** Design different types of combinational logic circuits.

**CO4** Design clocked sequential logic circuits using flip flops.

**CO5** Design different types of Counters, Registers and Programmable Logic Devices.

### Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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### COURSE CONTENT/TASK

**Task 1**

Verify the Behavior of Logic Gates using Truth Table and Realization of All logic gates using universal gates.

**Task 2**

Design and test various adders and subtractor circuits( Arithmetic circuits).

**Task 3**

Design and build different types of code converters.

**Task 4**
Design and implementation of magnitude comparators.

**Task 5**
Implementation of Decoders and encoders.
Implementation of Multiplexer and De Multiplexer.
Design a combinational circuit and implement it with multiplexers.
Use a demultiplexer to implement a multiple output combinational circuit from the same input variables.

**Task 6**
Construct an SR latch using NAND and NOR gates. Verify its operation and demonstrate the circuit.
Implement all types of FLIP-FLOPS using gates.
Construct and study the operation of Master-Slave JK Flip flop.

**Task 7**
Design a clocked sequential circuit for the given state diagram for a four state counter with one input where the counter counts up in binary when the input is low and counts in reverse when the input is high.

**Task 8**
Verification of Shift-Registers using flip flops.

**Task 9**
Design of Synchronous counters.
Design of Asynchronous counter.
Design of Ring-counter and Johnson counter.

**Task 10**
Design and Implementation of BCD to Seven Segment Display.
Design and Implementation of Digital clock.

**TEXT BOOKS**


**REFERENCE BOOKS**

17MC1307A
ENVIRONMENTAL STUDIES

Course Category: Institutional Core
Course Type: Theory
Prerequisites: -

Credits: -
Lecture -Tutorial-Practice: 2 - 0 - 0
Continuous Evaluation: 100
Semester end Evaluation: 0
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the various natural resources, analyze and explore degradation management

CO2 Understand the Ecosystems and need of Biodiversity

CO3 Realize and Explore the Problems related to Environmental pollution and its management

CO4 Apply the Role of Information Technology and analyze social issues, Acts associated with Environment.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT -I
The Multidisciplinary Nature of Environmental Studies: Definition, scope and importance, Need for public awareness.

Natural Resources

Renewable and Non-renewable Resources:
Natural resources and associated problems.
(a) Forest resources: Use and over-exploitation, deforestation. Timber extraction, mining, dams and their effects on forests and tribal people.
(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
(c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources.
(d) Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity.
(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources.

(f) 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.

UNIT II

Ecosystems: 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 following ecosystem:

(a) Forest ecosystem
(b) Grassland ecosystem
(c) Desert ecosystem
(d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Biodiversity and Its Conservation

Introduction, definition: genetic, species and ecosystem diversity; Biogeographically 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.

UNIT III

Environmental Pollution: 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; Disasters management: Floods, earthquake, cyclone and landslides

UNIT IV

Social Issues and the Environment: From unsustainable to sustainable development, Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people; its problems and concerns, Environmental ethics: Issues and possible solutions; Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Wasteland reclamation, Consumerism and waste products.


Field Work/ Case Studies [NOT TO BE INCLUDED IN SEMESTER END EXAMS]: Visit to a local area to document environmental assets—river/forest/grassland/hill/ mountain; Visit to a local polluted site—Urban/Rural/Industrial/Agricultural; Study of common plants, insects, birds; Study of simple ecosystems—pond, river, hill slopes, etc.

TEXT BOOKS


REFERENCE BOOKS

SEMESTER - IV
17CS3401
DISCRETE MATHEMATICAL STRUCTURES

Course Category: Programme Core
Course Type: Theory
Prerequisites: Truth tables, Sets and Relations, Permutations & combinations

Credits: 3
Lecture -Tutorial-Practice: 3 - 0 - 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Analysis of propositional calculus and first order logic.
CO2 Examining the basic and advanced counting techniques.
CO3 Classification of relations and digraphs and their applications.
CO4 Classification of graphs and their applications.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I: PROPOSITIONAL CALCULUS
Fundamentals Of Logic: Propositions, Connectives, Propositional functions, Truth Tables, Tautology, Contradiction, Logical equivalences, Normal forms, Logical inferences, Methods of proof of an implication.
First Order Logic: Predicate, Quantifiers, and Rules of inference for Quantified propositions.

UNIT II: COUNTING TECHNIQUES
Basics of Counting: Sum and product rules, Indirect counting, One to One Correspondence, Combinations and permutations, Enumerating Combinations and Permutations with and without repetitions.

UNIT III: RELATIONS AND DIGRAPHS
Relations and basic graphs, Special properties of binary relations, Equivalence relation, Partially ordered sets,
Hasse diagrams, Lattices, Operations on relations, Paths and closures, Directed graphs and Adjacency matrices, Transitive closure, Warshall’s algorithm.

UNIT IV: GRAPH THEORY
Introduction(graphs, subgraphs, circuits, trees) Sum of degrees theorem, Isomorphism and sub graphs, planar graphs, Euler’s formula, Multi graphs and Euler’s circuits, Hamiltonian graphs, Grinberg’s theorem, Graph coloring, Chromatic numbers.

TEXT BOOKS

REFERENCE BOOKS
[1] Trembly & Manohar, Discrete Mathematical structures with applications to Computer Science

E-RESOURCES AND OTHER DIGITAL MATERIAL
[1] discretemathsweb.berkeley.edu/teaching.html Last accessed on 01-06-2018

17CS3402
WEB TECHNOLOGIES

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Design and Create static web pages using HTML5 and CSS.

CO2 Create interactive web interfaces with client side technologies.

CO3 Create and validate XML documents.

CO4 Understand Server Side Scripting.

CO5 Design and Create Interactive Server side Scripting for an application

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
Introduction to Web: DNS, Role of DNS, DNS root servers, Internet and Intranet, Evolution: web 1.0, 2.0, 3.0, HTTP Request and HTTP Response, Website design principles, Planning.


UNIT II
Cascading Style Sheets: Inline Style Sheet, Internal Style Sheet and External Style Sheet and CSS Selectors, Creating Boxes and Columns using CSS.
**DHTML:** Overview of Java Script, Java Script Functions, Java Script Objects, working with window and Document Object properties and Methods, DOM Tree Traversing.


**UNIT III**

**Overview of AJAX:** AJAX Web Application Model, How AJAX works? Creating a Simple AJAX Application, creating the XMLHttpRequest Object-Properties and Methods.

**PHP:** Installing a WAMP on Windows, The Structure of PHP, Using Comments, Basic Syntax, Understanding Variables, Variable Scope, Operators, Constants, Expressions and Control Flow in PHP, PHP Functions-Defining a function, returning a value, returning an array, pass by reference, Returning Global variables, PHP Arrays, Date and Time functions.

**UNIT IV**

**File Operations:** including and requiring Files, File Handling – Reading from file, Copying Files, Deleting a File, Updating a File and Uploading Files.

**My SQL:** Creating Database, Data Types, Basic Operations on tables (Create, Select, Delete and Update)

**Working with Database & Forms:** Querying a My SQL Database with PHP, Get and Post Methods, Query strings, HTML form handling.

**Maintaining User State:** Cookies and Sessions

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**


17CS3403
ADVANCED DATA STRUCTURES

Course Category: Programme Core
Course Type: Theory
Prerequisites: Data Structures

Credits: 3
Lecture-Tutorial-Practice: 3 - 0 - 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Implement various balanced tree operations.
CO2 Implement Multiway search trees
CO3 Implement graph traversal techniques and shortest path algorithms
CO4 Understand different file processing operations.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
EFFICIENT BINARY SEARCH TREES
AVL Trees: AVL Tree Basic Concepts, AVL Tree Balance Factor, Balancing Trees: Left of Left, Right of Right, right of Left, Left of right.
Splay Trees: Introduction, Bottom Up Splay Trees

UNIT II
MULTIWAY SEARCH TREES
m-Way Search Trees: Definition and Properties, Searching an m-Way Search Tree.
B Trees: Definition and Properties, Number of elements in a B-Tree, Insertion into a B-Tree and Deletion from a B-Tree
Heaps: Priority Queues, Definition of Min Heap & Max Heap, Insertion into a Min Heap & Max Heap, Deletion from a Min Heap & Max Heap, Applications of Heap.
UNIT III

**Graphs:** Basic Concepts, Graph Storage Structures, Graph Abstract Data Type, Elementary Graph Operations: Depth First Search, Breadth First Search, Spanning Trees, Minimum Spanning Trees: Prim’s Algorithm and Kruskal’s Algorithms
**Shortest Paths and Transitive Closure:** Dijkstra’s Algorithm, Warshall’s algorithm, Floyd’s Algorithm.
**Activity Networks:** Activity on Vertex Networks, Definition, Topological Order

UNIT IV

**Fundamental File Processing Operations:** Physical Files and Logical Files, Opening Files, Closing Files, Reading and Writing, Seeking, Special Characters in Files, The Unix Directory Structure, Physical Devices and Logical Files, File-Related Header Files, Unix File System Commands.

**Fundamental File Structure Concepts:** Field and Record Organization, Managing Files of Records: Record Access, File Access and File Organization

TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

[4] IIT Guwahati B-Tree Construction, nptel.ac.in/courses/ 106103069/21 Last accessed on 01-06-2018
17CS3404
COMPUTER ORGANIZATION

Course Category: Programme Core
Course Type: Theory
Prerequisites: Digital Logic Design

Credits: 3
Lecture - Tutorial - Practice: 3 - 0 - 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Describe Register transfer and micro operations.
CO2 Understand the basic computer designing and micro programming.
CO3 Know the Organization of CPU.
CO4 Apply algorithms to perform arithmetic operations on fixed point and floating point data.
CO5 Understand Memory Hierarchy and I/O Organization.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT – I


UNIT - II
Micro Programmed Control: Control Memory, Address Sequencing, Micro-Program example, Design of
Control Unit.

**Central Processing Unit:** General register Organization, Stack Organization, Instruction Formats, Addressing Modes, Data Transfer and Manipulation, Program Control, Reduced Instruction Set Computer (RISC)

**UNIT - III**

**Computer Arithmetic:** Addition and Subtraction, Multiplication Algorithms – Signed Magnitude Multiplication, Booth Multiplication(Signed 2’s Complement Multiplication), Array Multipliers, Division Algorithm, Floating-point Arithmetic operations.

**Memory Organization:** Memory Hierarchy, Main Memory, Auxiliary memory, Associative Memory, Cache Memory, Virtual Memory, Memory Management Hardware.

**UNIT - IV**

**Input Output Organization:** Peripheral Devices, Input-output Interface, Asynchronous Data Transfer, Modes of Transfer, Priority Interrupt, Direct Memory Access (DMA), Input-Output Processor.,Serial Communication.

**Standard I/O Interfaces:** PCI Bus, USB

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

NPTEL http://www.nptel.iitm.ac.in/video.php?subjectId=106106092

NPTEL http://www.nptel.iitm.ac.in/video.php?subjectId=117105078
17TP1405
ENGLISH FOR PROFESSIONALS

Course Category: Institutional Core
Course Type: Learning by Doing
Prerequisites: -

Credits: 1
Lecture - Tutorial - Practice: 0 – 0 – 2
Continuous Evaluation: 100
Semester end Evaluation: 0
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Present themselves effectively in the professional world
CO2 Introduce themselves as well as others appropriately.
CO3 Use vocabulary to form sentences and narrate stories by using creative thinking skills
CO4 Involve in practical activity oriented sessions.
CO5 Learn about various expressions to be used in different situations.
CO6 Respond positively by developing their analytical thinking skills.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT-I
- Beginners, Functional, Situational Conversations
- Practicing on Functional Conversations.

UNIT-II
- Errors in usage of Parts of Speech with a thrust on Verbs, Adjectives and Conjunctions, Idioms/Phrases.
- Introducing Basic Grammar
- Practicing on Functional Conversations.
### UNIT-III
- Introducing Self & Others
- Structures and Forming Sentences
- Telephonic Etiquette, Social Etiquette and Table Manners
- Practicing on Functional Conversations.

### UNIT-IV
- Direct, Indirect/Reporting Speech
- Public Speaking Basics
- Versant Test Preparation
- Practicing on Situational Conversations.

### METHODOLOGY
Audio—Visuals / Hand Outs (Compiled/Created by Training Division, T&P Cell, VR Siddhartha Engineering College), Board & Chalk and Interactive Sessions.
### COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1**: Understand the basic principles of operating systems.
- **CO2**: Analyze CPU Scheduling and disk scheduling algorithms.
- **CO3**: Analyse the mechanisms used for process synchronization, deadlock prevention and deadlock detection.
- **CO4**: Apply different page replacement algorithms.
- **CO5**: Understand the file structure, directory structure and disk structures.

### Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2 - Medium, 3 – High)

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### COURSE CONTENT

**UNIT I**

**Operating-System Structures**: Operating-System Services, User and Operating-System Interface, System Calls, Types of System Calls.

UNIT II  
**Process Synchronization:** Background, The Critical-Section Problem, Peterson’s Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors  
**CPU Scheduling:** Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling, Real-Time CPU Scheduling.

UNIT III  
**Deadlocks:** System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.  
**Main Memory:** Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging, Structure of the Page Table

UNIT – IV  
**Virtual Memory:** Background, Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing.  
**Mass Storage Structure:** Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management  
**File System Implementation:** File-System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management, Efficiency and Performance, Recovery.

TEXT BOOKS  

REFERENCE BOOKS  

E-RESOURCES AND OTHER DIGITAL MATERIAL  
[1] Prof. P.K. Biswas sir, Ph.D.(IIT Kharagpur), Dated: 21-02-2013 Video Lectures on "Operating Systems"  
# 17CS3408

**PYTHON PROGRAMMING**

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<td><strong>Co - requisites:</strong></td>
<td>Problem Solving Methods Programming in C Object Oriented Programming using Java</td>
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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

<table>
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<th>CO1</th>
<th>Understand the basic concepts of Python</th>
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<td>CO2</td>
<td>Implement basic data structures in python</td>
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<tr>
<td>CO3</td>
<td>Implement handling exceptions and files.</td>
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<td>CO4</td>
<td>Develop GUI using python.</td>
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**Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2 - Medium, 3 – High)**

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## COURSE CONTENT

**UNIT I**

**Getting started:** Introducing python, Need of Python Programming, python features, basic applications of python.

**Variables, expressions and statements:** Values and types, variables, operators, expressions, statements, simple I/O, interactive mode and script mode.

**Conditionals and Loops:** Conditional statements: using the- if, else, elif statements, creating while loops, avoiding infinite loops, using compound conditions. using for loops.

**Strings:** Declaring a String, using quotes with strings, using escape sequences with strings, concatenating and repeating a strings, slicing strings, string methods.

**UNIT II**

**Arrays:** Creating an array, importing the array module, indexing and slicing on arrays, processing an array,
types of arrays, working with arrays.

**Functions:** Creating functions, Parameters and return values, Keyword arguments, global and local variables.

**Lists:** Introducing Lists, Naming and defining a list, Traversing a list, List operations, List slices, list methods.

**Tuples:** Introducing Tuples, creating tuples, using tuples operations.

**UNIT III**

**Dictionaries:** Introduction to dictionaries, creating and accessing dictionaries.

**Modules:** Importing a module, packages and creating a module.

**Exceptions and Assertions:** Difference between an error and Exception, Handling Exceptions, Built-in exceptions, and Assertions.

**Files:** reading and writing to text files, storing complex data in files.

**Regular Expressions:** Regular expressions in python.

**UNIT – IV**

**Object oriented programming:** object oriented basics, creating classes, methods and objects, constructors, attributes, class attributes and static methods, object encapsulation, private attributes and methods, attribute access, sending and receiving messages, combining objects, inheritance, extending a class through inheritance, altering behavior of inherited methods, understanding polymorphism.

**GUI Development:** examining GUI, understanding event driven programming, root window, labels, buttons, creating a GUI using a class, binding widgets and event handlers, text and entry widgets and Grid layout manager, check buttons, radio buttons.

**Graphics and Plotting with PyLab** – creating a graphics window, setting background image, understanding the graphics coordinate system, displaying a sprite, text, message, moving sprites, dealing with screen boundaries, handling a mouse input, a basic plot, Plotting several plots on the same graph, and Animations.

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**


**17CS3451**  
**WEB TECHNOLOGIES LABORATORY**

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**COURSE OUTCOMES**

Upon successful completion of the course, the student will be able to:

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<tr>
<th>CO1</th>
<th>Design and Create static web pages using HTML5 and CSS.</th>
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<td>CO2</td>
<td>Create interactive web interfaces with client side technologies.</td>
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<td>CO3</td>
<td>Create and validate XML documents.</td>
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<td>CO4</td>
<td>Understand Server Side Scripting.</td>
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<td>CO5</td>
<td>Design and Create Interactive Server side Scripting for an application</td>
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**Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)**

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**COURSE CONTENT**

**TASK-1:** Study of Network commands. (like ipconfig, tracert, ping, netstat, nslookup, getmac)  
**TASK-2:** Practice on Basic HTML5 elements  
1. List and tables  
2. Images and links  
3. Form Element (<input />)  
4. Bar Chart using Canvas  
**TASK-3:** Design static web site with header, footer, menus, images, tables, links and lists by taking an example organization. (Personal informationwebsite, Company website, Ecommerce website, Govt. department, etc..). Place suitable information.  
**TASK-4:**  
1. Design your web pages using different type of CSS.(Inline/Internal/External)
2. Change the appearance of the Buttons, Vertical Menu and Horizontal Menu
3. Create CSS box model.

**TASK-5:**
2. Create a dice game in java script and html using two dice.
3. Write a JavaScript to find the latitude and longitude of the user's position using HTML5 Geo Location.

**TASK-6:**

**TASK-7:**
1. Create an array and perform different operations on arrays using pre defined functions in PHP.
2. Create user defined functions and access in your program.

**TASK-8:**
1. Different File Operations using PHP.
2. Establish the connection between My SQL and PHP.

**TASK-9:**
1. Design a registration form for a website and save the information in the data base.
2. Design a Login form for a website and validate the user.

**TASK-10:**
Design an application using sessions and Cookies in PHP.

**TEXT BOOKS**


**REFERENCE BOOKS**

17CS3452
PYTHON PROGRAMMING LABORATORY

Course Category: Programme Core
Course Type: Practical
Prerequisites: C Programming Laboratory and Java Programming Laboratory

Credits: 1
Lecture -Tutorial-Practice: 0-0-2
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Implement the basic concepts of Python
CO2 Implement basic data structures in python
CO3 Implement handling exceptions and files.
CO4 Develop GUI using python.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

TASK-1: Implement basic concepts of loops, value types, statements and variables.

TASK-2: Use Strings and develop a python application and analyse various string patterns.

TASK-3: Implement Arrays to a given application

TASK-4: Create a List and apply list operations in python.

TASK-5: Develop a dictionary and Implement dictionary operations in python.

TASK-6: Create a module and access members from a module.

TASK-7: Create an application to copy content from one file to another file

TASK-8: Implement the concept of classes and objects.
**TASK-9:** Develop a python application using inheritance

**TASK-10:** Develop a python application using polymorphism.

**TASK-11:** Implement Exception handling to a given application.

**TASK-12:** Develop a GUI Application using python graphics system.

**TASK-13:** Create a GUI application plot a graph with given coordinates.

**Projects:**

1. Design and develop an automated ballot vote system.

2. Design and develop a banking application.

**TEXT BOOKS & REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

# 17CS3453
## COMPETITIVE CODING – I

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- CO1
- CO2
- CO3
- CO4

## Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

Solving the programs under “Easy / Medium” category in CodeChef & HackerRank, etc. Students must solve at least 100 problems in CodeChef / HackerRank, etc. The category may be under Easy / Medium. Students shall participate at least two contests per month, hosted in online judges. Problems to be solved in C.

A minimum of 15 problems shall be solved per week in either CodeChef / HarckerRank, etc.

Monthly contests hosted in CodeChef / HackerRank, etc., may be taken as day to day assessment of laboratory. Monthly one such evaluation

The work will be carried out in the laboratory slot allotted as well as at the home.

## TEXT BOOKS


## REFERENCE BOOKS

1. Programming Challenges: The Programming Contest Training Manual By Steven S Skiena, Miguel A.
Revilla


E- RESOURCES AND OTHER DIGITAL MATERIAL

17MC1407B
INDIAN CONSTITUTION

Course Category: Institutional Core
Course Type: Theory
Credits: -
Lecture -Tutorial-Practice: 2-0-0
Prerequisites: -
Continuous Evaluation: 100
Semester end Evaluation: 0
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Know the fundamental law of the land
CO2 Understand how fundamental rights are protected
CO3 Perceive the structure and formation of the Indian Government System
CO4 Explain when and how an emergency can be imposed and what are the consequences.

Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
Introduction to Constitution of India: Meaning of the Constitution Law and Constitutionalism, Historical perspective of constitution of India, Salient features of Constitution of India.

UNIT II
Fundamental Rights: Scheme of the fundamental rights, scheme of the fundamental right to equality, scheme of the fundamental right to certain freedoms under Article 19, scope of the right of life and personal liberty under Article 21, writs jurisdiction

UNIT III
Nature of the Indian Constitution: Federal structure and distribution of legislative and financial powers between the Union and states
**Parliamentary form of Government in India:** The Constitution powers and status of the President of India, Amendment of the Constitutional powers and Procedure, Historical Perspectives of the constitutional amendments in India

**Local Self Government:** Constitutional Scheme in India

**UNIT – IV**  
**Emergency Provisions:** National Emergency, President rule, Financial Emergency

**TEXT BOOKS**


**REFERENCE BOOKS**

SEMESTER - V
17CS3501
DATABASE MANAGEMENT SYSTEMS

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand different types of Database, data models, different database schemas in various database systems.

CO2 Analyse the Entity-Relationship models, inturn develop the Relational models that leads to database design

CO3 Apply various normalization techniques to relational models in order to improve database design quality

CO4 Understand database transactions processing, protocols for Concurrency control and Recovery techniques in database

CO5 Implement database management techniques to real world applications

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT 1


Overview of Data Warehousing and OLAP: Introduction, Definitions and Terminology, Characteristics of Data Warehouses, Data Modeling for Data Warehouses, Typical functionality of a Data Warehouse.
UNIT II
Relational Database Design by ER and EER-to-Relational Mapping: Relational Database Design Using ER-to-Relational Mapping.
The Relational Data Model and Relational Database Constraints: Relational Model Concepts, Relational Model Constraints and Relational Database Schemas.
The Relational Algebra and Relational Calculus: Unary Relational Operations: SELECT and PROJECT, Relational Algebra Operations from Set Theory, Binary Relational Operations: JOIN and DIVISION, Additional Relational Operations, Examples of Queries in Relational Algebra

UNIT III
Basics of Functional Dependencies and Normalization for Relational Databases: Functional Dependencies, Normal Forms Based on Primary Keys, General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form, Multi valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.
Concurrency Control Techniques and Database Recovery Techniques: Two Phase Locking techniques for Concurrency Control, The ARIES Recovery Algorithm.

UNIT IV
Emerging Database Technology: SQLite overview- Salient characteristics, applications, Architecture. Limitations
NOSQL: What It Is And Why You Need It: Definition and Introduction, Sorted Ordered Column-Oriented Stores, Key/Value Stores, Document Databases, Graph Databases.
Interfacing And Interacting With NOSQL: Storing and Accessing Data, Storing Data In and Accessing Data from MongoDB, Querying MongoDB, Storing Data In and Accessing Data from Redis, Querying Redis, Storing Data In and Accessing Data from HBase, Querying HBase.
Understanding the Storage Architecture: Working with Column - Oriented Databases, HBase Distributed Storage Architecture
Managing Transactions And Data Integrity: RDBMS and ACID, Distributed ACID Systems, Upholding CAP

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
[1] Dr S. Srinath IIT-Madras “Conceptual design process
   http://nptel.iitm.ac.in/video.php?subjectId=106106093 Last accessed on 01-06-2019
   “Normalization process” http://nptel.iitm.ac.in/courses/IIT_MADRAS/Intro_to_Database_Systems_Design/
   Last accessed on 01-06-2018
   http://nptel.iitm.ac.in/video.php?subjectId=106106093 Last accessed on 01-06-2018
[4] Dr Bill Howe University of Washington eScience Institute
   https://class.coursera.org/datasci001/lecture/21,99,101,103,107,111,113
   Last accessed on 01-06-2018
17CS3502
DESIGN AND ANALYSIS OF ALGORITHMS

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand fundamental concepts of Asymptotic notation of an algorithm and Divide and Conquer techniques

CO2 Analyze various design techniques of greedy algorithm and dynamic programming

CO3 Apply basic traversal and search techniques, backtracking for real time problems

CO4 Understand the concepts of Branch and Bound techniques, NP-Hard, NP-Complete.

Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT-I
Introduction: Algorithm, Algorithm Specification, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Randomized Algorithms
Divide and conquer: General method, Finding the maximum and minimum, Applications-Binary search, Merge sort, Quick sort, Strassen’s Matrix Multiplication.

UNIT-II
Dynamic Programming: General method, applications- Matrix chain multiplication, Multi stage graph problem, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Traveling sales person problem.

UNIT-III
Basic Traversal and Search Techniques: Techniques for Binary trees, graphs, connected components, biconnected components.
**Backtracking:** General method, applications- N-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles, 0/1 knapsack problem.

**UNIT-IV**

**Branch and Bound:** General method, applications - Traveling sales person problem, 0/1 knapsack problem - LC Branch and Bound solution, FIFO Branch and Bound solution.

**NP-Hard and NP-Complete problems:** Basic concepts, non deterministic algorithms, classes NP Hard and NP Complete, Cook’s theorem

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] [https://nptel.ac.in/courses/106101060/](https://nptel.ac.in/courses/106101060/) Last accessed on 01-06-2018
17CS3503
COMPUTER NETWORKS

Course Category: Programme Core
Course Type: Theory
Prerequisites: Operating Systems

Credits: 3
Lecture-Tutorial-Practice: 3 -0- 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand fundamentals of networks and network reference models
CO2 Analyze error control, flow control and multiple access mechanisms used at Data Link Layer
CO3 Analyze various routing protocols in network design
CO4 Analyze the underlying protocols in transport layer and Application layer.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT - I
Introduction: Uses of Computer Networks, Network Hardware, LANs, MANs, WANs, Network Software.
Physical Layer: Guided transmission media: Magnetic Media, Twisted Pair, Coaxial Cable, and Fiber Optics

UNIT - II
Data Link Layer: Data link layer design issues, Error detection and correction, Elementary data link protocols, and Sliding window protocols.
Medium Access Control Sub layer: The channel allocation problem, multiple access protocols:- ALOHA, CSMA protocol, collision-free protocols, limited-contention protocol, ETHERNET.

UNIT – III
Quality of Service: Requirements, Traffic Shaping, Packet Scheduling, Admission Control, Integrated Services, Differentiated Services, IP Protocol, IP addresses, Internet Control Protocols

UNIT – IV
Transport Layer: The Transport Service, Elements of Transport Protocols, and the Internet Transport Protocols TCP and UDP.
Application Layer: The Domain Name System (DNS), and E-Mail.

TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

17CS2504A
ADVANCED PROGRAMMING IN JAVA

Course Category: Open Elective
Course Type: Theory
Prerequisites: Problem Solving Methods, Programming in C, Java Programming.

Credits: 3
Lecture -Tutorial-Practice: 3 - 0 - 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Create GUI application
CO2 Create distributed application
CO3 Develop web application
CO4 Develop enterprise application

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
GUI Programming: Introduction to Swings, JLable and ImageIcon, JTextField, The Swing Buttons: JButton, checkboxes, RadioButtons, JTabbedPane, JList, JComboBox, JTable, Menu Bars and Menus.
Java Database Connectivity: JDBC Connectivity, Types of JDBC drivers, Connecting to the database, JDBC Statements, JDBC Exceptions, Manipulations on the database.

UNIT II
Network Programming: Introduction, InetAddress, Client/Server Interaction with Stream Socket
Connections, Client/Server Interaction with Datagrams socket connections, Manipulating URLS.

**Remote Method Invocation:** Introduction to RMI, RMI Architecture, Defining the Remote Interface, Implementing the Remote Interface, Compiling and Executing the Server and the Client.

**UNIT III**

**Servlets:** Web servers, Tomcat web server installation steps, introduction to servlets, Lifecycle of a Servlet, Simple servlet, the Servlet API, Reading Servlet parameters, the javax.servlet.http package, Handling Http Request & Responses, Using Cookies-Session Tracking.

**Java Server Pages:** Introduction to JSP, The Problem with Servlet, the Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC architecture.

**UNIT IV**

**JSP Application Development:** Generating Dynamic Content, Using Scripting Elements, Implicit JSP Objects, Conditional Processing, Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing data between JSP pages, Requests and Users, Passing Control and Date between Pages, Sharing Session and Application Data.

**Introduction to Spring Framework:** Introduction to Spring framework, Dependency Injection and Inversion of Control, Spring modules, Spring with MVC.

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

17CS2504B
COMPUTER GRAPHICS

Course Category: Open Elective
Course Type: Theory
Prerequisites: Basics of Mathematics (Algebra and Matrix Operations)
Credits: 3
Lecture -Tutorial-Practice: 3 - 0 - 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand working of different display device.

CO2 Apply Different Point Plotting techniques.

CO3 Demonstrate different 2D and 3D Object Transformation and Viewing.

CO4 Illustrate various 3D Projection and 2D Clipping

CO5 Understand computer animation sequence.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
Introduction and overview of Graphics Systems
Applications of Computer graphics, Video Display Devices: Refresh Cathode-Ray Tubes, Raster and Random Scan Displays, Colour CRT Monitors, LCD Liquid Crystal Display, Normalized device coordinates.

Output Primitives
UNIT II
Two-Dimensional Geometric Transformations
Basic Transformations: Translation, Rotation and, Scaling; Matrix representation and Homogeneous coordinates, Composite Transformations: Translations, Rotations, Scaling, General Pivot-Point Rotation, General Fixed-Point Scaling, Concatenation Properties; Other Transformations: Reflections and shear.

Two Dimensional Viewing
The viewing Pipeline-Viewing Coordinate Reference Frame- Window to View port transformation.

Polygons
Introduction-Polygons-An Inside-Outside Tests-Scan-Line Polygon Fill Algorithm- Boundary Fill Algorithm- Flood Fill algorithm- Fill Area Functions-Character Generation- Antialiasing

UNIT III
Line Clipping
The Cohen-Sutherland Outcode algorithm and Nicholl-lee-Nicholl Line clipping; Polygon Clipping: The Sutherland Hodgman Algorithm –Weiler Atherton Polygon Clipping - Character and Text Clipping.

Three Dimensional Geometric And Modelling Transformations
Translation-Rotation- General Three Dimensional Rotations – scaling - Other Transformations- Reflections and Shears-Composite Transformations

UNIT IV
Three Dimensional Viewing
Viewing Pipeline- Viewing Coordinates- Projections: Parallel Projection and Perspective projection

Computer Animation
Design of Animation Sequence, General computer Animation functions, Raster animation, Computer animation languages, key frame systems, motion specifications.

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
http://nptel.iitm.ac.in/video.php?subjectId=106106090 Last accessed on 01-06-2018
**INTER DISCIPLINARY ELECTIVE**  
17CS2505A  
DATA STRUCTURES THROUGH C

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**COURSE OUTCOMES**

Upon successful completion of the course, the student will be able to:

- **CO1**  Apply linear data structures to different applications.
- **CO2**  Solve problems using linked list.
- **CO3**  Implement operations on binary trees and binary search trees.
- **CO4**  Implement different searching and sorting algorithms.

**Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)**

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**COURSE CONTENT**

**UNIT I**

**Introduction:** Basic Concepts, Algorithm Specification, Data Abstraction, Performance Analysis-Time complexity, Space complexity, Asymptotic Notations  
**Searching:** Linear Search and Binary Search Techniques and their complexity analysis.  
**Stacks:** Definition, Representing stacks, ADT Stack and its operations: Algorithms and their complexity analysis, Applications of Stacks: Expression Conversion and evaluation – corresponding algorithms. Recursion, Towers of Hanoi problem.  
**Queues:** Queue and its Sequential Representation, Queue as an abstract data type, Types of Queue: Simple Queue, Circular Queue, Operations on each types of Queues: Algorithms.

**UNIT II**

**Linked list:** Singly linked lists: Representation in memory, Algorithms of several operations: Traversing, Searching, Insertion into, Deletion from linked list  
**Doubly linked list:** Operations and algorithms
UNIT III
Trees – Binary trees – Basic concepts – Implementation – Traversal – Applications – Binary search tree: Insertion a node. Deleting a node, searching
Sorting: Insertion sort and Selection sort, Quick sort, Merge sort

UNIT IV: Algorithm Design Techniques

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
# INTER DISCIPLINARY ELECTIVE
## 17CS2505B
### WEB DESIGNING

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

| CO1   | Design and Create static web pages using HTML5 and CSS. |
| CO2   | Create interactive web interfaces with client side technologies. |
| CO3   | Create and validate XML documents. |
| CO4   | Understand Server Side Scripting. |
| CO5   | Design and Create Interactive Server side Scripting for an application |

## Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

### UNIT I
**Introduction to Web:** DNS, Role of DNS, DNS root servers, Internet and Intranet, Evolution: web 1.0, 2.0, 3.0, HTTP Request and HTTP Response, Website design principles, Planning.


**HTML 5:** New Features of HTML5
UNIT II
Cascading Style Sheets: Inline Style Sheet, Internal Style Sheet and External Style Sheet and CSS Selectors, Creating Boxes and Columns using CSS.

DHTML: Overview of JavaScript, JavaScript Functions, JavaScript Objects, working with window and Document Object properties and Methods, DOM Tree Traversing.


UNIT III
Overview of AJAX: AJAX Web Application Model, How AJAX works? Creating a Simple AJAX Application, creating the XMLHttpRequest Object-Properties and Methods.

PHP: Installing a WAMP on Windows, The Structure of PHP, Using Comments, Basic Syntax, Understanding Variables, Variable Scope, Operators, Constants, Expressions and Control Flow in PHP, PHP Functions-Defining a function, returning a value, returning an array, pass by reference, Returning Global variables, PHP Arrays, Date and Time functions.

UNIT IV
File Operations: including and requiring Files, File Handling – Reading from file, Copying Files, Deleting a File, Updating a File and Uploading Files.

My SQL: Creating Database, Data Types, Basic Operations on tables (Create, Select, Delete and Update)

Working with Database & Forms: Querying a My SQL Database with PHP, Get and Post Methods, Query strings, HTML form handling

TEXT BOOKS


REFERENCE BOOKS

INTER DISCIPLINARY ELECTIVE
17CS2505C
FUNDAMENTALS OF OPERATING SYSTEMS

Course Category: Inter Disciplinary Elective
Course Type: Theory
Corequisites: Data Structures
Credits: 3
Lecture -Tutorial-Practice: 3-0-0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the basic principles of operating systems.
CO2 Analyze CPU Scheduling and disk scheduling algorithms
CO3 Analyse the mechanisms used for process synchronization, deadlock prevention and deadlock detection
CO4 Apply different page replacement algorithms

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
Introduction: What Operating Systems do, Memory Management, Storage Management
Operating-System Structures: Operating-System Services, User and Operating-System Interface, System Calls, Types of System Calls.

UNIT II
CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Thread Scheduling, Multiple-Processor Scheduling
Process Synchronization: Background, The Critical-Section Problem, Peterson’s Solution, Synchronization Hardware, Mutex Locks, Semaphores, Classic Problems of Synchronization, Monitors
UNIT III
Main Memory: Background, Swapping, Contiguous Memory Allocation, Segmentation, Paging

UNIT – IV
Virtual Memory: Background, Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames, Thrashing.
Mass Storage Structure: Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Management

TEXT BOOKS

REFERENCE BOOKS

E- RESOURCES AND OTHER DIGITAL MATERIAL
[1] Prof. P.K. Biswas sir, Ph.D.(IIT Kharagpur),Dated: 21-02-2013 Video Lectures on "Operating Systems"
# SELF LEARNING ELECTIVE (MOOCS)

## 17CS2506A

### INTRODUCTION TO R PROGRAMMING

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

**CO1** Learn R language fundamentals and basic syntax

**CO2** Perform data analysis using R

**CO3** Apply major R data structures

**CO4** Create visualizations using R

## Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

### The Minimum content to be covered

- Basic fundamentals, installation and use of software, data editing, use of R as a calculator, functions and assignments.
- Use of R as a calculator, functions and matrix operations, missing data and logical operators.
- Conditional executions and loops, data management with sequences. Data management with repeats, sorting, ordering, and lists.
- Vector indexing, factors, Data management with strings, display and formatting.
- Data management with display paste, split, find and replacement, manipulations with alphabets, evaluation of strings, data frames.
Data frames, import of external data in various file formats, statistical functions, compilation of data.

Graphics and plots, statistical functions for central tendency, variation, skewness and kurtosis, handling of bivariate data through graphics, correlations, programming and illustration with examples.

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

SELF LEARNING ELECTIVE (MOOCS)
17CS2506B
PRODUCT DESIGN AND INNOVATION

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1** Identify and analyse the product design and development processes in manufacturing industry.
- **CO2** Define the components and their functions of product design and development processes and their relationships from concept to customer over whole product lifecycle.
- **CO3** Analyse, evaluate and apply the methodologies for product design, development and management.
- **CO4** Undertake a methodical approach to the management of product development to satisfy customer needs.

**Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)**

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COURSE CONTENT

**The minimum content to be covered**

Need for Innovation and design, User Innovation, Introduction to product and Product Design, Difference between Product development and product design.

Need/Problem Identification, User study by contextual enquiry, Questionnaire study, Interview techniques, Persona and scenario mapping, Product Study And Market study, design brief.

Importance of Human factors in product design, Physical Ergonomics principles and issues, Ergonomic assessment tool, Cognitive issues in product design.

Creative techniques and tools for Concept generation, concept evaluation.
Product prototyping/ model making work flow, tools and techniques for model making and prototyping, introduction to prototype driven innovation,
Overview of materials and processes

Evaluation tools and techniques for User-Product interaction

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
[1] https://onlinecourses.nptel.ac.in/noc18_de02/preview, Accessed on 25th July, 2018
SELF LEARNING ELECTIVE (MOOCS)
17CS2506C
SOCIAL NETWORKS

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Study of theories related to social, information networks and their applications on real-world datasets.

CO2 Crunch the online available graph datasets and process them with the help of python networkx package

CO3 Visualize the graph datasets

CO4 Understand real world scenarios

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

The minimum content to be covered

Introduction to Graph Theory and Python

Analyzing Online Social Network Datasets

Power Law and Emergent Properties

Strength of Weak Ties

Homophily and Social Influence

Structural Balance
The Structure of the Web
Link Analysis and Web Search
Link Prediction
Information Cascades
Diffusion Behavior in Networks
The Small World Phenomenon

TEXT BOOKS
[1] Networks, Crowds and Markets by David Easley and Jon Kleinberg, Cambridge University Press, 2010

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
[1] https://nptel.ac.in/courses/106106169/, Accessed on June 24th, 2018
SELF LEARNING ELECTIVE (MOOCS)
17CS2506D
PROGRAMMING IN C++

Course Category: Self Learning Elective  Credits: 2
Course Type: Theory  Lecture - Tutorial - Practice: 0-0-0
Prerequisites: Programming in C  Continuous Evaluation: 30
  Semester end Evaluation: 70
  Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1  Understand how C++ improves C with object-oriented features

CO2  Write the programs using C++ features such as composition of objects, Operator overloading, inheritance, Polymorphism etc.

CO3  Apply the concepts of object-oriented programming like structures, unions etc.

CO4  Implement how inheritance and virtual functions implement dynamic binding with polymorphism.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

The minimum content to be covered

Programming in C++ is Fun: Build and execute a C program in C++, Write equivalent programs in C++

C++ as Better C : Procedural Extensions of C
Overview of OOP in C++ : Classes and basic Object-Oriented features (encapsulation)

Overview of OOP in C++ : More OO features, overloading, namespace and using struct and union

Inheritance : Generalization / Specialization of Object Modeling in C++

Polymorphism : Static and Dynamic Binding

Type Casting & Exceptions : C++ cast operators; C++ Exceptions & standard exception classes
Templates & STL – Function and Class templates and using STL like containers, algorithms

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SELF LEARNING ELECTIVE (MOOCS) 
17CS2506E 
ADVANCED COMPUTER ARCHITECTURE

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the Concept of Pipelining and its applications.

CO2 Explore Instruction Level Parallelism & data Level Parallelism

CO3 Understand the design & optimization techniques of cache memory

CO4 Understand the design Concepts of DRAM.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

The minimum content to be covered

Review of Basic Computer Organization, Performance Evaluation Methods, Introduction to RISC Instruction Pipeline, Instruction Pipeline and Performance. Pipeline Hazards and Analysis, Branch Prediction, MIPS Pipeline for Multi-Cycle Operations.

Compiler Techniques to Explore Instruction Level Parallelism, Dynamic Scheduling with Tomasulo’s Algorithm and Speculative Execution. Advanced Pipelining and Superscalar Processors, Exploiting Data Level Parallelism: Vector and GPU Architectures.


Introduction to DRAM System, DRAM Controllers and Address Mapping, Secondary Storage Systems,
Design Concepts in DRAM and Hard Disk.

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] Advanced computer architecture by Prof. John Jose, IIT Guwahati  
https://swayam.gov.in/nd1_noc19_cs62/preview  
(Accessed on 10-8-18)
17TP1507
PERSONALITY DEVELOPMENT

Course Category: Institutional Core  Credits: 1
Course Type: Learning by Doing  Lecture -Tutorial-Practice: 0 - 0 - 2
Prerequisites: -  Continuous Evaluation: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1  Perform as good team player.
CO2  Proficient in academic presentations.
CO3  Know the corporate etiquette.
CO4  Develop analytical skill set through case studies.
CO5  Develop competency in personal interviews, group discussions and succeed in professional and personal life.
CO6  Present them-selves with “corporate readiness”.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT – I
- Self-Introduction
- Shaping Young Minds – A Talk by Azim Premji (Listening Activity)
- Self – Analysis, Developing Positive Attitude
- Perception – Importance of analytical thinking

UNIT – II
- Communication Skills – Need and Methods
- Body-Language-I; How to interpret and understand other’s body language
- Body Language – II; How to improve one’s own Body Language
• Anger Management

UNIT – III
• Stress Management
• Time Management – Methods of using time effectively
• Social, Business & Dining Etiquette
• Telephone and Email Etiquette

UNIT-IV
• Standard Operation Methods - Note Making & Note Taking
• Minutes Preparation
• Email Writing
• Email – Practice Session
• Letter Writing – Formal & Informal

UNIT – V
• Team Building
• Leadership Qualities
• Six Thinking Hats

UNIT – VI
• Vocabulary
• Correction of Sentences
• Sentence Completion – Course of Action
• Sentences Assumptions

UNIT – VII
• Sentence Arguments
• Reading Comprehension-Practice work
• Group Discussion
• Group Discussion – Practice Session

UNIT-VIII
• Resume Preparation
• Interview Skills
• Mock Interviews.

METHODOLOGY
Audio—Visuals / Hand Outs (Compiled/Created by Training Division, T&P Cell, VR Siddhartha Engineering College), Board & Chalk and Interactive Sessions.
# 17CS3509
MICROPROCESSORS AND MICROCONTROLLERS

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

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<td>CO1</td>
<td>Understand the fundamental concepts of 8086 μP and its internal Architecture.</td>
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<tr>
<td>CO2</td>
<td>Apply 8086 μP Programming Knowledge to solve the problems.</td>
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<td>CO3</td>
<td>Understand the concepts of 8086 microprocessor interrupts</td>
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<td>CO4</td>
<td>Implement programs to interface the 8086 Microprocessor with Analog and Digital devices.</td>
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<td>CO5</td>
<td>Understand the internal architecture &amp; programming of 8051 microcontroller.</td>
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### Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

### UNIT I
The 8086 Microprocessor:
Overview of microcomputer structure & operation, overview of 8086 microprocessor family, features of advanced Pentium processors, 8086 internal architecture, Machine language Vs assembly language, 8086 addressing modes. 8086 pin diagram, 8086 minimum mode and maximum mode

### UNIT II
8086 Instruction Set & Programming:
Data transfer instructions, arithmetic instructions, bit manipulation instructions, string instructions, program execution transfer instructions, and processor control instructions, Assembler directives.
Standard 8086 assembly language program structure, Assembly language program development tools, writing simple programs in 8086 assembly language, Writing and using procedures and assembler macros

UNIT III
Interrupts: 8086 interrupts and interrupt responses, 8259A priority interrupt controller
Interfacing With 8086 Microprocessor
Programmable parallel ports and hand shake input/output, the programmable peripheral interface 8255A: modes of operation and initialization, Basics of D/A and A/D converters. Interfacing of DAC and ADC to 8086 microprocessor.

UNIT IV
The 8051 Microcontroller: 8051 micro controller hardware, inputs/outputs pins, ports and circuits, counters and timers, serial data input/output, interrupts.
Programming The 8051:
Addressing Modes, External data moves, code memory read only data moves, PUSH and POP op codes, data exchanges, byte level and bit level logical operations rotate and swap operations, arithmetic operations jumps, calls & subroutines Interrupts & returns.

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
17CS3551
DATABASE MANAGEMENT SYSTEMS LABORATORY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Design and implement a database schema for a given problem-domain

CO2 Model an application’s data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.

CO3 Apply normalization process for database design

CO4 Implement various OLAP operations

CO5 Demonstrate an understanding of the detailed architecture, define objects, load data, query data and performance tune Key-Value Pair NoSQL databases.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

PART-A (SQL, PL/SQL)

Task 1:
Defining schemas for applications (Creating tables,Renaming tables, Data constraints (Primary key, Foreign key, Not Null), Data insertion into a table)

Task 2:
Execute the aggregate functions like count, sum, avg etc. on the suitable database. Make use of built in functions according to the need of the database chosen. Retrieve the data from the database based on date function. Use group by and having clauses.

Task 3:
Implementation of different types of Joins, views, Sub-queries

**Task 4:**
Draw ER diagram for an application with at least 3 entities and relationships between them using a tool. Perform ER to Relational Mapping to derive Relational database

**Task 5:**
Write a PL/SQL block to implement various control structures

**Task 6:**
Write a PL/SQL block to implement all types of cursors.

**Task 7:**
Create simple procedure, procedures with parameters like IN, OUT & INOUT on the given schemas. Differentiate Function & Procedure. Create simple function on the given schema

**Task 8:**
Execute statement level and row level trigger on the given schema

**PART-B (No SQL)**

**Task 9:**
Create a NoSQL database for a sample application and perform CURD operations

**Task 10:**
Create a data warehouse and Implement OLAP operations

**Task 11:**
Design and Implement Database operations (add, delete, edit etc.) using SQLite.

**PART-C (DBMS LAB PROJECT)**

Design and Implement the given Database Application using following requirements

- **Database Analysis and Design**
  - Build Conceptual schema using tools
  - Apply Normalization process for relational database design
  - Relational Model Database

- **Implementation:**
  - Front End: Java/Perl/PHP/Python/Ruby/.net
  - Backend: SQL/MySQL/SQLite
  - Database Connectivity: ODBC/JDBC/Servlets

- **Testing: Data Validation**

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**
[1] Prof Arnab Bhattacharya IIT Kanpur, SQL Introduction
    https://nptel.ac.in/courses/106104135/10 Last accessed on 01-06-2019
[2] Prof Arnab Bhattacharya IIT Kanpur SQL: Updates, Joins, Views and Triggers
    https://nptel.ac.in/courses/106104135/11 Last accessed on 01-06-2019
    https://www.mooc-list.com/course/querying-transact-sql-edx Last accessed on 01-06-2019
# 17CS3552
## MICROPROCESSOR LABORATORY

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

| CO1      | Understand the fundamental concepts of 8086 µP and its internal Architecture. |
| CO2      | Apply 8086 µP Programming Knowledge to solve the problems.                      |
| CO3      | Understand the concepts of 8086 microprocessor interrupts                        |
| CO4      | Implement programs to interface the 8086 Microprocessor with Analog and Digital devices. |
| CO5      | Understand the features of peripheral devices and internal architecture of 8051 microcontroller. |

## Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

1. Task 1: Data transfer instructions (With different Address Modes).
2. Task 2: Demonstration on 8086 µP Flag Register with operations.
3. Task 3: Arithmetic instructions (8-bit /16-bit Data Size With different Address Modes)
4. Task 4: Loop instructions
5. Task5: Jump instructions
6. Task 6: Logical/ rotate/ shift instructions
7. Task 7: String instructions.
8. Task 8: Demonstration of subroutines Execution
Task 9: ADC interfacing
Task 10: DAC interfaces
Task 11: Stepper motor interfacing
Task12: Complete study of ARM Cortex processor

TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

   (Accessed on 10-8-18)
17CS2553A
ADVANCED PROGRAMMING in JAVA LABORATORY

Course Category: Open Elective
Course Type: Laboratory
Prerequisites: C Programming Laboratory, Java Programming Laboratory

Credits: 1
Lecture -Tutorial-Practice: 0 - 0 - 2
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Create GUI application
CO2 Create distributed application
CO3 Develop web application
CO4 Develop enterprise application

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

Task 1:

Course Outcome: CO1: Create GUI application

Topic: Java Swings.

Create a GUI application in java using Swing components, which enter the details of an Employee and on the submit display the details of the Employee (Employee details is like contains name, code, address, phone, joining details, blood group etc.)

Task 2:

Course Outcome: CO1: Create GUI application

Topic: Java Swings and JDBC Connectivity.

Design Employee Database for company or Organization (Employee Personal Details,
Department, Salary (basic, DA, HRA,..) Details) and develop JDBC based java application for following tasks:
1. Insert Records into respective table
2. Select records of particular table of database
3. Delete Records from table.
Connect GUI application to database and perform SQL commands via JDBC API

Task 3:
**Course Outcome: CO1: Create distributed application**
**Topic: Lambda Expressions.**

Create a simple java application for guessing game and keep track about top five scores for each game played by the user with implementation of lambda expressions.

Task 4:
**Course Outcome: CO2: Create distributed application**
**Topic: Network Programming**

Create Application for Datagram server and Client interaction as per given below.
i] Datagram server to send a message to client.
ii] Datagram client to receive the message sent by the server.
Create a simple UDP chat application where client and server can chat with each other. Write a client server program using TCP where client sends 10 numbers to server program and server program responds with the numbers in ascending order to respective client.

Task 5:
**Course Outcome: CO2: Create distributed application**
**Topic: RMI Programming**

Write an RMI client server String operations application. RMI server provides two remotely accessible methods:
long findStringLength(String s); //returns length of a String parameter
boolean checkPalindrome(String s); //determines whether a String
//parameter is palindrome or not

Task 6:
**Course Outcome: CO3: Create web application**
**Topic: Servlets**

Verify installation and setting of Web container/Web Server/Tomcat and prepare an installation report, which contains setting of class path,server port, starting and shutting down of server.
Develop web Application to display a greeting message in the browser by using Servlet interface.

Task 7:
Course Outcome: CO3: Create web application

Topic: Servlets

Create a simple Sign in and Signup web application using HTTPServlet class.

Task 8:

Course Outcome: CO3: Create web application

Topic: Servlets

Create Servlet for registering a new user and displaying the number of visits made by the existing user using cookies.

Task 9:

Course Outcome: CO3: Create web application

Topic: Java Server Pages

Create JSP to output, "Welcome to JSP world. The time now is: system current time. Use a scriptlet for the complete string, including the HTML tags.

Task 10:

Course Outcome: CO3: Create web application

Topic: Java Server Pages

Create a simple JSP application for online poll application that prompts the user to answer a question and display the results in bar graph representation.

Task 11:

Course Outcome: CO3: Create enterprise application

Topic: Spring framework

Create a simple web application for online poll application that prompts the user to answer a question and display the results in bar graph representation and use spring framework in development.

Lab Projects:

1. Apply the concepts of Java Swings, JDBC Connectivity and Networking programming to develop any real-time GUI based application.
   Ex. e-Shopping cart application.

2. Apply the key concepts of Servlets, JSP and EJB to develop web based application.
   Ex. interactive online-based quiz application.

TEXT BOOKS

   [Unit IV Chapter 3 ]
## REFERENCE BOOKS


## E-RESOURCES AND OTHER DIGITAL MATERIAL

17CS2553B
COMPUTER GRAPHICS LABORATORY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand working of different display device.

CO2 Apply Different Point Plotting techniques.

CO3 Demonstrate different 2D and 3D Object Transformation and Viewing.

CO4 Illustrate various 3D Projection and 2D Clipping

CO5 Understand computer animation sequence.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

Task 1: Digital Differential Analyzer Algorithm
Task 2: Bresenham’s Line Drawing Algorithm
Task 3: Midpoint Circle Generation Algorithm
Task 4: Ellipse Generation Algorithm
Task 5: Creating various types of texts and fonts
Task 6: Creating two dimensional objects
**Task 7**: Two Dimensional Transformations  
**Task 8**: Colouring the Pictures  
**Task 9**: Three Dimensional Transformations  
**Task 10**: Curve Generation  
**Task 11**: Simple Animations using transformations  
**Task 12**: Key Frame Animation  

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**TEXT BOOKS**


**REFERENCE BOOKS**


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**E-RESOURCES AND OTHER DIGITAL MATERIAL**

http://nptel.iitm.ac.in/video.php?subjectld=106106090 Last accessed on 01-06-2019  
17CS3554
COMPETITIVE CODING – II

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 | Understand the basic concepts such as Stacks, Queues, Linked Lists and Hashing Techniques in the programming language

CO2 | Analyse the programs on pointers, dynamic programming concepts

CO3 | Solve the problems with given test cases

CO4 | Apply programming skills for optimized code and derive the solutions according to the provided constraints

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

Solving the programs under “Easy / Medium” category in CodeChef & HackerRank, etc. Students must solve 20 problems related to Data Structures in CodeChef / HackerRank, etc. The category may be under Easy / Medium. Students shall participate at least two contests per month, hosted in online judges. Problems to be solved in C.

A minimum of 15 problems shall be solved per week in either CodeChef / HarckerRank, etc. Monthly contests hosted in CodeChef / HackerRank, etc., may be taken as day to day assessment of laboratory. Monthly one such evaluation

The work will be carried out in the laboratory slot allotted as well as at the home.

TEXT BOOKS


REFERENCE BOOKS

E- RESOURCES AND OTHER DIGITAL MATERIAL

# 17MC1508
## BIOLOGY FOR ENGINEERS

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1**: Describe the fundamental Principles and methods of engineering
- **CO2**: Identify the functions of different types in bio-molecules
- **CO3**: Describe mechanisms underlying the working of molecular biological processes including enzyme catalysis, metabolic pathways, gene expression.
- **CO4**: Use Excel, MATLAB and other computational tools to quantitatively analyze biological processes.

## Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

### Unit-I Introduction and Classification of Living organisms

**Introduction:**

Fundamental differences between science and engineering by drawing a comparison between eye and camera, Bird flying and aircraft. Biology as an independent scientific discipline. Discuss how biological observations of 18th Century that lead to major discoveries. Examples from Brownian motion and the origin of thermodynamics by referring to the original observation of Robert Brown and Julius Mayor.

**Classification:**

Classification of living organisms based on (a) Cellularity- Unicellular or multicellular (b) Ultrastructure-prokaryotes or eukaryotes. (c) Energy and Carbon utilization -Autotrophs, heterotrophs, lithotrophs (d) Ammonia excretion – aminotelic, uricotelic, ureotelic (e) Habitat- aquatic, terrestrial (f) Molecular taxonomy- three major kingdoms of life.
Unit-II Biomolecules and Enzymes

Biomolecules:

Enzymes:

Unit-III Genetics and Gene information Transfer

Genetics:
“Genetics is to biology what Newton’s laws are to Physical Sciences” Mendel’s laws, Concept of segregation and independent assortment. Concept of allele. Concepts of recessiveness and dominance. Gene interaction, Epistasis. Meiosis and Mitosis be taught as a part of genetics. Emphasis to be give not to the mechanics of cell division nor the phases but how genetic material passes from parent to offspring.

Information Transfer:

Unit-IV Metabolism and Microbiology

Metabolism:
Exothermic and endothermic versus endergonic and exergoinc reactions. Concept of Keq and its relation to standard free energy. ATP as an energy currency. Breakdown of glucose to CO2 + H2O (Glycolysis and Krebs cycle) and synthesis of glucose from CO2 and H2O (Photosynthesis). Energy yielding and energy consuming reactions.

Microbiology:

TEXT BOOKS

[2] Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wiley and Sons

E-RESOURCES AND OTHER DIGITAL MATERIAL

   Last accessed on 1-06-2019
SEMESTER - VI
17CS3601
THEORY OF COMPUTATION

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the basic concepts of formal languages of finite automata techniques.

CO2 Solve regular expressions and various problems to minimize FA.

CO3 Apply various languages to construct context free grammar.

CO4 Apply normal form techniques, Push down automata and Turing Machines to solve various problems.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I

UNIT II


UNIT III
Chomsky Normal Form-Greibach Normal Form-Pushdown Automata-Informal Description: Definitions-Pushdown Automata Context Free Languages- Properties of Context Free Languages- The
Pumping Lemma for CFL’s. Closure Properties of CFL’s- Decision Algorithms for CFL’s.

**UNIT IV**

**Turing Machines:** Introduction- Turing Machine Model-Computable Languages and functions-Techniques of Turing Machine Construction.

**Undecidability:** Properties of Recursive and Recursively Enumerable languages- Universal Turing Machines (without any reference to undecidable problems).

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] https://nptel.ac.in/courses/106104028/ Last accessed on 1-06-2019

17CS3602
SOFTWARE ENGINEERING

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COURSE OUTCOMES
Upon successful completion of the course, the student will be able to:

CO1 Understand basic concepts of software engineering.

CO2 Compare different software engineering process models.

CO3 Analyze the principles of requirement Engineering.

CO4 Create architectural design for a given project.

CO5 Apply different testing techniques

Contribution of Course Outcomes towards achievement of Program Outcomes (1-Low, 2-Medium, 3-High)

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COURSE CONTENT

UNIT I


UNIT II
Understanding Requirements: Requirements Engineering, Establishing the Groundwork, Eliciting Requirements, Developing Use Cases, Building the Requirements Model, Negotiating Requirements,

**Requirements Modelling:** Flow, Behavior, Patterns, And Web apps: Requirements Modeling Strategies, Flow-Oriented Modeling, Creating a Behavioral Model, Patterns for Requirements Modeling, Requirements Modeling for Web Apps.

**UNIT III**


**UNIT IV**
**Software Testing Strategies:** A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Test Strategies for Object-Oriented Software, Validation testing, System testing, the art of debugging.


**TEXT BOOKS**

**REFERENCE BOOKS:**

**E-RESOURCES AND OTHER DIGITAL MATERIAL**
[1] https://nptel.ac.in/courses/106101061/2 Last accessed on 1-06-2019
[2] https://nptel.ac.in/courses/106101061/5 Last accessed on 1-06-2019
17CS4603A  
CLOUD COMPUTING

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1  Understand various basic concepts related to cloud computing technologies

CO2  Understand different cloud programming platforms and tools

CO3  Explain and characterize different cloud deployment models and service models

CO4  Identify the security issues in cloud computing

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT 1: Introduction & Cloud Computing Architecture

Cloud computing at a glance: The vision of cloud computing, Defining a cloud, A closer look, The cloud computing reference model, Characteristics and benefits

Historical developments: Distributed systems, Virtualization, Web 2.0, Service-oriented computing, Utility-oriented computing

Building cloud computing environments: Application development, Infrastructure and system development, Computing platforms and technologies

The cloud reference model: Architecture, Infrastructure-and hardware-as-a-service, Platform as a service, Software as a service

Types of clouds: Architecture, Infrastructure-and hardware-as-a-service, Platform as a service, Software as a service,

Open Challenges: Cloud definition, Cloud interoperability and standards, Scalability and fault tolerance, Security, trust, and privacy, Organizational aspects.
UNIT II: Virtualization & SOA
Introduction, Characteristics of Virtualized Environments, Taxonomy of Virtualization Techniques - Execution Virtualization, Other types of Virtualization, Virtualization and Cloud Computing, Pros and Cons of Virtualization, Technology Examples – Xen, VMware, Microsoft Hyper-V
Introducing Service Oriented Architecture - Event-driven SOA or SOA 2.0, The Enterprise Service Bus, Service catalogs
Defining SOA Communications - Business Process Execution Language, Business process modeling

UNIT III: Cloud Platforms, Applications and Cloud Programming and Software Environments
Scientific Applications – Healthcare, Biology, Geoscience, Business and Consumer Applications – CRM and ERP, Productivity, Social Networking, Media Applications, Multiplayer Online Gaming
Features of Cloud and Grid Platforms - Cloud Capabilities and Platform Features, Traditional Features Common to Grids and Clouds, Data Features and Databases, Programming and Runtime Support
Programming Support of Google App Engine - Programming the Google App Engine, Google File System (GFS), BigTable, Google’s NOSQL System, Chubby, Google’s Distributed Lock Service. Programming on Amazon AWS and Microsoft Azure - Programming on Amazon EC2, Amazon Simple Storage Service (S3), Amazon Elastic Block Store (EBS) and SimpleDB, Microsoft Azure Programming Support.

UNIT IV: Cloud Security and Mobile Cloud
Securing the Cloud - The security boundary, Security service boundary, Security mapping.
Securing Data - Brokered cloud storage access, Storage location and tenancy, Encryption, Auditing and compliance.
Working with Mobile Devices - Defining the Mobile Market, Connecting to the cloud, Adopting mobile cloud applications.

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
17CS4603B
LINUX ESSENTIALS

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand and work confidently in Linux Environment

CO2 Apply the security and administration mechanisms for user or group management and permissions

CO3 Write shell scripts for solving problems

CO4 Develop the client/server communication using IPC mechanisms

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I

UNIT II
Managing Hardware: Learning about Your CPU, Understanding Disk Issues, Managing Displays, Handling USB Devices, Managing Drivers.
Getting to Know the Command Line: Starting a Command Line, Running Programs, Using Shell Features, Getting Help Using man Pages, Getting Help Using info Pages.

UNIT III
Managing Files: Navigating Files and Directories, Manipulating Files, Manipulating Directories.
Searching, Extracting, and Archiving Data: Using Regular Expressions Searching for and Extracting Data, Redirecting Input and Output, Archiving Data.
UNIT IV


TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

17CS4603C
STATISTICS WITH R

Course Category: Programme Elective
Course Type: Theory
Prerequisites: Discrete Mathematical Structures

Credits: 3
Lecture -Tutorial-Practice: 3 - 0 - 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Apply statistical methods to data for inferences and introduce the concepts of R
CO2 Analyze the libraries for data manipulation and data visualization in R
CO3 Analyze data-sets to create testable hypotheses and identify appropriate statistical tests
CO4 Analyze and summarize data-sets to fit linear and nonlinear models.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
Introduction: How to run R, R Sessions, Introduction to Functions, Vectors, Character Strings, Matrices, Lists, Data Frames, Classes.

UNIT-II

UNIT-III
**Graphics:** Creating Graphs, The Workhorse of R Base Graphics, the plot () Function – Customizing Graphs, Saving Graphs to Files.

**Probability Distributions:** Normal Distribution- Binomial Distribution- Poisson Distributions Other Distribution, Basic Statistics, Correlation and Covariance, T-Tests,-ANOVA.

**UNIT-IV**

**Linear Models:** Simple Linear Regression, -Multiple Regression Generalized Linear Models, Logistic Regression, - Poisson Regression- other Generalized Linear Models-Survival Analysis, Nonlinear Models, Splines, Decision Trees, Random Forests.

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

   Available: https://www.coursera.org/specializations/statistics
17CS4604A
INTERNET OF THINGS

Course Category: Programme Elective
Course Type: Theory
Prerequisites: Microprocessor & Microcontrollers

Credits: 3
Lecture -Tutorial-Practice: 3-0-0
Continuous Evaluation:
Semester end Evaluation:
Total Marks: 30

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the basic principles and architecture of IoT.
CO2 Determine the components used as smart objects and access technologies.
CO3 Understand network and application layer protocols for IOT
CO4 Relate data analytics and IOT and understand IOT security protocols.
CO5 Apply IOT related technologies for smart cities and transportation.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I

Introduction to IoT: Genesis of IOT, IOT and digitization, IOT impact, Convergence of IT and OT, IOT challenges.

IOT Network Architecture and Design: Drivers behind network architecture. Comparing IOT architectures, a simplified IOT architecture, the core IOT functional stack, IOT data management and compute stack.

UNIT II

Smart Objects: The “Things” in IoT: Sensors, Actuators and Smart Objects, sensor networks
Connecting Smart objects: Communication criteria, IOT access technologies: IEEE 802.15.4, Lora WAN

UNIT III

Protocols For IoT: Optimizing IP for IOT, the transport layer, IOT application transport methods: introduction to SCADA, IOT application layer Protocols: COAP, MQTT.

Data and Analytics for IoT: Introduction to data analytics for IOT, Edge streaming Analytics, Network Analytics.

UNIT IV


IOT Applications: SMART and Connected CITIES: IOT Strategy for smarter cities, smart city IOT architecture, Smart city security architecture, smart city –use case examples TRANSPORTATION: Transportation challenges, IOT architecture for Transportation, IOT use cases for transportation.

TEXT BOOKS

[1] David Hanes, “IOT FUNDAMENTALS” 1ST edition, CISCO PRESS, 2018

REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

17CS4604B
MOBILE APPLICATION DEVELOPMENT

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand J2ME technology
CO2 Create user interfaces for mobile application
CO3 Develop databases connection to given mobile application
CO4 Develop and deploy mobile application into an android device.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I

UNIT II
Commands, Items, and Event Processing: J2ME User Interfaces, Display Class, Command Class, Item Class, Exception Handling.
Record Management System: Record Storage, Writing and Reading Records, Record Enumeration, Sorting Records, Searching Records, Record Listener.
UNIT III
Generic Connection Framework: The Connection, Hypertext Transfer Protocol, Communication Management Using HTTP Commands, Session Management, Transmit as a Background Process

UNIT IV
Databases and Content Providers: Introducing Android Databases, Working with SQLite Databases

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
17CS4604C
DATA COMPRESSION

Course Category: Programme Elective
Course Type: Theory
Prerequisites: Digital Communication, Image Processing

Credits: 3
Lecture - Tutorial - Practice: 3-0-0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the data compression representations and its applications
CO2 Implement the compression techniques to compress the different raw data
CO3 Analyze the concepts associated speech, image and video compression
CO4 Analyze the usage of compression algorithms and compare its performance

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
Introduction: Compression Techniques, Lossless Compression, Lossy Compression, Measures of Performance, Modeling and Coding


Huffman Coding: Overview, The Huffman Coding Algorithm-Minimum Variance Huffman Codes, Optimality of Huffman Codes, Length of Huffman Codes, Extended Huffman Codes, Nonbinary Huffman Codes, Adaptive Huffman Coding - Update Procedure, Encoding Procedure, Decoding Procedure, Applications of Huffman Coding - Lossless Image Compression, Text Compression, Audio Compression

UNIT II
Arithmetic Coding: Overview, Introduction, Coding a Sequence - Generating a Tag, Deciphering the Tag,


**Lossless Image Compression**: Overview, Introduction- The Old JPEG Standard, CALIC , JPEG-LS Multi-resolution Approaches-Progressive Image Transmission, Facsimile Encoding-Run-Length Coding

**UNIT III**

**Transform Coding** : Overview, Introduction ,The Transform, Transforms of Interest- Karhunen-Loeve Transform ,Discrete Cosine Transform, Discrete Sine Transform, Discrete Walsh-Hadamard Transform, Quantization and Coding of Transform Coefficients , Application to Image Compression—JPEG- The Transform, Quantization, Coding ,Application to Audio Compression—the MDCT


**Audio Coding** : Overview, Introduction- Spectral Masking, Temporal Masking, Psychoacoustic Model, MPEG Audio Coding, Layer I Coding, Layer II Coding, Layer III Coding—mp3, MPEG Advanced Audio Coding - MPEG-2 AAC, MPEG-4 AAC, Dolby AC3 (Dolby Digital), Bit Allocation , Other Standards

**UNIT IV**


**TEXT BOOKS**


**REFERENCE BOOKS**

17CS2605A
ARTIFICIAL INTELLIGENCE TECHNIQUES, TOOLS AND APPLICATIONS

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the basic principles and applications of Artificial Intelligence.

CO2 Represent Knowledge by using various rules.

CO3 Apply filler structures for different sentences and know the concepts of Natural Language Processing.

CO4 List the key aspects of Expert Systems and realize the concepts of Connectionist Models.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I

Problems, Problem Spaces And Search: Defining the Problem as a State space Search, Production Systems, Problem Characteristics, Production system characteristics, Issues in the Design of Search Programs.

Heuristic Search Techniques: Generate-and-test, Hill Climbing, Best-First Search, Problem Reduction, Constraint Satisfaction, Means-Ends Analysis

UNIT II

Knowledge Representation Issues: Representations and Mappings, Approaches to Knowledge Representation, Issues in Knowledge Representation.


UNIT III
Weak Slot-and-Fillers Structures: Semantic Nets, Frames
Strong Slot-and-Fillers Structures: Conceptual Dependency, Scripts.
Natural Language Processing: Introduction, syntactic processing, Semantic analysis, Discourse and pragmatic processing, Statistical Language processing, Spell checking

UNIT IV
Connectionist Models: Introduction: Hopfield Networks, Learning in Neural Networks, Applications of Neural Networks.

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
[1] https://nptel.ac.in/courses/106105077/ Last accessed on 1-06-2019
# 17CS2605B BIOINFORMATICS

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1**: Know the biological sequence and structural databases.
- **CO2**: Understand the genome information and DNA sequence analysis.
- **CO3**: Describe pair-wise and multiple sequence alignment methods.
- **CO4**: Analyze secondary structure DNA data.

### Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

### UNIT I

**Introduction**: Definitions, Sequencing, Biological sequence/structure, Genome Projects, Pattern recognition an prediction, Folding problem, Sequence Analysis, Homology and Analogy.

**Protein Information Resources**: Biological databases, Primary sequence databases, Protein Sequence databases, Secondary databases, Protein pattern databases, and Structure classification databases.

### UNIT II

**Genome Information Resources**: DNA sequence databases, specialized genomic resources.

**DNA Sequence Analysis**: Importance of DNA analysis, Gene structure and DNA sequences, Features of DNA sequence analysis, EST (Expressed Sequence Tag) searches, Gene hunting, Profile of a cell, EST analysis, Effects of EST data on DNA databases.

### UNIT III
**Pair wise Alignment Techniques:**
Database searching, Alphabets and complexity, Algorithm and programs, Comparing two sequences, subsequences, Identity and similarity, The Dot plot, Local and global similarity, different alignment techniques, Dynamic Programming, Pair wise database searching.

**Multiple Sequence Alignment:**
Definition and Goal, The consensus, computational complexity, Manual methods, Simultaneous methods, Progressive methods, Databases of Multiple alignments and searching.

**UNIT IV**

**Secondary Database Searching:** Importance and need of secondary database searches, secondary database structure and building a sequence search protocol

**Analysis Packages:** Analysis package structure, commercial databases, commercial software, comprehensive packages, packages specializing in DNA analysis, Intranet Packages, Internet Packages.

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

https://www.bioinformatics.org/
[2] Protein Secondary Structure Databases :  
http://cybionix.com/bioinformatics/databases/ Last accessed on 01-06-2019
17CS2605C
IMAGE PROCESSING

Course Category: Open Elective
Course Type: Theory
Prerequisites: Computer Organization
Credits: 3
Lecture -Tutorial-Practice: 3 - 0 - 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Explain the fundamental concepts and basic relationship among the pixels.
CO2 Differentiate the Spatial and Frequency domain concepts in image enhancement.
CO3 Identify the image restoration filter for degraded image.
CO4 Compare the lossy and lossless image compression techniques
CO5 Explain the image segmentation techniques

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
Digital Image Fundamentals: Elements of Visual Perception, Image Sensing and Acquisition, Image Sampling and Quantization, Some basic Relationships between Pixels

UNIT II
Intensity transformations and Spatial filtering: Some Basic intensity transformation functions, Histogram Processing, fundamentals of Spatial Filtering, Smoothing spatial Filters, Sharpening spatial Filters
Filtering in Frequency Domain: The basics of filtering in the frequency domain, Image Smoothing
UNIT III
Image Restoration: A model of the image degradation/restoration process, noise models, restoration in the presence of noise—only spatial filtering, Weiner filtering, constrained least squares filtering
Color Image Processing: Fundamentals, color models

UNIT IV
Image Compression: Fundamentals, image compression models, some basic compression methods
Image Segmentation: Fundamentals, Point, Line and Edge Detection, Thresholding, Region-Based Segmentation

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
   Available: http://www.nptel.ac.in/courses/117105079/ Last accessed on 01-06-2019
   Available at: https://www.coursera.org/course/digital  Last accessed on 01-06-2019
17CS2605D
FUNDAMENTALS OF JAVA PROGRAMMING

Course Category: Open Elective
Course Type: Theory
Prerequisites: -

Credits: 3
Lecture -Tutorial-Practice: 3 - 0 - 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the concepts of object oriented programming.
CO2 Implement multiple inheritance through interfaces.
CO3 Apply exception, thread capabilities to a given application.
CO4 Apply Collections framework to a given application.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
Introduction to Java: Java history, java features, how java differs from C and C++.
Data Types, variables and arrays: Java keywords, Primitive types, Integers, Floating-Point Types, Characters, Booleans, Variables, Type Conversion, casting and Arrays.
Classes and objects: Class fundamentals, declaring objects, assigning object reference variables, introducing methods, constructors, this keyword, Garbage collection, overloading methods, using objects as parameters, returning objects, static and final keywords, nested and inner classes.

UNIT II
String Handling: The String Constructors, String Buffer Class, String Tokenizer class.
Inheritance: Inheritance basics, using super, multilevel hierarchy, method overriding, dynamic method dispatch, using abstract classes, final with inheritance.
Packages: Defining a package, finding package and CLASSPATH. Access protection, importing packages.
UNIT III
Interfaces: Defining an interface, implementing interfaces, nested interfaces, applying interfaces, variables in interfaces.

Exception handling: Exception handling fundamentals, exception types, uncaught exceptions, using try and catch, multiple catch clauses, throw, throws, finally, creating your own exception subclasses.


UNIT – IV


TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
# 17TP1606
## QUANTITATIVE APTITUDE

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### COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1** Effectively organize, summarize and present information in quantitative forms including tables,
- **CO2** Use mathematical based reasoning and to evaluate alternatives and make decisions
- **CO3** Think and reason logically and critically in any given situation.
- **CO4** Apply logical thinking to solve problems and puzzles in qualifying exams for companies and in other competitive exams

### Contribution of Course Outcomes towards achievement of Program Outcomes (1– Low, 2 - Medium, 3 – High)

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### COURSE CONTENT

#### UNIT I
- Number system
- HCF & LCM,
- Average,
- Percentages,
- Profit & Loss

#### UNIT II
- Ratio & Proportion,
- Partnership,
- Chain Rule,
- Time & Distance,
- Time & Work
UNIT III
- Pipes & Cistern,
- Problems on Trains,
- Problems on boats & Steams,
- Allegation,
- Simple interest and compound interest.

UNIT IV
- Area, Volume and Surface areas,
- Races & Games of skills,
- Calendar & Clock,
- Stocks & Shares,
- Permutations & Combination, Probability.

METHODOLOGY
Learning Resources: Quantitative Aptitude by R.S.. Aggarwal
17CS4651A
CLOUD COMPUTING LABORATORY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand various basic concepts related to cloud computing technologies

CO2 Understand different cloud programming platforms and tools

CO3 Explain and characterize different cloud deployment models and service models

CO4 Identify the security issues in cloud computing

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

Task 1: Case Studies
Study about Amazon AWS, Google Apps and Microsoft Azure.

Task 2: Working with Google App Engine
Building and hosting a simple cloud application using Google App Engine.

Task 3: Working with Microsoft Azure
Building and hosting a simple cloud application using Microsoft Azure.

Task 4: Working with Oracle VM Virtual Box Manager
Implement Virtual OS using Oracle VM Virtual Box Manager.

Task 5: Working with Cloud Simulator
Implement Cloud Simulator using Eclipse and create a datacenter with one host and run one cloudlet on it.

Task 6: Working with AWS
To launch a virtual machine using Amazon EC2 Instance in AWS.

**Task 7: Working with AWS**
Host a Static Personal Website or Marketing Website on AWS.

**Task 8: Working with AWS**
Deploy and host a production ready WordPress website on AWS.

**Task 9: Working with Salesforce Trailhead**
To Build a Battle Station App using Salesforce Trailhead.

**Task 10: Working with Salesforce Trailhead**
To work with Apex and Apex Triggers using the Salesforce Trailhead Platform.

**Task 11: Working with Yellow Circle**
To Create and launch Windows Server virtual machine using Yellow Circle platform.

**Task 12: Case Studies**
Study about Amazon AWS, Hadoop, Aneka

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

  Last accessed on 01-06-2019
17CS4651B
LINUX ESSENTIALS LABORATORY

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**COURSE OUTCOMES**

Upon successful completion of the course, the student will be able to:

| CO1 | Understand and work confidently in Linux Environment |
| CO2 | Apply the security and administration mechanisms for user or group management and permissions |
| CO3 | Write shell scripts for solving problems |
| CO4 | Develop the client/server communication using IPC mechanisms |

**Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)**

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**COURSE CONTENT**

PART – I: Introduction to Linux/Unix commands (utilities)

Task -1:

a. Implement basic commands such as date, who, who am I, uname, cal, tty, stty, echo, printf, bc, script, passwd, finger
b. Implement directory related commands: pwd, mkdir, cd, rmdir, ls and File related commands: cat, cp, mv, rm, chmod, chown, chgrp, file, find, ln, ulink, ulimit, umask, touch

c. Implement Process Related Commands: ps, kill, nohup, at, batch, crontab, fg, bg, jobs
d. Implement Network Related commands: telnet, ftp, rlogin, arp

Task -2:

a. Implement Process Related Commands: ps, kill, nohup, at, batch, crontab, fg, bg, jobs
b. Implement Network Related commands: telnet, ftp, rlogin, arp

Task -3: Working with grep command

a. Write a grep command that selects the lines from the file1 that have exactly three characters
b. Write a grep command that count the number blank lines in the file1

c. Write a grep command that selects the lines from the file1 that have the string UNIX.
d. Write a grep command that copy the file to the monitor, but delete the blank lines.
e. Write a grep command that selects the lines from the file1 that do not start with A to G

**Task -4: Working with sed command**

a. Write a sed command that print lines numbers of lines beginning with “O”
b. Write a sed command that delete digits in the given input file.
c. Write a sed command that delete lines that contain both BEGIN and END
d. Write a sed command that deletes the first character in each line in a file
e. Write a sed command to delete character before last character in each line in a file
f. Write a sed command that swaps the first and second character in each line in the file

**Task -5: Working with awk command**

a. Write an awk command to print the lines and line number in the given input file
b. Write an awk command to print first field and second field only if third field value is >=50 in the given input file.
c. Write an awk program to print the fields 1 and 4 of a file that is passed as command line argument. The file contains lines of information that is separated by “,” as delimeter. The awk program must print at the end the average of all 4th field data.
d. Write an awk program to demonstrate user defined functions and system command.
e. Write an awk script to count the number of lines in a file that do not contain vowels.
f. Write an awk script to find the number of characters, words and lines in a file

**PART – II: Shell Programming (utilities)**

**Task – 6: Shell Scripts**

a. Write shell script to perform integer arithmetic operations
b. Write a shell script to perform floating point arithmetic operations
c. Write a shell script to check the given file is writable or not

**Task – 7: Shell Scripts**

a. Write a shell program to find out reverse string of the given string and check the given string is palindrome or not
b. Write a shell program to find out factorial of the given number
c. Write a shell script to find out whether the given number is prime number or not

**Task – 8: Shell Scripts**

a. Write a shell script that computes the gross salary of a employee according to the following
   1) if basic salary is <1500 then HRA 10% of the basic and DA =90% of the basic
   2) if basic salary is >=1500 then HRA 500 and DA =98% of the basic
b. Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.
c. Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

**Task – 9: C Programs**

a. Write C program to implement ls -l command.
b. Write C program to list every file in a directory, inode number and file name

**Task – 10: Programs on IPC**

Write a C program that illustrates 2 processes communicating using shared memory.

**TEXT BOOKS**


**REFERENCE BOOKS**

E-RESOURCES AND OTHER DIGITAL MATERIAL

# 17CS4651C
## STATISTICS WITH R LABORATORY

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

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<th>Apply statistical methods to data for inferences and introduce the concepts of R</th>
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<td>Analyze the libraries for data manipulation and data visualization in R</td>
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<td>CO3</td>
<td>Analyze data-sets to create testable hypotheses and identify appropriate statistical tests</td>
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<td>CO4</td>
<td>Analyze and summarize data-sets to fit linear and nonlinear models</td>
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## Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

### Task 1
Program to handle vectors and perform simple statistics on the vectors using R.

### Task 2
Program to create a data frame in R and perform operations on it.

### Task 3
(a) Program to read data from files(.csv) and handle the data using functions like plot, hist, summary and mean, mode, median and standard deviation.
(b) Merge the datasets, transformation of variables and creating subsets of the dataset.

### Task 4
(a) Program to find the factorial of a number using recursion in R
(b) Program to print numbers from 1 to 100 using while loop and for loop in R

### Task 5
Program to plot graphs - scatter plot, box plot and bar plot.
Task 6
Program to create a list in R and perform operations on it like list Slicing, sum and mean functions, head and tail functions and finally delete the list using rm() function.

Task 7
a) Program to implement simple and multiple linear regression.
b) Program to implement non-linear regression.

Task 8
Program to implement logistic regression.

Task 9
Program to perform ANOVA test (one-way, two way).

Task 10
Program to perform Principal component analysis (PCA) on the dataset.

Task 11
Program to perform matrix operations (transpose, inverse, least square estimates, eigen values).

Task 12
Program to handle mathematical functions with single argument.

TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

   Available: https://www.coursera.org/specializations/statistics
COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1  Understand the basics of Embedded systems & 8051 Programming.

CO2  Understand the basic principles of IoT.

CO3  Differentiate the features of various IoT platforms.

CO4  Design simple IoT applications.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

PART I
Experiments on 8051 Microcontroller
Task 1: programmes on arithmetic instructions
Task 2: programmes on data transfer instructions
Task 3: programmes on logical instructions
Task 4: programmes on jump instructions
Task 5: Programs on interfacing

PART II
Experiments based on Arduino Uno
Task 6: Blinking of LED
Task 7: Temperature & Humidity Measurement
Task 8: Intruder Detection
Task 9: Distance Measurement
PART III
Experiments based on Raspberry pi
Task 10: Configuring Raspberry pi
Task 11: LED Control
Task 12: temperature measurement
Task 13: uploading data on open source cloud

TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

17CS4652B
MOBILE APPLICATION DEVELOPMENT LABORATORY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Implement J2ME technology

CO2 Create user interfaces for mobile application

CO3 Develop databases connection to given mobile application

CO4 Develop and deploy mobile application into an android device.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

Task 1:

Course Outcome: CO1: Implement J2ME technology

Topic: First application: Creating Android Project, Android Virtual Device Creation, Set up debugging environment, Workspace set up for development, Launching emulator, debugging on mobile devices.

Create a simple mobile application for login and logout activities that illustrates the GUI components, Colors and Fonts.

Task 2:

Course Outcome: CO2: Create user interfaces for mobile application

Develop a mobile application which displays different images dynamically by clicking on button that works with Layout managers and Event handlers.

Develop an application that shows names as a list and on selecting a name it should show the details of the candidate on the next screen with a “Back” button. If the screen is rotated to landscape mode (width greater than height), then the screen should show list on left fragment and details on right fragment instead of second screen with back button. Use Fragment transactions and Rotation event listener.

Task 3:  
**Course Outcome: CO2:** Create user interfaces for mobile application  
**Topic:** Basic UI design: Basics about Views, Layouts, Drawable Resources, Input controls, Input Events, Toasts, More UI Components: Layouts - GridView and ListView, Action bar, Adapters, Menus: Option menu, context menu, sub menu, Pickers - Date and Time.

Create a screen that has input boxes for User Name, Password, and Address, Gender (radio buttons for male and female), Age (numeric), Date of Birth (Date Picket), State (Spinner) and a Submit button. On clicking the submit button, print all the data below the Submit Button. Use  
(a) Linear Layout , (b) Relative Layout and  
(c) Grid Layout or Table Layout.

Task 4:  
**Course Outcome: CO2:** Create user interfaces for mobile application  
**Topic:** UI Components and Layout Managers.

Design and develop simple calculator application.

Task 5:  
**Course Outcome: CO2:** Create user interfaces for mobile application  
**Topic:** Graphics primitives

Create an application that draws basic graphical primitives on the screen. An Application which draws a Pie Graph to the display. Data Values can be given at int[][] array. You can enter four data(integer)values to the input text field.

Task 6:  
**Course Outcome: CO2:** Create user interfaces for mobile application  
**Topic:** UI Components

Implement an application that implements Multithreading. To design an application that implements Multithreading for multimedia content such as playing audio? Playing video? Capturing a snap shot simultaneously.

Task 7:  
**Course Outcome: CO3:** Create user interfaces for mobile application  
**Topic:** UI Design

To implement an application that read & writes data from and to the Internal memory device such as SD card using android Studio.

Task 8:  
**Course Outcome: CO4:** Develop and deploy mobile application into an android device.
Topic: Navigation Drawer: Panel that displays the app’s main navigation screens on the left edge of the screen
Develop a native application that uses GPS location information.

Task 9:
Course Outcome: CO3: Create user interfaces for mobile application
Topic: UI Components
Create an application that uses a text file to store user names and passwords (tab separated fields and one record per line). When the user submits a login name and password through a screen, the details should be verified with the text file data and if they match, show a dialog saying that login is successful. Otherwise, show the dialog with Login Failed message.

Task 10:
Course Outcome: CO4: Develop and deploy mobile application into an android device.
Topic: Android Notifications – Toast, Dialogs (TimePicker, DatePicker, Progress, Alert), Notification Manager and Push Notification.
Implement an application that creates an alert upon receiving a message. Develop an application that inserts some notifications into Notification area and whenever a notification is inserted, it should show a toast with details of the notification.

Task 11:
Course Outcome: CO3: Develop databases connection to given mobile application
Topic: Working with SQLite Databases
Develop database management system to retrieve data for mobile application.

Task 12:
Course Outcome: CO4: Develop and deploy mobile application into an android device.

Create an alarm clock application

Lab Projects:
For any given mobile application follow the steps
Ex: Your college mobile application,
   1. Understanding the requirement of a given application.
   2. Designing the interface and architecture.
   3. Best practices regarding application design and development.
   4. Writing code and testing it.
   5. Preparing application for Publishing.
Publishing to Android Market and Physical device

TEXT BOOKS
   [Unit I, II, IV ]  

REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

17CS4652C
DATA COMPRESSION LABORATORY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the data compression as an example of representation and its applications

CO2 Implement the compression techniques to compress the different raw data

CO3 Analyze the concepts associated speech, image and video compression

CO4 Analyze the usage of compression algorithms and compare its performance

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

Task1: Write a program which inputs a string of 1s and 0s and compresses the 0s using the Run-length compression technique.

Task2: Write a program to implement Arithmetic coding.
Task3: Write a program to compress file using Huffman coding.

Task4: Write a program to compress and uncompress file using adaptive Huffman coding.

Task5: Write a program to compress image using Lossy DPCM Algorithm and evaluate performance of DPCM Algorithm.

Task6: Write a program to implement Huffman data compression algorithm to generate Prefix codes and encoded text.
   a. Count of character frequencies.
b. Construction of prefix code.
c. Encoding the text.

Task 7: Write a program to implement Wavelet transform technique.

Task 8: Write a program to implement transform coding.

Task 9: Write a program to implement DTWT compression techniques.

Task 10: Write a program for compress the video file using the video compression technique.

TEXT BOOKS


REFERENCE BOOKS

17CS5653
ENGINEERING PROJECT FOR COMMUNITY SERVICES

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| COURSE OUTCOMES |

Upon successful completion of the course, the student will be able to:

| CO1               | Identify the Societal problems. |
| CO2               | Solve the problems.            |
| CO3               | Design of the problem/work plan. |
| CO4               | Design of the prototype/model. |

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<th>Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)</th>
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| COURSE CONTENT |

Students will go to the society (Villages/ Hospitals / Towns etc.,) to identify the problem and survey the literature for a feasible solution. The work will be carried out during summer vacation after IV Semester. The student is encouraged to take up real life problems leading to innovative model building.
17CS3654
COMPETITIVE CODING – III

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the basic concepts such as Divide and Conquer, Greedy and Dynamic programing principles

CO2 Analyse the programs on algorithm analysis concepts.

CO3 Solve the problems with given test cases.

CO4 Apply programing skills for optimized code and derive the solutions according to the provided constraints

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

Solving the programs under “Easy / Medium” category in CodeChef & HackerRank, etc. Students must solve 20 problems related to Design and Analysis of Algorithms in CodeChef / HackerRank, etc. The category may be under Easy / Medium. Students shall participate at least two contests per month, hosted in online judges. Problems to be solved in C, Java, Python.

A minimum of 15 problems shall be solved per week in either CodeChef / HarckerRank, etc.

Monthly contests hosted in CodeChef / HackerRank, etc., may be taken as day to day assessment of laboratory. Monthly one such evaluation

The work will be carried out in the laboratory slot allotted as well as at the home.

TEXT BOOKS


REFERENCE BOOKS

**E- RESOURCES AND OTHER DIGITAL MATERIAL**

SEMESTER - VII
17CS3701
COMPILER DESIGN

Course Category: Programme Core
Course Type: Theory
Prerequisites: Programming in C, Theory of Computation

Credits: 4
Lecture -Tutorial-Practice: 3 - 1 - 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the functionality of each phase involved in Compilation process.

CO2 Implement the parsing techniques for the given programming construct described in Context Free Grammar.

CO3 Identify the suitable intermediate representation based on the storage administration.

CO4 Generate the machine code by considering all the functionalities involved in different phases of the compilation process.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT-I


Lexical Analysis: - The role of lexical analyzer, Input Buffering, specification of tokens, The Lexical Analyzer Generator, Design of a Lexical Analyzer Generator
UNIT-II

Syntax Analysis: The Role of Parser, Context free Grammars, Top Down parsing, Predictive parsing, error recovery in Predictive Parsing

Bottom – Up Parsing: Shift Reduce Parsing, LR parsers, The canonical collection of LR(0) items, Constructing SLR parsing tables, Constructing canonical LR parsing tables, Constructing LALR parsing tables, compaction of LR Parsing tables, Using ambiguous grammar, Error recovery in LR Parsing.

UNIT-III

Syntax – Directed Translation: Syntax – directed definitions, Applications of Syntax Directed Translations, translation schemes, Implementation of Syntax-directed translators, Intermediate code, Postfix notation, Parse trees and syntax trees, Three-address code, quadruples, and triples, Translation of assignment statements, Type checking, Boolean expressions, Statements that alter the flow of control, Postfix translations, Procedure calls & Record Structures

Symbol Tables: The contents of a symbol table, Data structures for symbol tables, Representing scope information.

UNIT-IV


TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

# 17CS4702A
## DATA ANALYTICS

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1**: Understand the concepts of Data mining and Big Data Analytics
- **CO2**: Apply machine learning algorithms for data analytics
- **CO3**: Analyze various text categorization algorithms
- **CO4**: Use Technology and tools to solve the Big Data Analytics problems

## Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

### UNIT I

**Data Mining**: Data Mining, Kinds of Patterns Can Be Mined, Applications of data mining.

**Data pre-processing**: Data Cleaning: Missing Values, Noisy Data, Data Cleaning as a Process; Data Integration: Entity Identification Problem, Redundancy and Correlation Analysis, Tuple Duplication, Data Value Conflict Detection and Resolution; Data Transformation and Data Discretization: Data Transformation Strategies Overview, Data Transformation by Normalization, Discretization by Binning, Discretization by Histogram Analysis.

**Introduction to Big Data Analytics**: Big Data Overview, State of the Practice in Analytics, Key Roles for the New Big Data Ecosystem, Examples of Big Data Analytics

Data Analytics Lifecycle: Data Analytics Lifecycle Overview, Discovery, Data Preparation, Model Planning, Model Building, Communicate Results, Operationalize
UNIT II
Regression: Linear Regression, Logistic Regression
Advanced Analytical Theory and Methods-Classification: Decision Trees, Naïve Bayes; Classification by Back propagation
Advanced Analytical Theory and Methods-Clustering: major categories of clustering methods, k-means, k-nearest neighbor; DBSCAN

UNIT III
Advanced Analytical Theory and Methods-Text Analysis: Text Analysis Steps, Text Analysis Example, Collecting Raw Text, Representing Text, Term Frequency—Inverse Document Frequency (TFIDF), Categorizing Documents by Topics, Determining Sentiments

UNIT IV
Advanced Analytics- Technology and Tools: MapReduce and Hadoop: Analytics for Unstructured Data, The Hadoop Ecosystem,
In-Database Analytics: SQL Essentials, In-Database Text Analysis.
Putting It All Together: Communicating and operationalizing an Analytics Project, Creating the final deliverables, and Data Visualization basics.

TEXT BOOKS
[1] Data Science and Big Data Analytics, EMC2 Education Services, John Wiley, 2015 [Unit II,III,IV]
[2] Jiawei Han and Micheline Kamber, Data Mining Concepts and Techniques, 3 ed, Elsevier Publishers [Unit I]

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
[1] Prof.D. Janaki Ram and S. Srinath, III Madras, Data Mining and Knowledge Discovery  
https://freevideolectures.com/course/2280/database-design/35, Last accessed on 11th August 2018
[2] Prof. Nandansudharsanam and Prof B.Ravindran, IIT Madras, Introduction to Data Analytics  
http://nptel.ac.in/courses/110106064/23, Last accessed on 11th August 2018
17CS4702B  
HIGH PERFORMANCE COMPUTING

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**COURSE OUTCOMES**

Upon successful completion of the course, the student will be able to:

- **CO1** Understand the parallel programming platforms for parallel computer systems.
- **CO2** Optimize the performance of parallel programs.
- **CO3** Understand the working group communication operations of MPI.
- **CO4** Understand algorithm for multicore processors systems using MPI and thread Techniques

**Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)**

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**COURSE CONTENT**

**UNIT I**

**Parallel Programming Platforms:** Implicit parallelism: Trends in Microprocessor Architectures, Limitations of memory system performance, Dichotomy of parallel computing platforms, physical organization of parallel platforms, Routing mechanisms for interconnection networks.

**Principles of Parallel Algorithm Design:** Preliminaries, decomposition Techniques, Characteristics of tasks and interactions, mapping techniques for load balancing, parallel algorithm models.

**UNIT II**

**Basic communication operations:** One-to-All Broadcast and All-to-One Reduction, All-to-All Broadcast and Reduction, All-Reduce and Prefix-Sum Operations, Scatter and Gather.

**Analytical modeling of parallel programs:** sources of overhead in parallel programs, performance metrics for parallel systems.

**Introduction to Heterogeneous Computing:** Introduction to OPenCL, Platform and Devices, The Execution
Environment, Memory Model, Writing Kernels

UNIT III
**Programming using the message passing paradigm:** Principles of Message passing programming, The building blocks: Send and Receive Operations, MPI: the message passing interface, collective communication and computation Operations.

**Programming shared address space platforms:** Thread Basics, why Threads, The POSIX Thread API, Thread Basics: Creation and Termination, OpenMP: a standard for Directive based Parallel Programming.

UNIT IV
**Dense Matrix Algorithms:** Matrix-Vector Multiplication, Matrix – Matrix Multiplication.

**Sorting:** Issues in Sorting on Parallel Computers, Sorting Networks, Bubble sort and its variants.

**Graph Algorithms:** Minimum Spanning Tree: Prim’s Algorithm, Single-Source shortest paths: Dijkstra’s Algorithm.

**Introduction to General-Purpose GPU programming (CUDA):** The age of parallel processing, The Rise of GPU computing, CUDA, Applications of CUDA, Development Environment, Introduction to CUDA C, Parallel Programming in CUDA C.

TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] nptel.ac.in/courses/1061080555/ Last accessed 01-06-2020


17CS4703A
CRYPTOGRAPHY AND NETWORK SECURITY

Course Category: Programme Elective
Course Type: Theory
Prerequisites: Computer Networks

Credits: 3
Lecture -Tutorial-Practice: 3 - 0 - 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand various security issues related to cryptography and Network Security.

CO2 Analyze the process of cryptographic ciphers.

CO3 Summarizes the Network Security Scenarios.

CO4 Inspect the protection methods against Network security threats.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I


Block Cipher: Principles, DES, Strength of DES, AES

Block cipher Operations: Triple DES, ECB, CBC, CFM, OFM

UNIT II

Number Theory: Prime Numbers, Fermat’s theorem, Euler’s Theorem, Chinese remainder Theorem.


Cryptographic Hash Functions: Applications -Message Authentication, Digital signatures, SHA- Logic,
Round Functions

**Digital Signatures**: Properties, Attacks and Forgeries, Requirements

**UNIT III**
- X. 509 Certificates, Kerberos: Motivation Kerberos Version 4 Kerberos Version 5
- **HTTPS**: Connection Initiation Connection Closure

**UNIT IV**
- **Email Security**: Pretty Good Privacy- Notation, Operational Description
- **Malicious Softwares**: Types –Backdoor, Logic Bomb, Trojan Horses.
- **Firewalls**: The Need for Firewalls, Characteristics, Types of Firewalls - Packet Filtering Firewall, Stateful Inspection Firewalls, Application-Level, Gateway Circuit-Level Gateway

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

  Available: [https://www.cybrary.it/course/ cryptography/](https://www.cybrary.it/course/ cryptography/)
17CS4703B
MOBILE COMPUTING

Course Category: Programme Elective
Course Type: Theory
Prerequisites: Computer Networks

Credits: 3
Lecture-Tutorial-Practice: 3 - 0 - 0
Continuous Evaluation:
Semester end Evaluation: 30
Total Marks: 70
100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the concepts and techniques related to Mobile Communications

CO2 Analyze the architectures, protocols and features of GSM, GPRS, UMTS, Mobile IP, DHCP and issues related to Mobile Databases and Mobile OS

CO3 Analyze the architectures, protocols and features of MANETs and WSN

CO4 Examine the implementation aspects of HSPA, LTE, 4G, WiMAX and Mobile Application Development

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I


UNIT II
Mobile Internet Protocol: Mobile IP, Packet delivery, Overview, Desirable Features, Key Mechanism, Route
Optimization, DHCP

Mobile Transport Layer: Overview and Terminologies of TCP/IP, Improvement in TCP performance
Mobile Databases: Issues in Transaction processing, Transaction processing environment, Data Dissemination, Transaction Processing in Mobile Environment, Data Replication, Mobile Transaction Models, Rollback Process, Two-phase Commit protocol, Query Processing, Recovery

UNIT III
Mobile Adhoc Networks: Characteristics, Applications, MANET design issues, Routing, Essentials of Traditional Routing Protocols, Routing in MANET’s, Popular protocols, VANETs, MANET Vs VANET, Security Issues, Attacks and Countermeasures

UNIT – IV
OS for Mobile Computing: OS responsibilities, Mobile O/S, Special Constraints and Requirements of Mobile O/S, Comparative study of Mobile OSs

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
17CS4703C  
AGILE SOFTWARE DEVELOPMENT

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 | Compare different traditional software development models.
CO2 | Understand Agile concepts and principles
CO3 | Analyze the scrum and XP process model
CO4 | Apply Agile methodology for any given application

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COURSE CONTENT

UNIT I: TRADITIONAL SOFTWARE DEVELOPMENT

The Waterfall approach: Requirements, Design phase Implementation, testing, support, Advantages and disadvantages.


UNIT II: UNDERSTANDING AGILE & AGILE PRINCIPLES

Understanding agile values: What is Agile, A team lead & architect, No silver bullets, Agile manifesto.

The Agile Principles: The 12 principles of Agile software, Delivering the project, communicating and working together, project execution, constantly improving the project and the team.

UNIT III: SCRUM

**Scrum and self organizing teams:** The rules of a scrum, Act-I: can haz scrum, Act-II: Whole team uses scrum daily, Act-III: sprinting into a wall, Act-IV: Dog catches car

**Scrum planning and collective commitment:** Act-V: Expecting the unexpected, Act-VI: victory Lap.

UNIT IV: EXTREME PROGRAMMING(XP)

**XP and Embracing change:** Primary practices of XP, XP values help the team change their mind set, understanding XP principles.

**XP, Simplicity and Incremental Design:** Going into overtime, make code and design decisions at the last responsible moment, Incremental design and holistic practices.

TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL


# 17CS4704A
MACHINE LEARNING

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1**: Identify instance based learning algorithms
- **CO2**: Design neural network to solve classification and function approximation problems
- **CO3**: Build optimal classifiers using genetic algorithms
- **CO4**: Analyze probabilistic methods for learning

### Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

### UNIT I

**INTRODUCTION** - Well-posed learning problems, Designing a learning system, Perspectives and issues in machine learning

Concept learning and the general to specific ordering – Concept learning as search, General-to-specific ordering of hypotheses , Find-S: finding a maximally specific hypothesis, List then eliminate algorithm, Candidate elimination learning algorithm

### UNIT II

Decision Tree learning – Introduction, Decision tree representation, Appropriate problems for decision tree learning, The basic decision tree learning algorithm, Hypothesis space search in decision tree learning,
Inductive bias in decision tree learning, Issues in decision tree learning
Artificial Neural Networks – Neural network representation, Appropriate problems for neural network learning, Perceptrons- Gradient descent and the Delta rule, Multilayer networks and the back propagation algorithm
Evaluation Hypotheses – Estimation hypothesis accuracy, Basics of sampling theory, A general approach for deriving confidence intervals

UNIT III
Bayesian learning – Bayes theorem, Bayes theorem and concept learning, Bayes optimal classifier, Naïve Bayes classifier, Bayesian belief networks- Conditional independence, Learning Bayesian belief networks, The EM algorithm- general statement of EM algorithm,
Computational learning theory – Sample complexity for Finite Hypothesis Space, Sample Complexity for infinite Hypothesis Spaces- Shattering a Set of Instances
Instance-Based Learning- k -Nearest Neighbour Learning- Locally Weighted Regression, Case-Based Reasoning
UNIT IV
Genetic Algorithms – An illustrative Example, Genetic Programming-Representing Programs, Illustrative Example, Models of Evolution and Learning
Learning Sets of Rules – Sequential Covering Algorithms- General to Specific Beam Search, Learning First Order Rules, Learning Sets of First Order Rules: FOIL

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
[5] Sargur Srihari Department of Computer Science and Engineering, University at Buffalo https://cedar.buffalo.edu/~srihari/CSE574/
17CS4704B
SOFTWARE TESTING METHODOLOGY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the different concepts of testing and apply path testing.

CO2 Apply data flow and transaction flow testing.

CO3 Apply reduction procedure for any application.

CO4 Perform logic and state testing for any given application

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
Introduction: Purpose of testing, Dichotomies, model for testing, consequences of bugs, taxonomy of bugs.
Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, path sensitizing, path instrumentation, application of path testing.

UNIT II
Dataflow testing: Basics of dataflow testing, strategies in dataflow testing, application of dataflow testing.
Paths, Path products and Regular expressions: path products and path expression, reduction procedure, applications, regular expressions and flow anomaly detection.

UNIT III
Logic Based Testing: overview, decision tables, path expressions, kv charts, specifications.
State, State Graphs and Transition testing: state graphs, good and bad state graphs, state testing,Transition
testing.

UNIT – IV

TEXT BOOKS

REFERENCE BOOKS
[1] Perry, Effective Methods of Software Testing, John Wiley 

E-RESOURCES AND OTHER DIGITAL MATERIAL
17CS4704C
ROUTING AND SWITCHING ESSENTIALS

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Determine the subnets with the required number of hosts per subnet or the required number of subnets.

CO2 Apply the configuration steps and correctly configure static or dynamic routing on all the routers in the topology.

CO3 Identify the correct category of routing protocols and also be able to compare and contrast the relative merits and demerits.

CO4 Design the Local Area Network (LAN) by selecting the appropriate router and switch and correctly configuring them.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I

Inside the router, CLI configuration and addressing, Building the routing table, Path determination and switching, static route with next hop, static route with exit interface, summary and default static route, managing and troubleshooting static route. Introduction to dynamic routing protocols, classifying dynamic routing protocols, metrics, administrative distance.

UNIT II

Introduction to distance vector routing protocols, network discovery, route table maintenance, routing loops, RIPv1, Basic RIPv1 configuration, verification and trouble shooting, automatic summarization, default route
and RIPv1, Classful and Classless addressing, VLSM, CIDR, RIPv1 Limitations, Configuring RIPv2, The Routing table structure.

UNIT III
Introduction to EIGRP, Basic EIGRP configuration, EIGRP Metric calculation, DUAL, More EIGRP configurations. Link state protocols, Link state routing, implementing link state routing, Introduction to OSPF, Basic OSPF configuration, The OSPF metric, OSPF and multiclass networks, More OSPF configuration.

UNIT IV
Forwarding Frames Using a Switch, Switch Management Configuration, Configuring Switch Security, Introducing VLANs, VLAN trunking, Configuring VLANs and Trunks, VTP Concepts, VTP Operation, Configuring VTP, Inter VLAN Routing, Configuring Inter VLAN Routing.

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
# 17HS1705
## ENGINEERING ECONOMICS AND FINANCE

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### COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1**: Understand various forms of organizations and principles of management
- **CO2**: Understand the various aspects of economics related to the firm
- **CO3**: Acquire knowledge on Human resources and Marketing functions
- **CO4**: Understand best alternatives for various investment decisions and different depreciation methods

#### Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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### COURSE CONTENT

#### UNIT I


#### UNIT II

**Introduction to Economics**: Introduction to basic economic concepts, utility analysis, marginal utility and total utility, law of diminishing marginal utility, law of equi-marginal utility, demand analysis: theory of demand, demand function, factors influencing demand, demand schedule and demand curve, shift in demand, elasticity of demand, elastic and inelastic demand, types of elasticity, factors of production, production
function, production with one variable input, isoquants, returns to scale, cost function: cost-output relationship in short run and long run, relationship between AC and MC. Supply analysis, supply schedule and supply curve, factors influencing supply, supply function, theory of firm: price determination under equilibrium of firm, perfect competition.

**National Income, Money and Banking, Economic Environment:** National income concepts, GNP, NNP, methods of measuring national income, inflation, deflation, kinds of money, value of money, functions of bank, types of bank, economic liberalization, privatization, globalization.

**UNIT III**


**Marketing Management:** Concept of Selling And Marketing –Differences, Functions of Marketing, Product Life Cycle, Concept of Advertising, Sales Promotion, Types of Distribution Channels, Marketing Research, Break-Even Analysis -Problems.

**UNIT IV**

**Financial management:** Functions of financial management, time value of money with cash flow diagrams, calculation of simple and compound interest, present worth, future worth, annual equivalent, methods of evaluating alternatives under present worth method, future worth method, annual equivalent method for choice of decision making among alternative projects. Depreciation, causes of depreciation, factors influencing depreciation, common methods of depreciation: straight line method, declining balance method, sum of year’s digits method, problems.

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

1. www.tectime.com Last accessed 01-06-2019
2. www.exinf.com Last accessed 01-06-2019
3. www.slideshare.net Last accessed 01-06-2019
17CS4751A
DATA ANALYTICS LABORATORY

<table>
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| Lecture -Tutorial-Practice: | 0 - 0 - 3 |
| Continuous Evaluation:      | 30        |
| Semester end Evaluation:    | 70        |
| Total Marks:                | 100       |

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the concepts of Data mining and Big Data Analytics
CO2 Apply machine learning algorithms for data analytics
CO3 Analyze various text categorization algorithms
CO4 Use Technology and tools to solve the Big Data Analytics problems

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

PART-A (Data Mining)

Task 1:

Preprocessing: Removal specified attribute, discrimination of a continuous valued attribute, standardization and normalization of data.

Task 2:

Association Mining: Finding Association Rules using Apriori principle e

Task 3:

Classification: Use the Classification technique to classify the given dataset

Task 4:

Clustering: Apply the clustering technique to classify the given dataset
Task 5:
  Time Series: Apply Time series techniques for prediction.
Task 6:
  Text Analysis: Use text analysis methods for sentiment analysis

PART-B (Big Data Analytics)

Task 7:
  Hadoop file management: Adding files and directories, Retrieving files, Deleting files
Task 8:
  Word Count application: MapReduce program to understand MapReduce Paradigm
Task 9:
  Pig Latin scripts: To sort, group, join for a given dataset
Task 10:
  NO-SQL database – Apache Hbase: To set Hbase shell environment and to create tables, insert rows, display contents
Task 11:
  Database manipulation using Hive: To create, alter, drop databases and views
Task 12:
  Functions and indexes in Hive

PART-C (Data Analytics Lab Project)

TEXT BOOKS
[1] Data Science and Big Data Analytics, EMC2 Education Services
[2] Jiawei Han and Micheline Kamber, Data Mining Concepts and Techniques, 3 ed, Elsevier Publishers

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
17CS4751B
HIGH PERFORMANCE COMPUTING LABORATORY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the parallel programming platforms for parallel computer systems.
CO2 Optimize the performance of parallel programs.
CO3 Understand the working group communication operations of MPI.
CO4 Understand algorithm for multicore processors systems using MPI and thread Techniques

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

Task 1: Implement Basic of MPI Programs.
Task 2: Implement a Program for Communication between MPI processes.
Task 3: Implement advance communication between MPI processes
Task 4: Implement MPI collective operations using ‘Synchronization’
Task 5: Implement MPI collective operations using ‘Data Movement’
Task 6: Implement MPI collective operations using ‘Collective Computation’
Task 7: Write a program for MPI Non-Blocking operation
Task 8: Implement Matrix-Matrix multiplication - Cannon’s.
Task 9: Implement Sorting using MPI- Shell sort, Quick sort, Bucket.
Task 10: Implement Problems using OpenMP.
Task 12: Implement Problems using CUDA.
Task 13: Implement problems using OpenCL.

TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] nptel.ac.in/courses/106108055/ Last accessed 01-06-2019
17CS4752A
MACHINE LEARNING LABORATORY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Identify instance based learning algorithms
CO2 Design neural network to solve classification and function approximation problems
CO3 Build optimal classifiers using genetic algorithms
CO4 Analyze probabilistic methods for learning

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

Task 1: Implement and demonstrate the FIND-S algorithm for finding the most specific hypothesis based on a given set of training data samples. Read the training data from a .CSV file.

Task 2: For a given set of training data examples stored in a .CSV file, implement and demonstrate the Candidate-Elimination algorithm to output a description of the set of all hypotheses consistent with the training examples.

Task 3: Write a program to demonstrate the working of the decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
Task 4: Build an Artificial Neural Network by implementing the Back propagation algorithm and test the same using appropriate data sets.

Task 5: Write a program to implement the naïve Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.

Task 6: Assuming a set of documents that need to be classified, use the naïve Bayesian Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.

Task 7: Write a program to construct a Bayesian network for a sample dataset. You can use Java/Python ML library classes/API.

Task 8: Apply EM algorithm to cluster a set of data stored in a .CSV file. Use the same data set for clustering using k-Means algorithm. Compare the results of these two algorithms and comment on the quality of clustering. You can add Java/Python ML library classes/API in the program.

Task 9: Write a program to implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem.

Task 10: Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
17CS4752B
SOFTWARE TESTING METHODOLOGY LABORATORY

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

**CO1** Understand the different concepts of testing and apply path testing.

**CO2** Apply data flow and transaction flow testing.

**CO3** Apply reduction procedure for any application.

**CO4** Perform logic and state testing for any given application

**Contribution of Course Outcomes towards achievement of Program Outcomes** (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

**Task 1**: Design test cases for a given application

**Task 2**: Implementation of Path Testing

**Task 3**: Testing programs using JUNIT Tool

**Task 4**: Testing programs using JUNIT Tool

**Task 5**: Testing programs using JUNIT Tool
**Task 6:** Testing User Interface for VB application  
**Task 7:** Testing a VB/.Net application  
**Task 8:** Testing programs using NUNIT Tool  
**Task 9:** Debugging and error handling  
**Task 10:** Test a program using SELENIUM Tool.  
**Task 11:** Test a program using SELENIUM Web Driver.  
**Task 12:** Test a program using SELENIUM Web Driver.  

**TEXT BOOKS**  

**REFERENCE BOOKS**  
[1] Perry, Effective Methods of Software Testing, John Wiley  

**E-RESOURCES AND OTHER DIGITAL MATERIAL**  
1. Formulate Domain Analysis, Elaboration through Modeling and Implementation through state of the art technology available.

2. Develop generic and modular programs that includes Handling exceptional cases in providing reliable solutions

3. Testing and verification of programs for different scenarios

4. Conclude findings through oral presentations

5. Prepare proper documentation consisting of Software Requirements Specification (SRS), Modeling Techniques, Development Strategies, Implementation and Testing Strategies. Student may use any Design Methodologies such as SSAD, OOAD and UML

6. Builds the spirit of team work in design process.7. Become proficient in the programming languages

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1. Formulate Domain Analysis, Elaboration through Modeling and Implementation through state of the art technology available.

2. Develop generic and modular programs that includes Handling exceptional cases in providing reliable solutions

3. Testing and verification of programs for different scenarios

4. Conclude findings through oral presentations

5. Prepare proper documentation consisting of Software Requirements Specification (SRS), Modeling Techniques, Development Strategies, Implementation and Testing Strategies. Student may use any Design Methodologies such as SSAD, OOAD and UML

6. Builds the spirit of team work in design process.7. Become proficient in the programming languages

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The students may register for one of the following:

(a) Internships: The students are expected to do internship of minimum 3 weeks duration in the industry approved by respective Head of the Department. It carries two credits. The candidate shall submit the comprehensive report to the department. The report will be evaluated for 100 marks by the project review committee.
(b) **Industry offered courses:** The courses under this category shall be offered by the Industry experts. The courses under this category carry two credits. The semester end examination for courses under this category is evaluated for 100 marks and it shall be conducted and evaluated by the industry expert who has delivered the lecture or by faculty nominated by the head of the department in consultation with the industry expert. There will not be continuous evaluation for the courses under this category. It is mandatory to acquire minimum two credits for the award of degree.

(c) **Global Professional Certification:** The students are expected to do Global Professional Certification approved by respective Head of the Department. It carries two credits. The candidate shall submit the certificate to the department.
SEMESTER - VIII
# 17CS4801A
## BUSINESS INTELLIGENCE

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

| CO1 | Understand the concepts Business Intelligence |
| CO2 | Apply the Knowledge Delivery methods to visualize the customized requires |
| CO3 | Apply the Business Intelligence methods to solve the applications and measure the efficiency |
| CO4 | Understand the Future of Business Intelligence |

## Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

### UNIT I

**Business Intelligence**: Effective And Timely Decisions – Data, Information And Knowledge – Role Of Mathematical Models – Business Intelligence Architectures: Cycle Of A Business Intelligence Analysis – Enabling Factors In Business Intelligence Projects – Development Of A Business Intelligence System – Ethics And Business Intelligence.

### UNIT II

**Knowledge Delivery**: The Business Intelligence User Types, Standard Reports, Interactive Analysis And Ad Hoc Querying, Parameterized Reports And Self-Service Reporting, Dimensional Analysis, Alerts/Notifications, Visualization: Charts, Graphs, Widgets, Scorecards And Dashboards, Geographic Visualization, Integrated Analytics, Considerations: Optimizing The Presentation For The Right Message.
UNIT III


Business Intelligence Applications: Marketing Models – Logistic And Production Models

UNIT IV


TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

[1] Prof. Deepu Philip, IIT Kanpur, Business Intelligence & Analytics, accessed on 05-12-2019
   https://www.youtube.com/watch?v=BgA8SbVJlqU
[2] Prof. Gaurav Dixit, IIT Roorkee, Business Intelligence and Data Mining Modeling Using R accessed on 05-12-2019
   https://nptel.ac.in/courses/110107092/
   https://www.youtube.com/watch?v=N8F7eOqgH8Q
17CS4801B
M COMMERCE

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Identify the infrastructure required for building a M-commerce application
CO2 Understand the M-Commerce Technologies.
CO3 Identify the applications of M-Commerce
CO4 Understand the Challenges in implementing M Commerce applications

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
ELECTRONIC COMMERCE
Traditional commerce and E-commerce – The Dimensions of E-Commerce – E-Commerce Business Models – E-Commerce information System Function Model

MOBILE COMMERCE
Introduction – The Impact of mobility on e-commerce - Infrastructure of M–Commerce – Types Of Mobile Commerce Services – M-Commerce Business Models – the M-Commerce Value Chain – M-Commerce information system function Model

UNIT II
M COMMERCE: TECHNOLOGY
Mobile Clients: Types – Device limitations – Device location technology


UNIT III
MOBILE COMMERCE: APPLICATIONS
Mobile Financial Services – Mobile Advertising – Mobile Inventory Management – Mobile Product location and Shopping – Mobile Proactive Service Management – Mobile Business Services – Mobile Auction – Mobile Entertainment – Mobile Office – Mobile Distance Education – Mobile Information access – Vehicular Mobile Commerce – Location Based Applications.

WIRELESS APPLICATION DEVELOPMENT: Client Side – Server side – WAP

UNIT IV
M-COMMERCE TRUST, SECURITY, AND PAYMENT
Trust in M-Commerce, Encryption, Authentication, Confidentiality, Integrity and Non repudiation – Mobile Payment.

M-COMMERCE ISSUES

BEYOND M-COMMERCE

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
[1] Lecture Series on Internet Technologies by Prof.I.Sengupta, Department of Computer Science & Engineering, IIT Kharagpur
http://www.youtube.com/watch?v=xKJiyn8DaAw Last accessed on 01-06-2019
Last accessed on 01-06-2019
17CS4801C
INFORMATION RETRIEVAL SYSTEMS

Course Category: Programme Elective
Course Type: Theory
Prerequisites: Database Management Systems, Data Structures

Credits: 3
Lecture - Tutorial - Practice: 3 - 0 - 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the overview of Information Retrieval Systems
CO2 Compute the process of indexing and Information Extraction
CO3 Learn the stemming algorithms and implement with various data structures
CO4 Understand the concepts of term clustering and Information Visualization
CO5 Learn various text search algorithms.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
Introduction: Definition, Objectives, Functional Overview, Relationship to DBMS, Digital libraries and Data Warehouses.
Information Retrieval System Capabilities: Search, Browse

UNIT II
Data Structures: Introduction, Stemming Algorithms, Inverted file structures, N-gram data structure, PAT
data structure, Signature file structure, Hypertext data structure, Hidden Markov Model.

UNIT III

**Automatic Indexing:** Statistical indexing: Probabilistic Weighting, Vector Weighting, Natural language, Concept indexing

**Document and Term Clustering:**
Introduction, Thesaurus generation, Item clustering, Hierarchy of clusters.

UNIT IV

**User Search Techniques:** Search statements and binding, Similarity measures and ranking, Relevance feedback, Selective dissemination of information search, weighted searches of Boolean systems, Searching the Internet and hypertext.

**Text Search Algorithms:** Introduction, Software text search algorithms, Hardware text search systems.

**Information System Evaluation:** Introduction, Measures used in system evaluation, Measurement example – TREC results.

TEXT BOOKS


REFERENCE BOOKS


E-RESOURCES AND OTHER DIGITAL MATERIAL

17CS4801D
DATA VISUALISATION

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand basic and advanced techniques of information visualization and scientific visualization
CO2 Apply key techniques of the visualization process for good visualization
CO3 Develop visualization methods and visualization systems, and methods for their evaluation
CO4 Use interaction and distorting techniques for visual mapping and visualization

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I

Introduction: What is Visualization, relationship between visualization and other fields, visualization process, the role of cognition, pseudocode conventions, scatter plot, role of the user

Data Foundations: Types of data, structure within and between records, data pre-processing

Human perception and information processing: what is perception, physiology, perception in visualization, metrics, cognition

UNIT II

Visual foundations: Visualization process, semiology of graphical symbols, eight visual principles, taxonomies

Visualization techniques for spatial data: visualizing spatial data, Visualization of Point Data, Visualization of Line Data, Visualization of Area Data
Visualization Techniques for Multivariate Data: Point-Based Techniques, Line-Based Techniques, Region-Based Techniques, Combinations of Techniques.

**UNIT III**
Visualization Techniques for Trees, Graphs, and Networks: Displaying Hierarchical Structures, Displaying Arbitrary Graphs/Networks
Interaction Techniques: Visualization Structure Space (Components of the Data Visualization)

**UNIT IV**
Designing Effective Visualizations: Steps in Designing Visualizations, Problems in Designing Effective Visualizations
Comparing and Evaluating Visualization Techniques: User Tasks, User Characteristics, Data Characteristics, Visualization Characteristics, Structures for Evaluating Visualizations
Visualization Systems: Systems Based on Data Type, Systems Based on Analysis Type, Text Analysis and Visualization, Modern Integrated Visualization Systems

**TEXT BOOKS**

**REFERENCE BOOKS**

**E-RESOURCES AND OTHER DIGITAL MATERIAL**
[1] Prof. Han-Wei Shen Introduction to Data Visualization, http://web.cse.ohio-state.edu/~shen.94/5544/
Last accessed on 01-06-2019
## 17CS4801E
**CYBER SECURITY**

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## COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

| CO1 | Understand the classification of cyber crimes. |
| CO2 | Assess various security attacks. |
| CO3 | Understand the process to counter the cyber crimes. |
| CO4 | Analyze various tools and methods used in cyber crimes |

### Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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## COURSE CONTENT

### UNIT I

**Introduction of Cybercrime:** Definition and Origins of the Word, Cybercrime and Information Security, Cybercriminals, **Classifications of Cybercrimes:** E-Mail Spoofing, Spamming, Internet Time Theft, Salami Attack/Salami Technique, Data Diddling, Forgery, Web Jacking, Hacking, Online Frauds, Pornographic Offenses , Software Piracy, Computer Sabotage, E-Mail Bombing/Mail Bombs, Computer Network Intrusions, Password Sniffing, Credit Card Frauds, Identity Theft **Cyber offenses:** Criminals Plan: Categories of Cybercrime,

### UNIT II

**Cyber Attacks:** Reconnaissance, Passive Attack, Active Attacks, Scanning/Scrutinizing gathered Information, Attack (Gaining and Maintaining the System Access), Social Engineering, and Classification of Social Engineering **Cyberstalking:** Types of Stalkers, Cases Reported on Cyberstalking, Working of Stalking, Real-
Life Incident of Cyber stalking, Cybercafe and Cybercrimes, Botnets: The Fuel for Cybercrime, Botnet, Attack Vector

UNIT III

**DoS and DDoS Attacks:** DoS Attacks, SQL Injection, Buffer Overflow, Attacks on Wireless Networks, **Malicious Softwares:** Threat Model, Virus – types, Worms- types, **Penetration Testing:** Introduction, Penetration Testing types, Phases, Reconnaissance, Scanning-Types, Techniques, Gaining Access, Maintaining Access, Reporting and Analysis.

UNIT IV

**Tools and Methods:** Proxy Servers and Anonymizers, Phishing and Identity Theft : Working of Phishing, Identity Theft (ID Theft), **Password Cracking:** Online Attacks, Offline Attacks, Strong, Weak and Random Passwords, Random Passwords, **Keyloggers and Spywares:** Software Keyloggers, Hardware Keyloggers, Antikeylogger, Spywares, **Legal And Ethical Issues:** Cybercrime and Computer Crime, Intellectual Property, Privacy, Ethical Issues

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

17CS2802A
BLOCKCHAIN TECHNOLOGIES

Course Category: Open Elective
Course Type: Theory
Prerequisites: Cryptography and Network Security

Credits: 3
Lecture - Tutorial - Practice: 3 - 0 - 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the blockchain architecture and design
CO2 Analyze the consensus protocols Role in Blockchain
CO3 Understand functioning of Bitcoins
CO4 Analyze security and privacy aspects of Bitcoin

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I

Blockchain: Introduction, Structure of a Block, Block Header, Block Identifiers - Block Header Hash and Block Height, The Genesis Block, Linking Blocks in the Blockchain, Merkle Trees, Merkle Trees and Simplified Payment Verification (SPV).

Mining and Consensus I: Introduction, Bitcoin Economics and Currency Creation, De-centralized Consensus, Independent Verification of Transactions, Mining Nodes, Aggregating Transactions into Blocks, Transaction Age, Fees, and Priority

UNIT II

Mining and Consensus II: The Generation Transaction, Coinbase Reward and Fees, Structure of the Generation Transaction, Coinbase Data, Constructing the Block Header, Mining the Block, Proof-of-Work Algorithm, Difficulty Representation, Difficulty Target and Re-Targeting, Successfully Mining the Block,
Validating a New Block, Assembling and Selecting Chains of Blocks, Blockchain Forks, Mining and the Hashing Race, The Extra Nonce Solution, Mining Pools, Consensus Attacks. **Bitcoin**: Introduction, History, Bitcoin Uses, Users and Their Stories, Getting Started, Quick Start, Getting your first bitcoins, Sending and receiving bitcoins,

**UNIT III**

**Bitcoin Functioning**: Transactions, Blocks, Mining, and the Blockchain, Bitcoin Overview, Buying a cup of coffee, Bitcoin Transactions, Common Transaction Forms, Constructing a Transaction, Getting the right inputs, Creating the outputs, Adding the transaction to the ledger, Bitcoin Mining, Mining transactions in blocks, Spending the transaction

**Bitcoin Transactions**: Bitcoin Transactions, Common Transaction Forms, Constructing a Transaction, Getting the right inputs, Creating the outputs, Adding the transaction to the ledger, Bitcoin Mining, Mining transactions in blocks, Spending the transaction

**UNIT IV**

**Bitcoin Network**: Peer-to-Peer Network Architecture, Nodes Types and Roles, The Extended Bitcoin Network, Network Discovery, Full Nodes, Exchanging “Inventory”, Simplified Payment Verification (SPV) Nodes, Bloom Filters, Bloom Filters and Inventory Updates, Transaction Pools, Alert Messages


**Alternative Chains, Currencies, and Applications**: A taxonomy of alternative currencies and chains, Meta-Coin Platforms, Colored Coins, Mastercoin, Counterparty, Alt-coins, Evaluating an alt-coin, **Alt-Coins**: CryptoNote, Bytecoin, Monero, Zerocash/Zerocoin, Darkcoin, Namecoin, Bitmessage, Ethereum

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

17CS2802B
CYBER FORENSICS

Course Category: Open Elective
Course Type: Theory
Prerequisites: Computer Networks

Credits: 3
Lecture -Tutorial-Practice: 3 - 0 - 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the concepts of cyber forensics related Issues.
CO2 Analyse the process of various forensic systems.
CO3 Analyze Evidence capture mechanism and Recovery steps
CO4 Evaluate and Report electronic communications evidences.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I
Forensic overview:

UNIT II
**Data Recovery:** Defination, Data Backup and Recovery, The Role of Backup in Data Recovery, The Data-Recovery Solution, Hiding and Recovering Hidden Data


**UNIT III**


**Computer Image Verification and Authentication:** Special Needs of Evidential Authentication, Practical Consideration, Practical Implementation,** Reconstructing Past Events:** Introduction, Useable File Formats, Unusable File Formats, Converting Files.

**UNIT IV**


**Network Forensics Scenario:** A Technical Approach, Destruction of Email, Damaging Computer Evidence, Tools Needed for Intrusion Response to the Destruction of Data, System Testing

**E-mail Forensic:** Exploring the Role of E-mail in Investigations, Exploring the Role of Client and Server in E-mail, Investigating E-mail Crimes and Violations, Using Specialized E-mail Forensics Tools, Understanding Acquisition Procedure for Cell. Report Writing

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**


17CS2802C
DEEP LEARNING

Course Category: Open Elective
Course Type: Theory
Prerequisites: Machine learning

Credits: 3
Lecture - Tutorial - Practice: 3 - 0 - 0
Continuous Evaluation: 30
Semester end Evaluation: 70
Total Marks: 100

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the fundamentals of Applied Math for deep learning
CO2 Understand deep networks and Regularization for Deep Learning
CO3 Analyse Sequence Modeling and convolutional neural networks
CO4 Apply Monte Carlo Methods and recurrent neural networks

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I

Introduction: Historical Trends in Deep Learning


UNIT II

Deep Networks: Deep Feedforward Networks, Example: Learning XOR, Gradient-Based Learning, Hidden Units, Architecture Design, Back-Propagation and Other Differentiation
Algorithms

**Regularization for Deep Learning:** Parameter Norm Penalties, Norm Penalties as Constrained Optimization, Regularization and Under-Constrained Problem, Dataset Augmentation, Noise Robustness, Semi-Supervised Learning, Multitask Learning, Early Stopping, Sparse Representations, Bagging and Other Ensemble Methods, Tangent Distance, Tangent Prop and Manifold, Tangent Classifier

**UNIT III**

**Optimization for Training Deep Models:** How Learning Diﬃers from Pure Optimization, Challenges in Neural Network Optimization, Basic Algorithms, Algorithms with Adaptive Learning Rates

**Convolutional Networks:** The Convolution Operation, Pooling, Convolution and Pooling as an Infinitely Strong Prior, Variants of the Basic Convolution Function, Data Types, Eﬃcient Convolution Algorithms, Random or Unsupervised Features, The Neuroscientiﬁc Basis for Convolutional Networks, Convolutional Networks and the History of Deep Learning

**UNIT IV**

**Sequence Modeling:** Recurrent and Recursive Nets: Recurrent Neural Networks, Bidirectional RNNs, Encoder-Decoder Sequence-to-Sequence Architectures, Deep Recurrent Networks, Recursive Neural Networks, Echo State Networks, Leaky Units and Other Strategies for Multiple Time Scales

**Practical Methodology:** Performance Metrics, Selecting Hyperparameters, Debugging Strategies

Monte Carlo Methods: Sampling and Monte Carlo methods, Marko Chain Carlo Methods, Gibbs Sampling

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**

[1] Ian GoodFellow, Introduction to Deep Learning,  
https://www.youtube.com/embed/vi7IACKOUao Last accessed on 01-06-2020

[2] Ian GoodFellow, Deep Feed forward Neural Netowrks,  
https://drive.google.com/file/d/0B64011x02sIlkRExCY0FDVXFCOHM/view Last accessed on 01-06-2020

[3] Ian GoodFellow, Recurrent and Recursive Nets,  
https://www.youtube.com/watch?v=ZVN14xYm7JA&feature=youtu.be Last accessed on 01-06-2020
17CS2802D
USER INTERFACE AND EXPERIENCE DESIGN

| Course Category: | Open Elective | Credits: | 3 |
| Course Type: | Theory | Lecture -Tutorial-Practice: | 3 - 0 - 0 |
| Prerequisites: | - | Continuous Evaluation: | 30 |
| | | Semester end Evaluation: | 70 |
| | | Total Marks: | 100 |

COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

CO1 Understand the key terms of interactive graphical systems.

CO2 Use appropriate device and screen based controls for presenting information.

CO3 Apply design principles for developing sophisticated User interfaces.

CO4 Identify faults in the interfaces and suggest alternative designs.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT I

Introduction: Importance of user Interface – definition, importance of good design, benefits of good design, a brief history of screen design.

The Graphical User Interface: Popularity of graphics, the concept of direct manipulation, graphical system, characteristics.

Web User Interface: Popularity, principles and characteristics.

UNIT II


Screen designing: Interface design goals, screen meaning and purpose, organizing screen elements, ordering of screen data and content, screen navigation and flow, visually pleasing composition, amount of information, focus and emphasis, presenting information simply and
meaningfully, technological considerations in interface design.

UNIT III

**Windows:** Characteristics, components, operations, Selection of devices based and screen based controls.

**Components:** Icons and images, Multimedia.

UNIT IV

**Organize and Layout windows and pages:** General Guidelines, Organization guidelines, control navigation, window guidelines, web page guidelines.

**Testing User interfaces:** The purpose of Usability testing, Importance of Usability testing, Scope of Testing, prototypes and kind of Tests, Developing and Conducting the Test.

**TEXT BOOKS**


**REFERENCE BOOKS**


**E-RESOURCES AND OTHER DIGITAL MATERIAL**


17CS2802E  
PATTERN RECOGNITION

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COURSE OUTCOMES

Upon successful completion of the course, the student will be able to:

- **CO1** Explain the basic concepts and importance of pattern recognition.
- **CO2** Compare the supervised, unsupervised and semi-supervised learning.
- **CO3** Discuss the Bayesian decision theory for continuous and discrete features.
- **CO4** Explain the Maximum likelihood and Bayesian parameter estimation.
- **CO5** Identify the major issues in clustering.

Contribution of Course Outcomes towards achievement of Program Outcomes (1 – Low, 2 - Medium, 3 – High)

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COURSE CONTENT

UNIT 1

**Introduction:** Machine perception, pattern recognition example, pattern recognition systems, the design cycle, learning and adaptation, Bayesian Decision Theory: Introduction, continuous features –two categories classifications, minimum error-rate classification-zero–one lossfunction, classifiers, discriminant functions, and decision surfaces.
Unit II
Normal density: Univariate and multivariate density, discriminant functions for the normal density different cases, Bayes decision theory – discrete features, compound Bayesian decision theory and context.

Unit III
Maximum likelihood and Bayesian parameter estimation: Introduction, maximum likelihood estimation, Bayesian estimation, Bayesian parameter estimation – Gaussian case, Component analysis and Discriminants: Principal Component Analysis, Fisher Linear Discriminant, Multiple Discriminant Analysis

Unit IV
Un-supervised learning and clustering: Introduction, mixture densities and identifiability, maximum likelihood estimates, application to normal mixtures, K-means clustering. Date description and clustering – similarity measures, criteria function for clustering.

TEXT BOOKS

REFERENCE BOOKS

E-RESOURCES AND OTHER DIGITAL MATERIAL
   [NPTEL, Video lecture]. Available: http://www.nptel.ac.in/courses/117105101/ Last accessed on 01-06-2020
17CS5851  
MAJOR PROJECT

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1. Formulate a real world problem and develop its requirements
2. Develop and design solution for a set of requirements
3. Test and validate the conformance of the developed prototype against the original requirements of the problem
4. Work as a responsible member and possibly a leader of a team in developing software solutions
5. Express technical and behavioral ideas and thought in oral settings
6. Participate in and possibly moderate, discussions that lead to making decisions
7. Express technical ideas, strategies and methodologies in written form
8. Prepare and conduct oral presentations
9. Self learn new tools, algorithms, and/or techniques that contribute to the software solution of the project
10. Generate alternative solutions, compare them and select the optimum one

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