To,

1. Controller of Examination
2. Central Library in charge

Sub – Copy of Structure and Syllabus of B.Tech. for Semester VII & VIII And M. B. A. Semester I to IV to be implemented from 2016-17.

Sir/Madam

Sending herewith, the copy of Structure and Syllabus of B.Tech. for Semester VII & VIII and M. B. A. Semester I to IV to be implemented from 2016-17.

Thanking you

Dr. M.T. Telsang
Dean Academics

CC to: -

HOD Automobile
HOD Civil
HOD C.S.E.
HOD Electrical
HOD ETC
HOD IT
HOD Mechanical
HOD Science and Humanities
HOD M.B.A.
## B Tech
### Open Elective Course Code
#### Semester VII (2016-17)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Department</th>
<th>List of Open Electives-I</th>
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<td>Auto</td>
<td>Reliability Engineering</td>
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<tr>
<td>2</td>
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<td>Project Management</td>
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<td>Environmental Impact Assessment</td>
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## B Tech
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#### Semester VIII (2016-17)

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### Teaching Scheme

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### Evaluation Scheme

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### RATIONALE:
Reliability engineering consists of the systematic application of time-honored engineering principles and techniques throughout a product lifecycle. The goal of reliability engineering is to increase the ability of the components and the devices to sustain under a number of extreme environmental and operating conditions, such that they operate for longer periods of time without failure. Reliability Engineering is used in modern industries in case of electronic systems, automotive components, electrical and mechanical systems, process industry and also in software industry.

### COURSE LEARNING OUTCOMES:
At the end of the course, students will be able to;
1. Explain fundamental concepts and measures of reliability.
2. Apply methods for estimating the reliability of designs and for analyzing reliability data.
3. Create reliability block diagram for a given system to predict and enhance the reliability of a particular system.
4. Apply engineering knowledge and specialist techniques to prevent or to reduce the failures or frequency of failures.
5. Apply the appropriate methodologies to determine time and strength based reliabilities.
6. Explain terms involved in software reliability.

### PRE-REQUISITES: Basic Mathematics, Probability fundamentals etc.

### CURRICULUM

**Unit 1 Introduction to Reliability Engineering**  
7 hrs

Reliability definitions, failure, failure density, failure rate, hazard rate, Mean Time To Failure (MTTF), Mean Time Between Failure (MTBF), safety and reliability, quality, cost and system effectiveness, life characteristic phases, modes of failure, areas of reliability, quality and reliability assurance rules, product liability, importance of reliability, reliability function, hazard function, the expected (or mean) residual life.

(To be Implemented from Year 2016-17)
Unit 2: System reliability and Reliability Allocation 7 hrs
Series models, Parallel systems, Complex system analysis and optimal arrangement of components, Tie and Cut-Set Methods for Complex System reliability, Computations, Reliability considerations in design. Reliability allocation or apportionment, reliability apportionment techniques, equal apportionment, AGREE, ARINC feasibility of objectives apportionment, reliability block diagrams and models, reliability predictions from predicted unreliability, minimum effort method.

Unit 3: Time and failure-dependent reliability 5 hrs
Series chain model, parallel system model, Standby systems, Mixed Parallel and Standby systems, Repairable system, Markov models, availability and maintainability, Non-repairable standby systems.

Unit 4: Failure Mode, Effects and Criticality Analysis 6 hrs
Failure mode effects analysis, severity/criticality analysis, Ishikawa diagram for failure representation, fault tree construction, basic symbols, development of functional reliability block diagram, fault tree analysis, fault tree evaluation techniques, minimal cut set method, minimal tie set method for fault tree estimation.

Unit 5: Strength based Reliability 6 hrs
Safety factor, safety margin, stress strength interaction, design of mechanical components and systems, material strengths and loads, reliability testing and reliability growth testing, mechanical and human reliability, accelerated life testing, Highly Accelerated Life Testing (HALT) and highly accelerated stress screening.

Unit 6: Software Reliability 5 hrs
Need and Concepts of Software Reliability, Failure and Faults - Prevention, Removal, Tolerance, Forecast, Dependability Concept - Failure Behaviour, Characteristics, Maintenance Policy, Reliability and Availability, Modeling, Reliability Evaluation

TEXT BOOKS

REFERENCE BOOKS
2. B.S.Dhillon, Maintainability, Maintenance and Reliability for Engineers, CRC Press.
5. Roger D Leitch, Reliability Analysis for Engineers : An Introduction, Oxford University Press, 1995
9. Dr. A. K. Gupta, Reliability, Maintenance and Safety Engineering.

(To be implemented from Year 2016-17)
Open Elective – II
OE 402 RENEWABLE ENERGY SOURCES

<table>
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RATIONALE:
This course provides a comprehensive overview of renewable energies including solar energy, wind power, hydropower, fuel cells, biomass, and other alternative renewable sources. This study provides the students with basic principles of various renewable energy sources and their applications. At the end of the course, the students are expected to identify the new methodologies / technologies for effective utilization of renewable energy sources.

COURSE LEARNING OUTCOMES:
After successful completion of the course students should be able to
1. Describe the challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the environment
2. Describe the primary renewable energy resources and technologies.
3. Apply the knowledge of thermodynamic and heat transfer principles to evaluate the performance of energy conversion systems for maximum efficiency.
4. Compare the various renewable energy technologies.

PREREQUISITES: Basic knowledge of non-renewable energy sources.

CURRICULUM
Unit 1: Introduction to Energy Sources: 6 hrs

Unit 2: Solar Energy 6 hrs

Unit 3: Bio - Energy 6 hrs

(To be implemented from Year 2016-17)
Unit 4: Wind Energy 6 hrs

Unit 6: Hydrogen Energy 6 hrs

Unit 6: Other Renewable Energy Sources 6 hrs
Tidal energy, Wave Energy – Open and Closed OTEC Cycles, Small Hydro-Geothermal Energy, Stored hydro energy, Principles of hydro power technology

TEXT BOOKS


REFERENCE BOOKS


(To be implemented from Year 2016-17)
Semester-VII
Open Elective-I OE421: Network Administration

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Course Description:

The main objective of this course is to study the various concepts of Networking. It contains medium, devices, routing and designing of network.

Course Learning Outcomes:

On completion of this course the student will be able to:

1. Identify the correct cable type required to connect two networks.
2. Express working of Internetworking models and need of OSI model
3. Differentiate between collision and broadcast domain
4. Identify IPv4 address and classify it
5. Express working of networking services like FTP, Telnet, DHCP and DNS
6. Design a network for given requirements

Effective from: Academic Year 2016-17
SYLLABUS

Unit 1: Internetworking
Introduction to Computer Network, Internetworking basics, internetworking model

Unit 2: OSI Reference model
OSI reference model, Application layer, presentation layer, session layer, transport layer, network layer, data link layer, physical layer

Unit 3: Ethernet networking and Data Encapsulation
Collision domain, broadcast domain, CSMA/CD, Half and Full Duplex Ethernet, Ethernet at the Data Link Layer, Ethernet at the physical layer, Ethernet cabling, Straight-through cable, Crossover cable, rolled cable, fiber optic

Unit 4: IP addressing
IP addressing, IP terminology, The hierarchical IP addressing scheme, Private IP addresses, Ipv4 address types, Layer 2 broadcasts, Layer 3 broadcasts, Unicast Address, Multicast Address

Unit 5: Introduction to networking services
Introduction to File Transfer Protocol, Telnet, Dynamic Host Configuration Protocol, Domain Name Service

Unit 6: Network Design
Action Plan, Needs of network, Example of network design

Text Books:
1. Unit 1, 2, 3 and 4 from chapter 1, 2 and 3, "CCNA Routing and Switching", Todd Lammle, Sybex A Wiley Brand publication.
2. Unit 6 from chapter 12, "Head First Networking", Al Anderson, & Ryan Benedetti, O’reilly publication.

Reference Books:
1. Unit 5 from TCP/IP protocol suite - Behrouz A. Forouzen (Tata Mag. Hill)

Effective from: Academic Year 2016-17
Semester-VII

Open Elective-I OE423: Software Project Management

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Course Description:

This course provides an introduction about software project management. This course’s purpose is aware students about the different factors needed for software project management. It also includes learning of activity planning, risk management, resource allocation.

Course Learning Outcomes:

Upon successful completion of the course students should be able to:

1. Discuss importance of project management.
2. Prepare project plan, evaluate and estimate efforts.
3. Perform activity planning and risk management.
4. Identify resources for selected project and perform allocation.

Effective from: Academic Year 2016-17
SYLLABUS

Unit 1: Introduction to Software Project Management
Introduction, Why is software project management important? What is a project?
Software projects versus other types of project, Contract management and technical project management, Activities covered by software project management, Plans, methods and methodologies, Some ways of categorizing software projects, Stakeholders, Setting objectives, The business case, Project success and failure, What is management? Management control

Unit 2: Project Evaluation and Programme Management
Introduction, A business case, Project portfolio management, Evaluation of individual projects, Cost–benefit evaluation techniques, Risk evaluation, Programme management, Managing the allocation of resources within programmes, Strategic programme management, Creating a programme, Aids to programme management, Some reservations about programme management, Benefits management

Unit 3: Project Planning
Introduction to Step Wise project planning, Select project, Identify project scope and objectives, Identify project infrastructure, Analyse project characteristics, Identify project products and activities, Estimate effort for each activity, Identify activity risks, Allocate resources, Review/publicize plan, Execute plan/lower levels of planning

Unit 4: Software Effort Estimation
Introduction, Where are estimates done?, Problems with over- and underestimates, The basis for software estimating, Software effort estimation techniques, Bottom-up estimating, The top-down approach and parametric models, Expert judgment, Estimating by analogy, Albrecht function point analysis, Function points Mark II, COSMIC full function points, COCOMO 13: a parametric productivity model

Effective from: Academic Year 2016-17
Unit 5: Activity Planning and Risk Management
The objectives of activity planning. When to plan. Project schedules, Projects and activities. Sequencing and scheduling activities, Network planning models, Formulating a network model, Adding the time dimension. The forward pass, The backward pass, Identifying the critical path. Activity float. Shortening the project duration. Identifying critical activities. Activity-on-arrow networks.

Unit 6: Resource Allocation

Text Book:

References:

Effective from: Academic Year 2016-17
Semester-VII

Open Elective-I OE425: Quality Management

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Course Description:

This course presents guidelines and principles to develop and implement total quality management system. Quality management is very essential to face challenges in real world’s business. This course demonstrates leadership and innovation approaches to survive the business community.

Course Learning Outcomes:

After successful completion of this course student should able to:

1. Explain meaning of quality concept and its influence.
2. Use quality management methods and tools for analyzing and solving problems of organization.
3. Identify elements in quality measurement process and predict the errors.

Effective from: Academic Year 2016-17
SYLLABUS

Unit 1: Quality Concepts:
Evolution of Quality Control, concept change, TQM Modern concept, Quality concept in design, Review of design, Evolution of prototype.
Control on Purchased Product:
Procurement of various products, evaluation of supplies, capacity verification, Development of sources, procurement procedure.

Unit 2: Manufacturing Quality:
Methods and techniques for manufacture inspection and control of product, quality in sales and services, guarantee, analysis of claims.
Quality Management:
Organization structure and design, quality function, decentralization, designing and fitting, organization for different type products and company, economics of quality value and contribution, quality cost, optimizing quality cost, seduction program.

Unit 3: Human Factor in quality:
Attitude of top management, cooperation of groups, operators attitude, responsibility, causes of apparatus error and corrective methods.

Unit 4: Control Charts:
Theory of control charts, measurement range, construction and analysis of R charts, process capability study, use of control charts.
Attributes of Control Chart:
Defects, construction and analysis of charts, improvement by control chart, variable sample size, construction and analysis of C charts.

Unit 5: Defects diagnosis and prevention:
defect study, identification and analysis of defects, correcting measure, factors affecting reliability, MTTF, calculation of reliability, building reliability in the product, evaluation of reliability, interpretation of test results, reliability control, maintainability, zero defects, quality circle.

Effective from: Academic Year 2016-17
Unit 6: ISO-9000 and its concept of Quality Management

ISO 9000 series, Taguchi method, JIT in some details.

Text / Reference Books:

Course Description:

The course represents the Intellectual Property and experience of software industry. Also give basic knowledge about Information Technology subject to entry-level engineers from heterogeneous backgrounds and disciplines to deliver world-class projects to global customers. The purpose of this course is to provide a unique set of teaching aids, consolidated training material to entry level engineers to help them make “industry ready”.

Course Learning Outcomes:

On completion of this course student will be able,

1. Demonstrate the necessity of data structure in computational problems.
2. Apply concepts of Object Oriented approach and their application to solve problems.
3. Analyze and write succinct, clear and efficient algorithm for a given problem.
4. Design database using Relational Database Management System concepts.
5. Choose basic skills in project management.
SYLLABUS

Unit 1:  Introduction to C & Data Structure:
        Computer terms and concepts, Introduction to C, Introduction to Basic Data
        Structure, Searching and Sorting Algorithms.

Unit 2:  Problem Solving Techniques:
        Introduction to Logic, Introduction to Problem Solving, Introduction to Algorithms,

Unit 3:  Programming and Testing:
        Introduction to programming paradigm, Basic Programming and selection Control
        Structure, Iteration Control Structure, Coding Standards and Best Practices,
        Demonstration of 1D and 2D Array, String, Introduction to code optimization
        techniques, Modular Approach through usage of Functions, Testing and Debugging
        , Project Specification and Briefing.

Unit 4:  Object Oriented Concepts Using Java:
        Introduction to Object Oriented Programming, Abstraction & Encapsulation,
        Relationships, Polymorphism, Interfaces and Packages.

Unit 5:  Relational Database Management:
        Introduction, ER Modeling, Normalization, SQL

Unit 6:  Project Management:
        Project Management Concepts, Project Management Activities, Project Estimation
        Techniques, Project Planning and Scheduling, Project Risk Management, Project
        Execution & Monitoring, Project Communication Management, Project
        Management Tools, Project Monitoring and Control.

Text Books:
1. Data Structures and Algorithms, Addison-wesley - Alfred V. Aho, Ullman,
   Hopcroft

Effective from: Academic Year 2016-17
2. Let Us C - Yashwant Kanitker

Reference Books:
1. Structured Computer Organization- Andrew S. Tanenbaum
3. Algorithms and Data Structures The Science- Baldwin, Douglas & Scragg, Greg W.,

Effective from: Academic Year 2016-17
Course Code: OE424

Course: Database Administration

Teaching Scheme

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Evaluation Scheme

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Course Description:

This course will cover both traditional database systems and recent developments in database systems, emphasizing fundamental principles, computer structure, and practical techniques. This course provides instruction in the operations of an Oracle database. Database administration skills covering installation, configuration, and tuning a database, administering servers and server groups, managing and optimizing schemas, tables, indexes, and views, creating logins, configuring permissions, assigning roles, and performing other essential security tasks, backup and recovery strategies, automation, and maintenance.

Course Learning Outcomes:

On successful completion of course, the student should be able to:

1. Properly install, configure, and tune a database
2. Properly administer servers and server groups
3. Properly manage and optimize schemas, tables, indexes, and views
4. Properly create logins, configure permissions, assign roles, and perform other essential security tasks and properly monitor server activity and resolve performance issues
5. Implement replication and data merging
6. Manage data publications and subscriptions

Effective from: Academic Year 2016-17
SYLLABUS

Unit 1: Overview of Oracle DBA tasks
Oracle as a flexible, complex & robust RDBMS. The evolution of hardware and the
relation to Oracle. Different DBA job roles (VP of DBA, developer DBA,
production DBA, database babysitter). The changing job role of the Oracle DBA.
Environment management (network, CPU, disk and RAM). Instance management
(managing SGA regions). Oracle table and index management.

Unit 2: Oracle Database Management
Overview of instance management, Initialization file management, Oracle*Net
configuration, Data buffer configuration & sizing, Verifying network connectivity
with ping and nslookup, Testing database links.

Unit 3: Oracle Object Management
Oracle tables, views and materialized views, Oracle indexes, Oracle constraints,
Schema, File & tablespace management, Database Maintenance, Oracle DBA
Utilities.

Unit 4: Monitoring Oracle
Dictionary and VS views, Table & index monitoring, workload & trend monitoring,
Instance monitoring, Oracle environment monitoring, STATSPACK and AWR
performance management.

Unit 5: Performance Management
Bottleneck performance analysis, Instance Tuning, SQL and CBO behavior, Tracing
SQL Execution, SQL Execution Internals, and SQL Tuning.

Unit 6: Oracle High Availability tools
Continuous availability and disaster recovery, Quantifying the cost of unplanned
downtime, Oracle multi-master replication, DataGuard, Oracle Streams, Real
Application Clusters, Backup & Recovery

Effective from: Academic Year 2016-17
Text Books:

1. Easy Oracle Jumpstart Oracle Database Management Concept and Administration by Steve Karam, Robert Freeman
2. C.J. Date, Database Systems, Addison Wesley, 2000
3. Chip Dawes, Biju Thomas, Introduction to Oracle 9i SQL, BPB, 2002
5. Doug Stums, Matthew Weshan, Oracle 9i DBA Fundamental I, BPB, 2002
   Joseph C. Johnson, Oracle 9i Performance Tuning, BPB, 2002

Professional Associations

1. The Professional Association for SQL Server (PASS)
2. Data Management Association (DAMA)

Reference Books:

1. C.J. Date, Database Systems, Addison Wesley, 2000
2. Introduction to Database Administration, by O’Reilly
3. ORACLE DBA handbooks

Effective from: Academic Year 2016-17
Teaching Scheme: Lectures: 3 hours/week

Exam Scheme: 100 Marks (ISE 20 + MSE 30 + ESE 50)

Course Outcomes:

On successful completion of this course the learner will be able to:

1. Explain the need and basic terms of the optimization
2. Classify optimization problem
3. Apply mathematical tools to solve optimization problem
4. Compare the different solution techniques

Unit I:
Introduction and Basic Concepts of optimization: Historical Development; Engineering applications of Optimization; General model of Optimization problem; Objective function; Constraints and Constraint surface; Classification of optimization problems; Optimization techniques – classical and advanced techniques.

Unit II:
Optimization using Calculus:
Stationary points; Functions of single and two variables; Optimization of function of one variable and multiple variables; Examples; Optimization of function of multiple variables subject to equality constraints; Lagrangian function; Optimization of function of multiple variables subject to equality constraints; Hessian matrix formulation; Eigen values; Kuhn-Tucker Conditions; Examples.

Unit III:
Linear Programming:
Standard form of linear programming (LP) problem; Canonical form of LP problem; Assumptions in LP Models; Elementary operations; Examples; Motivation of simplex method, Simplex algorithm and construction of simplex tableau; Simplex criterion; Revised simplex method

Unit IV:
Non-Linear Programming:
Standard form of non-linear programming (NLP) problem; Direct root method; Newton, quasi-Newton, Secant methods; Examples

Unit V:
Introduction to Heuristic Techniques:

Revised syllabus implemented from 2016-17
Introduction; Benchmark Test Function; Example; Comparison of Heuristic Techniques and Numerical Technique

Unit VI:
Metaheuristic Technique:
Introduction to Metaheuristic Technique, Example; Statistical analysis of Metaheuristic Technique.

Reference Books:
3. Particle Swarm Optimization, Maurice Clerc, ISTE Ltd., 2006
Final Year B.Tech (Electrical Engineering) – Part-II (Sem-VIII)
Course – OE432: Wind Energy Engineering

Teaching Scheme: Lectures: 3 hours/week
Exam Scheme: 100 Marks (ISE 20 + MSE 30 + ESE 50)

Course Outcomes:
On successful completion of this course the learner will be able to:
1. Apply fundamental principles of thermodynamics, fluid mechanics and mechanical systems to wind turbine engineering.
2. Calculate various parameters related to wind turbine.
4. Design in virtual environment.
5. Work on team-based projects.

Unit I:
The Wind Resource:
The Nature of the Wind; Geographical Variation in the Wind Resource; Long-term Wind-speed Variations; Annual and Seasonal Variations; Synoptic and Diurnal Variations; Turbulence; Gust Wind Speeds; Extreme Wind Speeds, Turbulence in Wakes and Wind Farms, Turbulence in Complex Terrain.

Unit II:
Aerodynamics of Horizontal-axis Wind Turbines:

Unit III:
Wind-turbine Performance:

Unit IV:
Conceptual Design of Horizontal Axis Wind Turbines:
Introduction, Rotor Diameter, Machine Rating, Rotational Speed, Number of Blades, Power Control, Braking Systems, Fixed-space, Two-speed or Variable-speed Operation, Type of Generator.

Unit V:
Component Design:
Blades, Pitch Bearings, Rotor Hub, Gearbox, Generator, Mechanical Brake, Yaw Drive, Tower, Foundations.

Revised syllabus implemented from 2016-17
Unit VI:
Wind-turbine Installations and Wind Farms:
Project Development, Visual and Landscape Assessment, Noise, Electromagnetic Interference,
Ecological Assessment, Finance.

References:

Revised syllabus updated from 2016-17
COURSE DESCRIPTION:

digital image processing is a fascinating subject in several aspects. human beings perceive most of the information about their environment through their visual sense. while for a long time images could only be captured by photography, we are now at a stage which allows image data to be captured, manipulated, and evaluated electronically with computers. with breathtaking pace, computers are becoming more powerful and at the same time less expensive, so that widespread applications for digital image processing emerge in every field. hence this course is offered as an open elective for all branches of engineering.

the course tries to offer an integral view of image processing from image acquisition to the extraction of the data of interest. the topics covered include fundamentals of digital image, improving quality of an image, segmentation of area of interest from an image and representation of segmented part of an image.

COURSE OUTCOMES:

After completion of this course students will be able to:

1. illustrate process of image formation and digitization.
2. apply different image processing operations on an image
3. utilize suitable image processing operation to perform given task.
4. assess effect of different image processing operations on an image
5. devise suitable scheme for solving given problem.

PREREQUISITE: Nil

Implemented from year 2016-17
UNIT-I
DIGITAL IMAGE FUNDAMENTALS: Components of image processing system, human and computer vision, hierarchy of image processing system, applications, image formation and digitization, binary, gray scale and color images.

UNIT-II
IMAGE ENHANCEMENT IN SPATIAL DOMAIN: Gray level transformation function: image negatives, Log transformation, power law transformation, Piecewise linear transformation functions, Histogram equalization, Enhancement using arithmetic / Logic operation.

UNIT-III
IMAGE FILTERING: Basics of spatial filtering, image smoothening spatial filters, image sharpening spatial filters, Detection of discontinuities: Point detection, line detection, edge detection, Sobel, Prewitt, Laplacian mask for edge detection.

UNIT-IV
MORPHOLOGICAL IMAGE PROCESSING: Dilation & erosion, opening and closing operation, Hit- or -miss transformation. Basic morphological algorithms: Boundary extraction, region filling, thinning and thickening, skeletons.

UNIT-V
IMAGE SEGMENTATION: Thresholding, Role of illumination, global and adaptive thresholding, pixel based segmentation, region based segmentation and edge based segmentation

UNIT-VI
IMAGE SHAPE AND CLASSIFICATION: shape representation, shape parameters, feature space, clusters, and classification techniques.

Implemented from year 2016-17
TEXT BOOKS:

REFERENCE BOOKS

Implemented from year 2016-17
COURSE DESCRIPTION:
This course is designed to facilitate students from different programs to understand the basics and advanced topics of ROBOTICS with respect to a single, dedicated, Indian company designed platform. We have selected our own Mumbai based company NEX Robotics platform, which has been accepted globally. NEX robotics has designed and developed the ROBOTIC Domain at par excellence with global players.

Firebird V is their new version BOT in the FIREBIRD Series. Fire Bird V will help you gain exposure to the world of robotics and embedded systems. With help of its innovative architecture and adoption of the ‘Open Source Philosophy’ in its software and hardware design, you will be able to create and contribute to complex applications that run on this platform, helping you acquire expertise as you spend more time with them.

COURSE OUTCOMES:
After completion of this course students will be able to:

1. Define Intelligence in ROBOTICS & Develop the different ways of adding Intelligent Quotient in ROBOT.
2. Explain in detail the architecture, components and technical spec of Fire Bird V ATMEGA2560 Robot.
3. Analyze PC Based Control Using Serial Communication.
4. Test programming on Fire Bird V ATMEGA2560 Robot with different I/O modules.
5. Execute the Interfacing between Fire Bird V ATMEGA2560 Robot with different wired and wireless communication modules.

PREREQUISITE:
No prerequisite. Knowledge of C and Basic electronics will be helpful.

Implemented from year 2016-17
UNIT-I

UNIT-II

UNIT-III
PC BASED CONTROL USING SERIAL COMMUNICATION: Communication protocol for simple robot control, Robot control using RS232 serial port, Robot control using USB port, Robot control using XBee wireless communication module, Robot Control using 'GUI' for Fire Bird V ATMega2560, Errata

UNIT-IV

UNIT-V
INTERFACING PROGRAMS ON FIRE BIRD V ATMega2560: Timer / Counter Operations on the Robot, LCD Interfacing, Analog to Digital Conversion, Serial Communication, SPI Communication.

UNIT-VI
ADVANCED PROGRAMMING CONCEPTS OF FIRE BIRD V ATMega2560: (Learning by Doing - Learning mechanism)

Implemented from year 2016-17
USB Communication Wired RS232 (serial) communication, Wireless ZigBee Communication (2.4GHZ) (if XBee wireless module is installed), Wi-Fi communication (if Wi-Fi module is installed), Bluetooth communication (if Bluetooth wireless module is installed), Simplex infrared communication (From infrared remote to robot)

TEXT BOOK:
3. Fire Bird V ATMEGA2560 Software Manual V1.00 15-08-20122012-.pdf

REFERENCE BOOKS (DATASHEETS):
1) ACS714- Automotive Grade, Fully Integrated, Hall Effect-Based Linear Current Sensor IC with 2.1 kV RMS Voltage Isolation and a Low-Resistance Current Conductor
2) ATMEGA 8 -8-bit with 8K Bytes In-System Programmable Flash
3) ATMEGA 2560 - 8-bit Microcontroller with 64K/128K/256K Bytes In-System Programmable Flash
4) CD40106BM/CD40106BC Hex Schmitt Trigger
5) FT232R USB UART 2005
6) GP2D12J00000F - Sharp Distance Measuring Sensor
7) GP2D120 - FT232R USB UART 2005
8) GP2Y0A02YK - FT232R USB UART 2005
9) HD44780U (LCD-II) (Dot Matrix Liquid Crystal Display Controller/Driver)
10) L293D - Push-Pull Four Channel Driver
11) LM 324 - Low Power Quad Operational Amplifiers
12) LM1117 - 800mA Low-Dropout Linear Regulator
13) XBee™/XBee-PRO™ OEM RF Modules
14) MAX 232 - +5V-Powered, Multichannel RS-232 Drivers/Receivers
15) TCRT 5000 - Reflective Optical Sensor with Transistor Output
16) TSOP1738 - Photo Modules for PCM Remote Control Systems

Implemented from year 2016-17
Rajarambapu Institute of Technology, Sakharale  
(An Autonomous Institute)  
Final Year B. Tech. (Department of Information Technology)  
Semester VII

Course Code: OE 451  
Course Title: Software Project Management (Theory) 
(Open Elective-I)  
Credits: 03

Teaching Scheme:  
L- 03  T-00  P-00

Evaluation Scheme: ISE-20% MSE-30% ESE-50%  
(Minimum Passing Marks: 40%)

Course Learning Outcomes:  
On completion of this course the student will be able to:
1. Describe the key concepts of software project management and quality issues related to software.
2. Determine the feasibility of the software project prior to implementation.
3. Estimate the effort and cost needed to implement the software.
4. Prepare an activity plan for a project and to estimate the overall duration of the project by analyzing the risks involved in it.

UNIT 1: Introduction to Software Project Management  
Definition of the project, Principles of project management, Project management life cycle, Characteristics of software project, Importance of software project management.

UNIT 2: An Overview of Software Project Planning  
Introduction to stepwise project planning, Select project, Identify project scope & objectives, Identify project infrastructure, Analyze project characteristics, Identify project products & activities, Estimates efforts for each activity, Identify activity risks, Allocate resources, Review/publicize plan, Execute plan/lower level of planning.

UNIT 3: Software Effort Estimation  

UNIT 4: Activity Planning  
Introduction, Objectives of activity planning, When to plan, Project schedules, Projects and activities, Network planning models, Adding the time dimension, Identify the critical path, Forward pass and backward pass.

UNIT 5: Risk Management  
Risk and it’s implication, Categories of risks, Framework for dealing with risk, Risk identification, Risk assessment, Evaluating risks to the schedule, PERT techniques, Advantages of PERT.

UNIT 6: Software Quality  
Attributes of successful project management, Responsibilities of the project manager, Problems with project goals, Project management issues with regard to new technologies, Software quality and measurement of software quality, Place of

Text Books:

Reference Books:
Rajarambanapu Institute of Technology, Sakharale
(An Autonomous Institute)
Final Year B. Tech. (Department of Information Technology)
Semester VIII

Course Code: OE 452 Course Title: IT for Engineers (Theory)
(Open Elective-II)
Credits: 03

Teaching Scheme: \text{L-} 03 \text{ T-00 P-00}
Evaluation Scheme: ISE-20\% MSE-30\% ESE-50\% (Minimum Passing Marks: 40\%)

Course Learning Outcomes:
On completion of this course the student will be able to:
1. Define the terminology and describe in writing the concepts of Operating Systems, Databases, Networking and Web Technology.
2. Identify and execute OS commands, Networking tools and SQL queries to perform operations.
3. Configure and manage Linux and network administration tasks for a given system.
4. Design and develop IT applications.
5. Use IT essentials to solve the given problem.

UNIT 1: Operating System Concepts
Introduction to operating system, Types of operating system, Services of operating system, Operating system working, User and kernel mode, Process, File system, Operating system administration.

UNIT 2: Linux Basic Administration
Component of Linux system, Basic features of Linux, Architecture of Linux, and general purpose commands and utilities, Files and directory related utilities, File-security features, Network configuration, User administration.

UNIT 3: Networking Management
Fundamentals of computer networks & concepts, Types of computer networks, OSI and TCP/IP network models, Networking devices, Network protocols, Network connectivity test tools, Network/Internet services, Basic network configuration.

UNIT 4: Database Management
Database abstraction levels, Applications, Data models, Fundamental relational algebra operations, Structured Query Language (SQL).

UNIT 5: Introduction Web Technology
Introduction of web, Client server architecture, Website, HTTP, Architecture of web browser and server, Introduction of java scripts, HTML and CSS, Deployment and hosting.
UNIT 6: Web Programming

Text Books:

Reference Books:
Course Code: OE461  
Course Name: Aircraft Systems  

Teaching Scheme | Evaluation Scheme
--- | ---
L | T | P | Credits | Scheme | Theory (Marks %) | Practical (Marks %)
--- | --- | --- | --- | --- | --- | ---
3 | -- | -- | 3 | ISE | 20 | 40% | --
 |  |  |  | MSE | 30 | -- | --
 |  |  |  | ESE | 50 | 40% | --

**Course Description:**
This course gives information about different systems used in aircraft. Students will draw an analogy from the engineering knowledge they earned during their last 3 years of learning and existing aircraft systems they are learning. Students will come to know that with little efforts they can design the aircraft systems and thus it will become easy for them to select aviation sector as a career.

**Prerequisites:**
No prerequisites are needed for enrolling into this Open Elective course.

**Course Learning Outcomes:**
After successful completion of the course, students will be able to,
- **CO_1:** Get an exposure to the Aircraft and Aerospace Industry.
- **CO_2:** Understand Aircraft Control Systems and Engine Control System.
- **CO_3:** Know the need and functioning of Environmental Control System.
- **CO_4:** Explain and Design Fuel, Hydraulic and Pneumatic Systems of Aircraft.
- **CO_5:** Explain and Design functioning of Electrical System of Aircraft.
- **CO_6:** Evaluate and decide avionics and information system for aircraft.

**Course Content**

<table>
<thead>
<tr>
<th>Unit No.</th>
<th>Description</th>
<th>Hrs</th>
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"With Effect from 2016-17"
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<th>Thrust.</th>
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<tbody>
<tr>
<td>3. Environmental Control Systems:</td>
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<td>06</td>
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<tr>
<td>4. Fuel, Hydraulic and Pneumatic Systems:</td>
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<td>06</td>
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<td>5. Electrical Systems:</td>
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<td>06</td>
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<tr>
<td>6. Avionics and Information Systems:</td>
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<td>06</td>
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References -

"With Effect from 2016-17"
Course Description:
Fierce competition in today's global markets, the introduction of products with shorter life cycle, and the heightened expectations of customers have forced business enterprises to invest in, and focus attention on, their supply chains. This, together with continuing advances in communications and transportation technologies (e.g., mobile communication, Internet, and overnight delivery), has motivated the continuous evolution of the supply chain and of the techniques to manage it effectively.

In a typical supply chain, raw materials are procured and items are produced at one or more factories, shipped to warehouses for intermediate storage, and then shipped to retailers or customers. Consequently, to reduce cost and improve service levels, effective supply chain strategies must take into account the interactions at the various levels in the supply chain. In this course, students will able to present and explain concepts, insights, practical tools, and decision support systems important for the effective management of the supply chain. This course will help the students to develop an understanding of the following key areas and their interrelationships:

- The strategic role of a supply chain
- The key strategic drivers of supply chain performance
- Supply chain network design and analytical methodologies for supply chain analysis

This course will help the students to learn the strategic importance of good supply chain design, planning, and operation for every firm. The students will be able to understand how good supply chain management can be a competitive advantage, whereas weaknesses in the supply chain can hurt the performance of a firm.

Course Learning Outcomes:
After successful completion of the course, students will be able to,

CO_1. Develop understanding of role and identify key issues in the supply chain management.
CO_2. Explore and suggest appropriate SC strategies under given situations.
CO_3. Design the inventory system and level at various locations in supply chain.
CO_4. Select the distribution and transportation options.
CO_5. Develop appropriate strategic alliances for enhancing the performance of SC.
CO_6. Use Information technology to improve SC performance.

"With Effect from 2016-17"
<table>
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<th>Unit No.</th>
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<tbody>
<tr>
<td>1.</td>
<td><strong>Understanding of Supply Chain:</strong>&lt;br&gt;Objectives of a supply chains, decision phases, stages of supply chain, supply chain process view, cycle view of supply chain process, push/pull view of supply chain processes, key issues in SCM</td>
<td>06</td>
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<tr>
<td>2.</td>
<td><strong>Supply chain drivers and obstacles:</strong>&lt;br&gt;Four drivers of supply chain- inventory, transportation, facilities and information;&lt;br&gt;A framework for structuring drivers in supply chain, supply chain strategies, strategic fit, Obstacles to achieve strategic fit, value of information, Bullwhip effect and reduction</td>
<td>06</td>
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<tr>
<td>3.</td>
<td><strong>Inventory Management:</strong>&lt;br&gt;Role of cycle inventory, Economics of scale to exploit fixed costs and discounts, cycle time related costs, levels of safety, single stage inventory model, risk pooling, centralized and decentralized systems of planning inventory in supply chain</td>
<td>06</td>
</tr>
<tr>
<td>4.</td>
<td><strong>Network Planning and supply chain Integration:</strong>&lt;br&gt;Network design, warehouse location, service level requirements, integrating inventory positioning and network design, supply chain integration, Push-pull and pull-push type systems, demand driven strategies, Impact of internet on supply chain strategies, Transportation in a supply chain, facilities affecting transportation decision, modes of transportation and their performance characteristics.</td>
<td>06</td>
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<tr>
<td>5.</td>
<td><strong>Distribution strategies and strategic alliances:</strong>&lt;br&gt;Introduction, Centralized vs. decentralized control, direct shipment, cross docking, push based vs. pull based supply chain, third party logistics (3PL), Retailer-Supplier relationship issues, requirements, success and failures, distributor integration types and issues</td>
<td>06</td>
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<tr>
<td>6.</td>
<td><strong>Global logistics and Risk management:</strong>&lt;br&gt;Agile supply chains, Introduction to global SCM, risk management, issues in international SCM, regional differences in logistics, design for logistics, supplier integration in to new product development, pricing issues and smart pricing. IT and Business processes in supply chain.</td>
<td>06</td>
</tr>
</tbody>
</table>

**Reference -**

2) logistics and supply chain management, Christopher Martin, Pearson Education Asia 2002
3) Marketing logistics: A supply chain Approach, Kapoor KK; Kansal Purva, Pearson Education Asia; 2003

"With Effect from 2016-17"
Course Description:
Creativity and innovation are the key drivers of success for many of today’s leading companies. Some of the most dramatic gains in shareholder value over the last few years (e.g., Google, Apple) are due to a culture of creative innovation. Indeed, a culture of creativity and innovation is commonly recognized as the only sustainable competitive advantage. An important element of a creative culture is the use of breakthrough design thinking.
Ever since the wheel was invented, innovations have taken the world forward, right from sending humans to space to the ubiquitous handheld devices like Mobile phones. Innovations have broken the barriers to information, made communication faster and most importantly made our lives easier. While the rate of innovation has increased dramatically, as a natural corollary, things are also getting obsolete faster, that means companies not only have the challenge of staying ahead of the innovation curve, but also staying relevant for a longer period of time. Companies that have managed to do both have been game-changers in their field, be it Google, Amazon, Apple or Facebook. Now the race is on to find the next Google, Amazon, Apple and Facebook. Are you interested to be part of it?

Course Objective:
The premises of this course are that (i) all people are naturally creative and (ii) everyone’s creative abilities can be improved (just like all of your other abilities) through learning and practicing certain skills and techniques. The course is intended for students who want to enhance their innovation and design thinking skills in Technology, Business and other domains. More specifically, the course is designed to help students in achieving following course learning outcomes through case studies, group exercises, expert lectures etc.

Prerequisites:
There is no any specific prerequisite except openness to accept contradictions and willingness to experiment creatively.

Methods for Learning and Teaching:
This class will involve a blend of lecture, large-and small-group discussion, in-class collaborative creation, and design workshops. Students are expected to bring texts to class each session. Students will be expected to read in advance of class sessions and be prepared to discuss relevant ideas, themes, and writing practices.
It is expected that the course should be more challenging and expectations for the quality of student
work to increase as the semester progresses. Moreover, it is expected that the students to put forth effort in each creative project and assignment, giving each the care and time it needs. The course design will help assist in this area through integrative collaboration, in-class discussions of projects and creative concepts, in-class workshops, copies of all creative projects will be collected, including outlines, rough drafts, and proof of invention process, from all students. Students should keep detailed notes for each stage of invention process that show intentional strategies for creative thinking.

The class will be divided into no. of multidisciplinary groups with max. four students in each group.

**Course Learning Outcomes:**

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

- **CO_1.** Stimulate creativity in yourself and others.
- **CO_2.** Incorporate design thinking into analysis of situations.
- **CO_3.** Apply creative and design thinking to a real-world situation.
- **CO_4.** Learn how to build and lead an innovation team

**Course Content**

<table>
<thead>
<tr>
<th>Unit No.</th>
<th>Description</th>
<th>Hrs</th>
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<tbody>
<tr>
<td>1.</td>
<td><strong>Introduction to Innovation and Creativity:</strong></td>
<td>06</td>
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<tr>
<td></td>
<td>Importance and influence on business, triggers of innovation, types of innovation, innovations in different areas – Product development, Education, Entrepreneurship, Marketing, Health care, security, Agriculture, transportation, banking etc.</td>
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<td>2.</td>
<td><strong>Innovation &amp; Creativity: Tools &amp; Techniques:</strong></td>
<td>06</td>
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<tr>
<td></td>
<td>Problem solving techniques, Brainstorming, SCAMPER methods, Creativity styles, Mind stimulation: games, brain-twisters and puzzles, Six thinking hats</td>
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<td>3.</td>
<td><strong>Characteristics of Innovators</strong></td>
<td>06</td>
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<td>4.</td>
<td><strong>Design Thinking for strategic Innovation:</strong></td>
<td>06</td>
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<td>Thinking preferences, Lateral thinking, Systematic Inventive Thinking</td>
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<td>5.</td>
<td><strong>Innovation Management:</strong></td>
<td>06</td>
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<td>8D Approach to ideation, creativity process/stages, Intellectual Property</td>
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<tr>
<td>6.</td>
<td><strong>Fostering Innovation Culture:</strong></td>
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<td></td>
<td>Building team of creative people</td>
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**Assignments include:**

1) Brain teasers (to be solved individually)
2) Cartoon captions ( teams)
3) Book readings and discussions ( teams)
4) Team presentations on innovation: (1) innovative individual, (2) innovative company, (3) innovative movie/game, (4) sustainable innovation, (5) innovation in business, (6) innovation in art, (7) innovation in architecture, (8) innovative nation, (9) innovation in science, (10) innovation in engineering & Technology

"With Effect from 2016-17"
Course Description:
Now a day's all engineers run behind campus interviews and secured job. Very few of them think seriously above their career as entrepreneur. Instead becoming job seekers, they should become job creators. Nation also expects same thing from young technocrats. Therefore Start up India & Make In India mission are in progress. Technopreneures should take advantage of these mission to start their career as Entrepreneur.
Up till now belief was Entrepreneurs are born and cannot be created. But research by David Mcleland & Entrepreneurship Development Institute of India, Ahmedabad, has proved that with proper guidance & training successful entrepreneurs can be created. With reference to guide lines provided by EDI Ahmedabad, NIESBUD, NIMSME, syllabus for course is designed.

Prerequisites:
Student from any branch of engineering with strong passion for Entrepreneurship.

Course Learning Outcomes:
After successful completion of the course, students will be able to,

CO_1. Identify, analyze & select business opportunity to suit his personality based on SWOT analysis
CO_2. Make market research & survey for selected business
CO_3. Prepare and apprise detailed Project Report
CO_4. Formulate plan for financial management of project.
CO_5. Apply managerial inputs for starting & establishing his own business

Course Content

<table>
<thead>
<tr>
<th>Unit No.</th>
<th>Description</th>
<th>Hrs</th>
</tr>
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</table>
| 1.       | 1.1. Entrepreneur:  
Definition, Concept, importance, nature, types, entrepreneurial culture, growth, entrepreneurial traits & motivations.  
1.2. Entrepreneurship:  
Theory, Aspects, environment for entrepreneurship, The process of entrepreneurial development training, Barrier to entrepreneurship, Entrepreneur | 04 |

"With Effect from 2016-17"
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| 2. | **Project identification:**  
   Concept of Project & classification, Searching for business idea, opportunity finding, Scanning Business Idea & development, Project formulation, Project design & network analysis.  
   **05** |
| 3. | **Setting Up of Enterprize:**  
   Steps for starting small scale industry, whom to approach for what, incentives and subsidies, Role of state development, finance corporations, nodal agencies, Role of consultancy Organization, Lead Bank, various clearances & certificate required for a particular industry, Start Up India & Make in India program.  
   **05** |
| 4. | **4.1. Industrial Finance:**  
   Long term loan, short term loan, over drafts, letter of credit, working capital management. Interviews with Industrialist,  
   **06**
   **4.2. Market Survey:** Tools & techniques |
| 5. | **Project Report:**  
   Project Report preparation, Preliminary Project Report, feasibility report, marketing research, Project appraisal, statement of cash flow, accounting ratios, Break-even analysis  
   **10** |
| 6. | **Costing and Accounting:**  
   Financial appraisal, Direct and Indirect costs, Financial projections, Balance Sheet, Profit and loss account, Income tax, Sales Tax (VAT), Excise Tax, factory design and Layout  
   **06** |

**References -**

**Text Books:**

1) Dynamics of Entrepreneurial Development and Management -By Vasant Desai, Himalaya Publishing House,  
2) Management of small scale Industries, -By Vasant Desai; Himalaya Publishing House, Delhi, 1980  
3) Small Scale Industries and Entrepreneurship, -By Vasant Desai, Himalaya Publishing House, Delhi, 2011

**Reference Books:**

1) Entrepreneurship Development and Management -By Neeta Bopodikar, Himalaya Publishing House, Delhi  
2) Project Profiles for S.S.I. Mechanical Products;  
3) E.D.P. Study Material by by Dr. Dinesh Awasthi, Mr. Raman Jossi V Padmanan, E.D.I Ahamadabad  
4) E.D.P. Study Material by MITCON Pune  
5) E.A.P. Study Material by Mr. Raman Gujaral, E.D.I. Ahmednagar

"With Effect from 2016-17"
### Course Description:
Operations Research (OR) refers to science of decision making. Every business in the world needs to make complex decisions. Operations Research (OR) provides tools needed to make these decisions rigorously and effectively. The course extended the opportunity to develop skills to convert real life problem into the mathematical model and suggest the optimal solution to the problem. The focus of the course is on application of OR rather than rigorous mathematical treatment.

This is the first course in the program which familiarizes the students with formulation and solution of Linear Programming problems, dynamic and Linear Programming, assignment and Transportation models, Queering models, game theory and decision theory. It is an interdisciplinary course designed to consider application from several branches of engineering.

The course helps to build skills and competency to formulate and provide optimum solutions to the engineering problems. No prerequisites to opt this course.

### Course Learning Outcomes:
After successful completion of the course, students will be able to,

- **CO_1.** Identify the breadth of quantitative decision situation that arise in engineering.
- **CO_2.** Develop skills needed for the mathematical modeling of real world decision situations.
- **CO_3.** Choose appropriate techniques and methodology to solve the problems
- **CO_4.** Analyze the solution and carryout post optimality (sensitivity analysis) to implement the solution with practical consideration.
- **CO_5.** Ability to work in a team specifically to solve the larger problems.

### Course Content

<table>
<thead>
<tr>
<th>Unit No.</th>
<th>Description</th>
<th>Hrs</th>
</tr>
</thead>
</table>
| 1.       | Operations Research and Decision Theory:  
Types of Decisions, decision environment, decision models. Expected monetary value (EMV), EVPI, EOL. Decision making under uncertainty, Decision making | 06 |

"With Effect from 2016-17"
under conflict, Decision tree analysis, Decision making under utilities. Case problems on decision theory applications.

2. **Formulation and solution of linear programming problems:**
   Formulation of Linear programming problems. Graphical solution. Simplex procedure for solving L.P.P. maximization and minimization Big ‘M’ method (charnes penalty method), Degeneracy in L.P.P. special cases, duality in Linear programming, converting primal to dual, sensitivity analysis.

3. **Assignment and Transportation models:**
   Mathematical statement of Transportation models, Matrix form of Transportation problem. Initial Basic Feasible Solution (IBFS) - Methods, optimum solution to Transportation models (modified distribution method, degeneracy and its resolution, transshipment problem)

4. **Integer and Dynamic Programming**
   Integer Programming problem, Gomory’s cutting plane algorithm.
   Dynamic Programming – Bellman’s principle of Optimality. Basic terminologies application of Dynamic programming applications: Project management, Cargo loading problem, Shortest route problem, Capital budgeting problems and Reliability problems

5. **Queering Models and Games Theory:**
   Queering system, Transient and steady state system. Kendal’s notation. Models of Queering model and problem on Queering models. Monto Carlo Simulation of Queering.
   Games theory, Basic terminologies games with saddle point, pure and mixed strategies dominance properties. Solution methods and mixed strategies, Graphical Solution, solution of games using L.P.P. Business applications of Games theory.

6. **Replacement and Reliability models:**
   The replacement problem, failure mechanism, Replacement models, Replacement of items that deteriorate, Replacement of items that fail completely. System reliability, mathematical model of system reliability, Reliability estimation, Reliability testing and reliability improvement.

**References -**

1) Operation Research, Theory, methods and application, S. D. Sharma, Kedarnath rammath Publisher (Reprint 2015).
4) Introduction to Operation research concept and cases - Hiller and Liberman, T.M.H. New Delhi (2008)

"With Effect from 2016-17"
OE471 Marketing for Engineers

Course Description
Marketing is the core of operating any business. Marketing defines & guides companies for interfacing with customers, competitors, collaborators, and the environment. Marketing helps you plan and execute the creating a value proposition by determining pricing, promotion, and distribution of ideas, goods, and services. It begins with needs and wants determination, assessing the five forces existing in the competitive environment. Selecting the most appropriate customer targets and developing marketing strategy and implementation program for an offering that satisfies consumers’ needs better than the competition with emphasis on Industrial Marketing. Marketing is the art and science of creating customer value in exchange it benefits the organization and its stakeholders.

Course Objectives
The main objectives of this course is to improve the ability of engineers to:
1. Assess market opportunities by analyzing customers, competitors, collaborators, context, and the strengths and weaknesses of a company.
2. Develop effective marketing strategies to achieve organizational objectives.
3. Design a strategy implementation program to maximize its chance of success.
4. Communicate and defend your recommendations and critically examine and build upon the recommendations of your classmates both quantitatively and qualitatively.

This course is appropriate for engineers in all functional areas (Automobile, white goods & software marketing emphasis). Course will help develop and implement marketing strategy, in other functional areas (finance, management, accounting, and operations) besides help understand how marketing strategies impact the profitability of an organization. For an entrepreneurial ventures and start-ups to succeed an excellent marketing strategy is the prerequisite.

Syllabus
1. Introduction to Marketing Core concept of marketing, Marketing Process, Function of Marketing environment, Analyzing needs & trends in micro, macro business environment.
4. Pricing & Distribution Price determinants, policies, methods. Channel management, Channel conflict and resolutions
5. Promotion mix, Advertising, Media decisions, Sales Promotion, Personal selling, Managing sales force. Global marketing.

Reference:
Course Description:
Engineering integrates physical environment and economical environment. Physical environment outlines produce goods and services, depending upon physical laws and economic environment assess worth of goods and services. So learning EE equips the budding engineers with the analytical tools of Economics and applies the same to rational decision-making. It further seeks to develop economic way of thinking in dealing with practical business problems and challenges.

Course Outcomes:
After successful completion of course, engineers will be able to:
1. Assess microeconomic variables and its implication in business decision making.
2. Analyses and evaluate macroeconomic variables for selection of best alternatives to maximize profit and value of an organisation.
3. Identify the competitive and global market for making larger presence and leadership.
4. Apply in calculating present and future value of money for taking right decision in terms of investment and disinvestment.
5. Modify, supplement, and enrich economic theory by adding insights from behavioral psychology.
6. Understand the role and function of financial institutions and trade organisations for expanding and diversifying the business in national and international boundary.

Unit 01: Applied Microeconomics
Role of microeconomic analysis in decision in view of complexity of the modern economy, Resources and Scarcity, Demand Analysis and demand management (domestic), Determinants, estimations and uses of elasticity of demand, Supply and Price, Elasticity of supply, Demand Forecasting, Indifference Curve, Production and output estimation in short run and long run, Cost theory and estimation, Production Possibility Curve and its importance in business decision making.

Unit 02: Applied Macroeconomics
Gross Domestic Product(GDP) and Gross National Product(GNP), Consumer Price Index(CPI), Wholesale Price Index(WPI) and GDP Deflator, Capital accumulation and economic growth, level of Investment, Inflation, Theory of employment, interest and money by Keynes and contrasting with Say’s theory, and Balance of Payment, Deficit financing, Globalisation and Division of labour, Business Cycle, Fiscal and Monetary Policy, Exchange Rate Policy (Comparison with a few leading economies), Gini Coefficient and Purchasing Power Parity(PPP), Poor economics, Free Market Economics

Unit 03: Firms and Markets

Unit 04: Time Value of Money
Concepts and application. Capital budgeting; Traditional and modern methods, Payback period method, IRR, ARR, NPV, PI (with the help of case studies).
Unit 05: Behavioral Economics


Unit 06: Financial Institutions and Trade Organisations (National and International)

Reserve Bank of India (RBI), Security and Exchange Board of India (SEBI), Banks-Public, Private, Foreign and International Apex Bank-World Bank, Asian Development Bank, New Development Bank BRICS etc. National Trade Organisations (CII, FICCI and ASSOCHAM), International Trade Blocks (NAFTA, SAFTA, EU etc.) and International Trade Organisation - WTO

Reference Books:
4. C R Thomas and S C Maurice, Managerial Economics, TMH, 2015
OE 472: Finance for Engineers

Course Description:
In today's workplace, it is nearly impossible for an engineer to perform without considering the financial impact of every action on the organization's bottom line. Engineers need to be aware of issues such as cost reduction and capital investment and how their decisions can affect the financial statements. This course introduces basic financial management to engineers and technical personnel who need this knowledge to manage a profit center effectively. The course aims at providing students with an in-depth coverage of the various aspects of financial management.

It covers the assessing the financial health of the organization through ratio and cash flow analysis, sources of long term as well as short term finance. Decisions concern with financing, working capital and long term investment. Class will focus on both the academic theories underlying the management of funds and the practical aspects of financial management.

Course Objectives:
The course objective is to improve ability of the students to:

1. Develop confidence in the language of finance management in the engineering domain by analyzing financial reports to propose new financial and operating strategies.

2. Select the best decision-making criteria in making investment decisions (Short term & long term) and allocating capital.

3. Recommend long term financing source & determine the enterprise costs of raising capital through debt and equity offerings.

Unit 1: Financial Statement & Finance Terminologies:
Key terms of Accounting and Finance, Accounting Principles underlying Preparation of Financial Statements

Unit 2: Analyzing Health of a Firm:
Techniques of Analyzing Health of a Firm, Classification of Ratios – Liquidity, Leverage, Activity, Profitability, Analysis of Cash Flows

Unit 3: The Management of Working Capital:
Need of Working Capital, Operating Cycle of Working Capital, Determinants of Working Capital
Unit 4: Investment Decision Rules:

Investment Decision Rules, Mutually Exclusive Projects, Evaluation Criteria for Investment Decision: Payback, ARR, NPV, PI & IRR, Benefit Cost Ratio, Decision Tree Analysis

Unit 5: Long Term Financing:

Long Term Financing: Shares, Debentures, Loan capital, foreign capital, FDI, Euro issues & external borrowings, Venture capital financing.

Unit 6: Financing Decisions and Cost of Capital:

Risk & Return, Cost of Capital, Cost of Equity, Cost of Debt, Weighted Average Cost of Capital, Making Financial Sense in Merger & Acquisition

Reference Books:

OE474 COSTING & COST CONTROL
Final Year B.Tech Sem. VIII

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Unit 1 Introduction to Cost Terms & Concepts
Cost Objects, Direct & Indirect Costs, Period & Product Costs, Cost Estimation & Cost Behavior, Relevant & Irrelevant Costs and revenues, Avoidable & Unavoidable Costs, Sunk Costs, Opportunity Costs, Incremental & Marginal Costs

Unit 2 Cost Accumulation for Inventory Valuation and Profit Measurement
Cost assignment for direct and indirect costs, Job Costing & Process Costing System, Joint and By-Product Costing, Income effects of alternative cost accumulation systems

Unit 3 Cost Analysis for Decision-Making
Cost–Volume–Profit Analyses, Cost Estimation and Cost Behavior, Measuring relevant costs and revenues for decision-making, Activity Based Costing

Unit 4 Cost Analysis for Planning, Control and Performance Measurement
Budgets & Budgetary Control System, Stages in Budgeting Process, Master Budget, Zero Base Budgeting, Standard Costing and Variance Analysis

Unit 5 Strategic Cost Decision Making
Relevant Cost Analysis Decisions: Relevant Cost, Irrelevant Costs, Committed Cost, Absorbed Cost, Situations where Fixed Costs become relevant for decision-making and its related implications, Target Costing, Life Cycle Costing, Kaizen Costing

Unit No. 6 Project Cost Management Decisions

References Books:
### Semester-VII

#### Teaching and Evaluation Scheme

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<th>Sr. No.</th>
<th>Course Code</th>
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* Average contact hours/week/group.

Total Contact Hrs : 27
Total Credits : 24
ISE : In Semester Evaluation
MSE : Mid Semester Examination
ESE : End Semester Examination

Effective From: Academic Year 2016-17
### Semester-VIII

**Teaching and Evaluation Scheme**

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* Average contact hours/week/group.

Total Contact Hrs = 26
Total Credits = 24
ISE = In Semester Evaluation.
MSE = Mid Semester Examination.
ESE = End Semester Examination

Effective From: Academic Year 2016-17
## Elective List

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<th>Program Electives</th>
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<th>Network Stream</th>
<th>Software Design Stream</th>
<th>IT Technologies Stream</th>
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<td>Mobile Technology (CS4071)</td>
<td>Object Oriented Modeling and Design (CS4091)</td>
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<td>Big Data Analytics (CS4041)</td>
<td>Internet of Things (CS4061)</td>
<td>Principles and Practices for IT Management (CS4081)</td>
<td>Cyber Law and Forensics (CS4101)</td>
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### Open Electives

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Effective From: Academic Year 2016-17
 Semester-VII
CS4011: Advanced Database Systems

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Course Description:

The database field has experienced a rapid growth since the development of relational databases. The progress in database systems and applications has produced a diverse landscape of specialized technology areas that have often become the exclusive domain of research specialists. This course provides a systematic introduction to and an in-depth treatment of advanced database areas. It supplies practitioners and researchers with authoritative coverage of recent technological advances that are shaping the future of commercial database systems and intelligent information systems. Also course includes study of XML databases, details of data warehousing and Information retrieval concepts, etc.

Course Learning Outcomes:

2. Make use of object relational database and various centralized & decentralized data architectures for their applications.
3. Analyze the role of XML in databases.
4. Apply object-relational data model concepts in database modeling and design.
5. Demonstrate handling and administration of real time systems.
6. Describe concepts of data warehousing and information retrieval.

Effective From: Academic Year 2016-17
Course Prerequisites:

1. Basic knowledge of Database Systems.
2. Basic programming and analytical skills.

SYLLABUS

Unit 1. Introduction to Centralized, Distributed and Parallel Databases

Unit 2. Object-Oriented and Object-Relational Databases:
Overview of object oriented concepts, object identity, object structure, encapsulation, complex types, structured type, reference types, functions and stored procedures, inheritance, database schema design for OODBMS, Persistent programming languages.

Unit 3. XML Databases
Overview of XML, motivation, structure of XML data, DTD and XML schema, querying and transformation of XML data, storage of XML data, API for XML, XML applications.

Unit 4. Application Development & Administration
Web interfaces to databases, performance tuning, performance benchmarks, standardization, E-commerce, Legacy systems.

Unit 5. Advanced Transaction processing:
Transaction-processing monitors, transactional workflows, main-memory databases, real-time transaction systems, long-duration transactions, transaction management in multi-databases.

Unit 6. Data Mining and various Case Studies:
Decision support systems, OLAP, Data Warehousing, Database security

Effective From: Academic Year 2016-17
Case Studies: PostgreSQL, IBM DB2 Universal database, Oracle 11g, BigData, Hadoop.

Text Books:

Reference Books:
Semester-VII

CS4031: Virtualization and Cloud Computing

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Course Description:

The course introduces the fundamental principles of Cloud computing and its related concepts. It elaborates virtualization technologies along with the architectural models of cloud computing. It presents prominent Cloud Computing Technologies available in the market place, and contains dedicated chapters on concurrent, high throughput and data intensive computing paradigms. Broadly presents about Aneka Platform, its programming models and deployment models. Various Application case studies from domains such as science, engineering, gaming, and social networking are introduced along with their architecture and how they make use of various Cloud technologies.

Course Learning Outcomes:

After completion of this course student should be able to:

1. Understand the Fundamental concepts of cloud Computing and its architecture.
2. Describe core concepts of virtualization and its relation to clouds.
3. Demonstrate the Cloud deployment models using Aneka and its programming models.
4. Apply the concurrent, high throughput and data intensive computing paradigms in real life scenarios.
5. Develop applications in science, engineering and life science problems using Aneka programming models.
6. Analyze the use cloud computing in different domains and future research.

Effective From: Academic Year 2016-17
Course Prerequisites:

1. Fundamental knowledge of Operating System
2. Basics of client/server programming and network protocols

SYLLABUS

Unit 1. Introduction to Cloud Computing:


Unit 2. Virtualization:

Introduction, Characteristics of virtualized Environments, Taxonomy of Virtualization techniques, Virtualization and Cloud computing, Pros and Cons of virtualization, Technology Examples: Xen: Para virtualization, VMware: Full Virtualization, Microsoft Hyper-V.

Unit 3. Cloud Computing Architecture:


Unit 4. Aneka: Cloud Application Platform:

Framework Overview, Anatomy of Aneka Container: Platform Abstraction Layer; Fabric Services; Foundation Services; Application Services, Building Aneka Clouds: Infrastructure Organization; Logical Organization; Private Deployment Mode; Public Cloud Deployment Mode; Hybrid Deployment Mode, Cloud Programming and Management.

Unit 5. Aneka Programming Models:

Concurrent Programming-Thread Programming: Programming applications with Threads; Multithreading with Aneka; Programming Applications with Aneka, High
Final Year B. Tech.

Throughput computing- Task Programming; Task computing; Task Based Application Models; Aneka task-based Programming, Data Intensive Computing-
Map Reduce Programming: Aneka Map Reduce Programming.

Unit 6. Cloud Applications and Advanced Topics in Cloud Computing:

Scientific applications: Health Care; Biology; Geo Science, Business And Consumer Applications: CRM & ERP; Productivity; Social Networking; Media Applications;
Multiplayer Online Gaming, Energy Efficiency in clouds, Market Based Management of clouds, Federated Clouds/Inter Cloud.

Text Books:


Reference Books:

Course Code | Course | Teaching Scheme | Evaluation Scheme
-------------|--------|-----------------|-------------------
CS4051       | Soft Computing | L  T  P  Credits | Scheme | Theory (Marks %) | Practical (Marks %)
             |        |                |       | Max | Min for Passing | Max | Min for Passing
-------------|--------|-----------------|-------------------|
              | 3     | --  --  3       | ISE  | 20  | --              | --  | --              |
              |       |                | MSE  | 30  | --              | --  | --              |
              |       |                | ESE  | 50  | --              | --  | --              |

Course Description:

Soft Computing is a discipline that deals with the design of intelligent systems which are in contrast to classical hard computing techniques. The main features of such techniques are tolerant to imprecision, uncertainty, partial truth, and approximation. It helps to achieve tractable, robust, and low cost solutions to real-world problems. The principal objective of this course is to introduce students to soft computing techniques from computer science perspective.

Course Learning Outcomes:

Upon successful completion of the course students should be able to:

1. Discuss importance of soft computing.
2. Demonstrate different applications of fuzzy logic.
3. Apply genetic algorithm to solve different real world problems.
4. Demonstrate working of Particle swarm optimization and Teaching learning based optimization algorithms.

Effective From: Academic Year 2016-17
Course Prerequisites:

1. Basic understanding of problem solving
2. Design and analysis of algorithm
3. Computer programming

SYLLABUS

Unit 1: **Introduction to Soft Computing**


Unit 2: **Fuzzy Set Theory**

Basic definitions and terminology, set-theoretic operations, Mf formulation and parameterization.

Unit 3: **Fuzzy Rules and Fuzzy Inference Systems**

Extension principles and fuzzy relations, fuzzy if-then rules, fuzzy reasoning, mamdani fuzzy models, sugeno fuzzy models, Tsukamoto fuzzy models, other considerations.

Unit 4: **Genetic Algorithms**


Unit 5: **Other Soft Computing Techniques**

Particle Swarm Optimization (PSO), Teaching Learning Based Optimization Algorithm (TLBO).

Unit 6: **Applications of Soft Computing**

Fuzzy sets and Genetic algorithms in Game Playing, Applications of PSO and TLBO.

Effective From: Academic Year 2016-17
Reference Books


Semester-VII
Program Elective-ICS4071: Mobile Technology

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Course Description:

Mobile Technology is a young and dynamic field. Ubiquitous access to information, anywhere, anyplace, and anytime, will characterize whole new kinds of information systems in the 21st century. This course will examine the area of wireless networking and mobile computing, looking at the unique network protocol challenges and opportunities presented by wireless communications and host or router mobility. The course will give a brief overview of fundamental concepts in mobile wireless systems and mobile computing, it will then cover system and standards issues including wireless LANs, mobile IP and Personal Area Networks, as well as issues associated with small handheld portable devices and new applications that can exploit mobility and location information. This is followed by several topical studies around recent research publications in mobile computing and wireless networking field. This course will make the system architecture and applications accessible to computer scientist.

Course Learning Outcomes:

On successful completion of course, the student should able to:

1. Identify the different generations of cellular networks with their change in technologies.
2. Differentiate between different generations of mobile communication.
3. Differentiate between GSM and CDMA technology.
4. Familiarize with mobile network and transport layer.
5. Acquaint with link and security management in mobile computing.

Course Prerequisites:
1. Basic knowledge of computer network
2. Basic knowledge of security management

SYLLABUS

Unit 1. Evolution of Cellular System

Unit 2. GSM Technology
GSM system overview, Introduction to GSM, GSM Network and system Architecture, GSM Channel Concept, GSM Identities, GSM system operations. (Traffic cases).

Unit 3. CDMA Technology
Introduction to CDMA, CDMA Network and system Architecture, CDMA Channel Concept, CDMA System (Layer 3) operations, 3G CDMA – 1S-95B, CDMA 2000 and W-CDMA.

Unit 4. Mobile Network Layer
Mobile IP - Goals, assumptions, entities and terminology, IP packet delivery, agent advertisement and discovery, registration, tunneling and encapsulation, optimizations, Dynamic Host Configuration Protocol (DHCP).

Effective From: Academic Year 2016-17
Unit 5. Mobile Transport Layer

Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit, fast recovery, Transmission time-out freezing, Selective retransmission, Transaction oriented TCP.

Unit 6. Protocols and Tools

Wireless Application Protocol-WAP, WAP protocol architecture, treatment of protocols of all layers, Personal Area Network-PAN, User scenarios, physical layer, MAC layer, networking, security, link management.

Text Books:

MAGAZINES:
1. Mobile choice, London
2. Mobile world, UK
3. Mobile Today, UK

Reference Books:
Semester-VII

Program Elective-ICS4091: Object Oriented Modeling and Design

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Course Description:

This graduate course is intended to provide an in depth understanding of object oriented approaches to software development, in particular to the analysis and design phases of the software life cycle. Topics include notation, methods, competing methodologies, issues in object oriented development, and recent advancements which complement traditional object-oriented methodologies. Students apply the techniques in analysis and design projects. The course objective is to produce analysis and design documents that can be used to develop object-oriented software systems. This course will cover - Object-oriented analysis/design concepts, UML notation and approaches to transforming a problem into an object oriented analysis model and object oriented design.

Course Learning Outcomes:

Upon successful completion of the course students should be able to:

1. Understand and compare the need of object oriented modeling with traditional methods.
2. Propose software system using requirements/feature lists, use cases, and simple of structural UML models.
3. Demonstrate knowledge of functional and behavioral modeling techniques.
4. Design an software system based on advanced static/dynamic UML models.

Effective From: Academic Year 2016-17
5. Analyze the application domain and requirements of the problem. Develop the skills to determine which processes and OOAD techniques should be applied to a given project.

6. Able to work in teams to perform the above techniques as well as the ability to translate UML models into code using an OO programming language

Course Prerequisites:
1. Software engineering.
2. Object oriented programming language.

SYLLABUS

Unit 1: Overview of Prominent OO Methodologies
The Rumbaugh OMT, The Booch methodology, Jacobson's OOSE methodologies, Unified Process, Introduction to UML, Important views & diagram to be modeled for system by UML.

Unit 2: Static structural view (Models):
Classes, values and attributes, operations and methods, Relationships among classes, Class Modeling and Design Approaches: approaches for identifying classes, Flexibility guidelines for class diagram: Cohesion, Coupling, Forms of coupling (identity, representational, subclass, inheritance), class Generalization, class specialization versus aggregation.

Unit 3: Functional view (models):
Use case diagram- Building blocks of Use Case diagram - actors, use case guidelines for use case models. Relationships between use cases - extend, include, and generalize. Activity diagram- Elements of Activity Diagram - Action state, Activity state, Object, node, Control and Object flow, Transition (Fork, Merge, Join)

Unit 4: Behavioral (Dynamic structural view):
State diagram State Diagram Notations, events (signal events, change events, Time events). State Diagram states (composite states, parallel states, and History states),
transition and condition, state diagram behavior (activity effect, do-activity, entry and exit activity), completion transition, and sending signals.

**Interaction diagrams:**
Sequence diagram - notations and examples, iterations, conditional messaging, branching, object creation and destruction, time constraints, origin of links, Activations in sequence.
Collaboration diagram - notations and examples, iterations, conditional messaging, branching, object creation and destruction, time constraints, origin of links, Activations in sequence diagram.

**Unit 5: Architectural view**
Logical architecture- dependency, class visibility, subs systems.
Hardware architecture- deployment diagram notations, nodes, object migration between nodes. Process architecture- what are process and threads and their notations in UML, object synchronization, invocation schemes for threads (UML notations for different types of invocations). Implementation architecture-component diagram notations and examples.

**Unit 6: Case studies**
Understanding the problem statement and designing object oriented models for real time problems from different domains such as banking industry, manufacturing industry, retail industry, insurance companies, healthcare sector etc.

**References**
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado: UML 2 Toolkit, WILEY-Dreamtech India Pvt. Ltd.

Effective From: Academic Year 2016-17


Semester-VII
Program Elective-I CS4111: Recent IT Technologies

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Course Description:
Recent technologies are a course containing a wide range of topics. It includes topics like, recent Operating Systems, Linux administration, Networking Management, Database Management, Recent Trends in Web Technology and Internet Of Things. It gives overview to latest IT technologies in above areas.

Course Learning Outcomes:
On completion of this course the student will be able to:

1. Define the terminology and describe concepts of recent trends in Operating Systems.
2. Express recent trends in Databases.
3. Discuss latest trends and technologies in Networking.
4. Apply concepts of recent trends in Web Technology.
5. Describe concepts of recent technology in IOT.

Course Prerequisites:
1. Basic knowledge of Operating System
2. Fundamentals of Database
   - Fundamentals of Linux
   - Basics of Computer Network
   - Basics of Web Technology

Effective From: Academic Year 2016-17
SYLLABUS

Unit 1: Recent Trends in Operating System
Introduction to recent Operating system and their Services, recent Kernel Mode, Process, File System and Operating System administration

Unit 2: Recent Trends in Linux Administration
Advanced Component of Linux System, recent Architecture Of Linux, Commands And Utilities, Files And Directory Related Utilities, File-Security Features, Network Configuration, User Administration

Unit 3: Recent Trends in Networking Management

Unit 4: Recent Trends in Database Management
Recent trends and tools in Database management system.

Unit 5: Recent Trends in Web Technology
Recent trends in Client Server architecture, Website, HTTP, Architecture of web browser and server, advanced deployment and hosting of website.

Unit 6: Recent Trends in IOT
Recent trends and technology in IOT.

Reference Books:

Effective From: Academic Year 2016-17
Semester-VII
Program Elective-II CS4131: Machine Learning

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Course Description:

Machine Learning is concern with computer programs that automatically improve their performance through experience. This course covers the algorithms for machine learning from variety of perspectives. This course is designed to give graduate level student a through grounding in methodologies, technologies, mathematics and algorithms currently needed by people who do research on machine learning.

Course Learning Outcomes:

Upon successful completion of this course student should able to:

2. Demonstrate strength and weakness of many machine learning approaches.
3. Design various machine learning algorithms in a range of real world applications.
4. Compare and apply machine learning algorithms.

Course Prerequisites:

1. Basics of computer science including algorithms, data structure, theory of computation etc.
2. Basic Linear Algebra
3. Basic Probability and statistics Theory
K. E. Society's
Rajarambapu Institute of Technology, Rajaramnagar.
An Autonomous Institute-Affiliated to Shivaji University, Kolhapur

Final Year B. Tech.

SYLLABUS

Unit 1: Introduction to Machine Learning: (6)
Machine Learning and Data Mining, Input- Concept, Attribute, Preparing Input,
Output- Knowledge Representation: Tables, Linear Models, Trees, Rules, Instance
based representation, Clusters

Unit 2: Algorithms – Basic Methods: (6)
Inferring Rudimentary Rules, Statistical Modeling, Divide-and-Conquer, Covering
Algorithms, Mining Association Rules, Linear Models, Instance-Based Learning,
Clustering, Multi-Instance Learning.

Unit 3: Credibility: (6)
Training and Testing, Predicting Performance, Cross-Validation, Other Estimates,
Comparing Data Mining Schemes, Predicting Probabilities, Counting the Cost,
Evaluating Numeric Prediction, Minimum Description Length Principle, Applying
the MDL Principle to Clustering.

Unit 4: Implementations: (6)
Decision Trees, Classification Rules, Association Rules, Extending Linear Models,
Instance-Based Learning.

Unit 5: Numeric Prediction with Local Linear Models, Bayesian Networks, Clustering, (6)
Semi-supervised Learning, Multi-Instance Learning.

Unit 6: Ensemble Learning: (6)
Combining Multiple Models, Bagging, Randomization, Boosting, Additive
Regression, Interpretable Ensembles, Stacking.

Effective From: Academic Year 2016-17
Reference Books:

3. Pattern Recognition and Machine Learning - Christopher M. Bishop
Course Code: CS4151

Course Description:
Wireless networking is one of the fastest growing segments of the computer industry. Every electronic device seems capable of wireless connections these days: computers, handhelds, cell phones, and even digital cameras are all capable of transmitting without a tether. This course covers fundamental techniques in design and operation of first, second, and third generation wireless cellular. As an example for the future wireless networks, Ad hoc Networks are discussed in detail since they are expected to have a large impact on future world.

Course Learning Outcomes:

1. Study the evolving wireless technologies and standards.
2. Review architectures of various access technologies such as 3G, 4G, WiFi etc.
3. Discuss various protocols used at MAC layer in Adhoc networks.
4. Study various protocols used at data link and network layer in Adhoc network.
5. Analyze various protocols used at transport layer in Adhoc network.

Course Prerequisites:
1. Computer Networks
SYLLABUS

Unit 1: Introduction to Wireless Networks

(6)

Unit 2: Wi-Fi and Next Generation WLAN
Wi-Fi (802.11), 802.11 Standards, Wi-Fi Protocols, Frequency Allocation, Modulation and Coding Schemes, Network Architecture, Typical Wi-Fi Configurations, Security, 802.11 Services, HotSpots, Virtual Private Networks (VPNs), Mobile VPN, VPN Types, Wi-Fi Integration with 3G/4G, Benefits of Convergence of Wi-Fi and Wireless Mobile.

(6)

Unit 3: Third Generation Mobile Services
Introduction, Universal Mobile Telecommunications Service (UMTS), UMTS Services, The SUMTS Air Interface, and Overview of the 3GPP.

(6)

Unit 4: Introduction

(6)

Unit 5: MAC Protocols for ad hoc wireless networks

(6)

Unit 6: Network layer and transport layer protocols
Introduction, Issues in designing a routing protocol for ad hoc wireless networks, Classification of routing protocols, Table driven, on-demand Hybrid routing protocols, Transport layer protocols, classification of transport layer solutions, TCP over adhoc wireless networks.

(6)
Text Books:


Reference Books:

1. Ad Hoc Wireless Networks – A communication Theoretic perspective by O. K. Tonguz & G. Ferrari, Wiley India.
3. Ad Hoc Networking by Charles E. Perkins (Pearson Education)
Course Description:
This course aims to guide students in both the theoretical and practical aspects of developing computer solutions for real-world problems. This course is designed to present students with an overview of advanced topics in software engineering.

Course Learning Outcomes:
On successful completion of this course, the student should be able to:
1. Demonstrate knowledge of the wider software engineering context, software engineering processes and its applicability.
2. Apply professional practices in managing the development of quality software.
3. Apply different software testing strategies.

Course Prerequisites:
1. Software Engineering
SYLLABUS

Unit 1: Software And Software Engineering

Unit 2: Agile Development

Unit 3: Software Project Management Concepts

Unit 4: Software Testing
Basic objectives, Test case design, White-box methods, Black-box methods, Special issues for object-oriented testing, Testing strategies, Debugging

Unit 5: Software Process Improvement

Unit 6: Emerging Trends in Software Engineering

Effective From: Academic Year 2016-17
Text Books:

References:
Semester-VII

Program Elective-II CS4191: Software Testing and Quality Assurance

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Course Description:

The course represents the experience of one of the important software development life cycle in industry. This course exposes Computer engineering students to Testing domain. The course includes introduction to software testing terminologies and framework, basics of software testing life cycle, introduction to test management, defect management, test data management, automation testing and basics understanding of using automation testing tool.

Course Learning Outcomes:

On completion of this course student will be able,

1. Demonstrate various terms and technologies used in testing domain.
2. Apply the software testing techniques in commercial environments
3. Design different test plan and test cases for software quality improvement.
4. Choose suitable open source testing & automation tools.
5. Use various types of software tests and quality control standards
SYLLABUS

Unit 1: Software Testing Overview:
What is testing, Why is testing necessary, Role of Tester, Testing and Quality,
Overview of STLC, SDLC vs STLC, different stages in STLC, document templates
generated in different phases of STLC, different levels of testing, different types of
testing

Unit 2: Basics of Test Design Techniques:
Static techniques, reviews, walkthroughs, Various test categories, test design
techniques for different categories of tests. Designing test cases using MS-Excel.

Unit 3: Test & Defect management:
Documenting test plan and test case, Effort estimation, Configuration management,
Project progress management, Test Execution, logging defects, defect lifecycle,
fixing / closing defects, Test Data Management, Automation and testing tools.

Unit 4: Software Metrics:
Need, Definition and classification of software metrics, Testing Metrics for
monitoring and controlling the test process.

Unit 5: Quality Assurance:
Quality concept, Quality Control, Quality Assurance, Cost of Quality Software
Quality Assurance – SQA activities, Software Reviews, Inspections, Audits,
Software reviews, Software Reliability Quality, Attributes: correctness, reliability,
usability, integrity, portability, maintainability, interoperability. Ishikawa’s Seven
Basic Tools.

Unit 6: Quality Standards
Basic concept of – ISO 9000 & 9001, CMM, six sigma.
Text Books:
2. Foundations of software testing (3rd edition) – by Dorothy Graham, Erik van Veenendaal, Isabel Evans, Rex Black.

Reference Books:
1. Foundation of Software Testing 2 e, by Aditya P. Mathur, Pearson publication
3. Implementing Automated Software Testing: How to Save Time and Lower Costs While Raising Quality - By: Elfriede Dustin
Semester-VII

CS4511: Advanced Database System Lab

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Course Description:

This course aims study and practices various database architectures. Also course focuses on the implementation of advanced database concepts like OLAP, Multimedia and XML queries. This course explores the comparison of different parallel joining and sorting techniques to analyze the role of databases in parallel architecture.

Course Learning Outcomes:

Upon successful completion of the course students should be able to:

1. Analyze the role of XML in databases.
2. Create and explore different database architectures and their features.
3. Write OLAP queries for data analysis
4. Design & Implement concurrency control and crash recovery techniques

Course Prerequisites:

1. Basic Knowledge of database Engineering
2. Java Programming, Oracle 10g / 11g
SYLLABUS

The lab work should consist of minimum 8-10 experiments based on the following concepts.

- Installation of Oracle 10g/11g and configuration
- Multimedia databases
- Parallel join and sorting
- Distributed databases
- Temporal Database
- XML databases
- Web interfaces to databases
- OLAP queries
- Case study on IBM-DB2, Hadoop and big data

The practical assignments are to be given and evaluated by the respective course coordinator. A journal is to be prepared by individual student and to be submitted to the department at the end of the semester.


Semester-VII

CS4531: Web Technology Lab

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Course Description:

This course teaches techniques for the designing applications for World Wide Web that applications generally utilize a server and a client (web browser). Also provides information about web technologies that relate to the interface between web servers and their clients. This subject contains Extensible markup language (XML), Java servlet, JSP.

Course Learning Outcomes:

On successful completion of Web Technology course, students should be able to:

1. Develop application using HTML, CSS, Java Script and jQuery.
2. Create XML document and its DTD, create XML parser and Apply XSL on XML.
3. Develop application using Java Servlet, Manage session of users in web application.
4. Create application using Java Server Pages and access database.
5. Build, deploy and maintain web applications using Struts Framework.

Course Prerequisites:

1. Knowledge of Markup Language.
2. Knowledge of HTML
3. Basics of Java Language
4. Understanding of programming concepts.

Effective From: Academic Year 2016-17
SYLLABUS

Unit 1: Introduction to Web:
Introduction to Web, HTML 5, working of HTML 5, tags, CSS 3.0, classes
border, margin, padding, background, tables aligns.

Unit 2: Client side scripting:
Javascript, variables, operators, data types, functions, objects, events, jquery,
selectors, events, effects, animation, ajax

Unit 3: Introduction to XML:
What is XML, XML verses HTML, XML terminology, XML standards, XML
syntax checking, The idea of markup, XML Structure, Organizing information in
XML, Creating Well-formed XML, XML Namespaces. DTD- Introduction to DTD,
Document Type Declaration, Element Type Declaration, Attribute Declaration,
Conditional Section, Limitations of DTD

Unit 4: Extensible Style sheet Language (XSL):
Introduction to XSL, overview, XPATH, XSLT – templates, creating elements and
attributes, looping and sorting, conditional processing, defining variables
XML Schema:
Introduction, basic and complex schema, specifying frequency, element contents,
content model reuse, anonymous types, mixed content, grouping of data, mandating
all elements, choices, sequences, simple types- numeric, time, xml, string, binary
data types, deriving types- facets, attributes.

Unit 5: Introduction to Servlet:
History of web applications, support for web application, power of servlet, a
Servlet’s job, basic servlet code, configuration of apache tomcat server, set up
Development Environment, Compiling and Deploying Servlet, Web Application -
directory structure, Deployment descriptor, Assigning custom URLs to servlet.
Structure of Servlet, Retrieving Information, Session Management in servlet,
Database access.

Effective From: Academic Year 2016-17
Unit 6: Java Server Pages:

Need for JSP, Benefits of JSP, Advantages of JSP over other technologies, Installation of JSP pages, Creating Template Text, Invoking Java Code From JSP, Limiting the JAVA code in JSP, Using JSP Expression, Example of JSP Expression, Comparing Servlet to JSP, Writing Scriptlets, Scriptlet examples, Scriptlet for conditional execution, Using Declaration, Declaration Example, Using Predefined Variables,

JSP page Directive – Import, Content Type, Page Encoding, Session, Buffer, Auto Flush, File Handling, Database Access, Sending Email.

The lab manual should consist of 8-10 experiments based on:

- Java script
- XML
- XSL
- Java servelet
- JSP
- Database connectivity

Text Books:

1. XML and Related Technologies- AtulKahate, Pearson Education.
2. Java Servlet Programming- Jason Hunter, SPD O'REILLY.

Reference Books:

Semester-VII

CS4551: Project Phase -I

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<td>L   T  P Credits</td>
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<tr>
<td>CS4551</td>
<td>Project Phase -I</td>
<td>4* 4</td>
<td>ISE</td>
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</table>

* Average contact hours/week/group.

Course Description:

Project management & Project planning is a very essential task in project development. So, to achieve goal, this course helps students to analyze the real world problems and design the practical solutions for the same. It also helps to improve project management’s skills within the students.

Course Learning Outcomes:

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

1. Apply knowledge of computer science for real world problem.
2. Possess Professional, Practical and reflective practitioner skills.
3. Upgrade and apply the knowledge through continuous learning.
4. Effectively apply Design Thinking Processes and Template to structure learning lifecycle in the development of a prototype.
5. To develop project management and time management skills
6. To formulate a process whereby to keep the end-user or customer in mind throughout the project lifecycle.

Course Prerequisites:

1. Students should have basic knowledge of their respective Project area.
SYLLABUS

The project work is to be carried out in two semesters of Final Year B. Tech. The project should be undertaken preferably by group of 2-4 students who will jointly work and implement the project in the two semesters.

In Semester-VII, The group will select a project with the approval of the Guide and Panel and submit the name of the project with a synopsis of the proposed work of not more than 02 to 08 pages. The project group will submit software requirement specification (SRS) of their project. The group is expected to complete detailed system design, analysis, data flow design, procurement of hardware and/or software, implementation of a few modules of the proposed work at the end of semester –VII as a part of the term work submission in the form of a joint report. The term work assessment will be done jointly by teachers appointed by Head of the Department.

The tentative presentations for B. Tech. Project is given as below,

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<thead>
<tr>
<th>Sr. No.</th>
<th>Presentation</th>
<th>Presentation Details</th>
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<tbody>
<tr>
<td>01</td>
<td>Presentation - I</td>
<td>Presentation will be based on synopsis</td>
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<td>02</td>
<td>Presentation - II</td>
<td>Presentation will be based on SRS</td>
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<tr>
<td>03</td>
<td>Presentation - III</td>
<td>Presentation will be based on the Partial Project report of semester –I</td>
</tr>
</tbody>
</table>

Note:
1. Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
2. Timely mid-term evaluations should be done, which includes presentations and demos of the work done.

Effective From: Academic Year 2016-17
Course Description:

This course provides elementary introduction about Parallel Programming Techniques. This course's purpose is aware students about design and development of parallel algorithms and programs to solve different computationally expensive problems. This course introduces multi-core programming approaches like OpenMP and many-core programming approaches like CUDA C/C++ as programming languages to implement different algorithms and applications. This course focuses on learning and implementation of different application to harness the power of CPU and GPU due to advancement of technologies.

Course Learning Outcomes:

Upon successful completion of the course students should be able to:

1. Identify compute intensive part from sequential algorithm.
2. Design parallel algorithm from given sequential algorithm.
3. Write parallel programs using OpenMP, CUDA C/C++, etc.
4. Explore different compute intensive applications.

Course Prerequisites:

1. Preliminary knowledge of C/C++ programming, Data structure and Design of Algorithms.
SYLLABUS

Unit 1: Parallel Algorithm Design (5)

Unit 2: OpenMP Programming (6)
Threads, OpenMP Overview, The OpenMP model, Writing OpenMP programs, Creating Threads, Examples.

Unit 3: Advanced OpenMP Programming (7)
Data-sharing attributes, Work sharing constructs, Synchronizations, Task Parallelism in OpenMP, Miscellaneous points, Examples.

Unit 4: Introduction to GPU Computing and CUDA (6)
Introduction to GPU Computing and CUDA: CUDA Data Parallelism Model, CUDA Program Structure, Device Memories and Data Transfer, Kernel Functions and Threading, CUDA Threads: CUDA Thread Organization, Using blockIdx and threadIdx, Synchronization and Transparent Scalability, Thread Assignment, Thread Scheduling and Latency Tolerance.

Unit 5: Introduction to CUDA Memories (5)
Importance of Memory Access Efficiency, Memory Types, Reducing Global Memory Traffic, Examples.

Unit 6: CUDA Performance Considerations (7)
More on Thread Execution, Global Memory Bandwidth, Dynamic Partitioning of SM Resources, Instruction Mix, Thread Granularity, Measured Performance and Summary, Floating-Point Format, Re-presentable Numbers, Special Bit Patterns and Precision, Arithmetic Accuracy and Rounding, Algorithmic Considerations.
References

1. Parallel Computer Architecture - A Hardware / Software Approach - David Culler, Jaswinder Pal Singh, Anoop Gupta, Publisher: Morgan Kaufmann.


Course Description:

This course focuses on the fundamentals of information security that are used in protecting both the information present in computer storage as well as information traveling over computer networks. Interest in information security has been spurred by the pervasive use of computer-based applications such as information systems, databases, and the Internet. Information security is enabled through securing data, computers, and networks. By the end of this course, you will be able to describe major information security issues and trends, and advise an individual seeking to protect his or her data.

Course Learning Outcomes:

1. Analyze different methods of Data Encryption and Decryption; their advantages & limitations.
2. Use different key distribution methods for distribution of Public/Private & Secret keys.
3. Apply message authentications techniques for implementing security during message communication.
4. Create and use digital signatures.
5. Discuss different security attacks & security solutions for e-mail & web applications.

Effective From: Academic Year 2016-17
Course Prerequisites:
1. Computer Networks
2. Operating Systems
3. Algorithm Basics

SYLLABUS

Unit 1: Symmetric Ciphers

Unit 2: Asymmetric Ciphers
Public Key Cryptography and RSA – Principles of Public Key Cryptosystems, The RSA Algorithm Key management; Other public key cryptosystems– Key Management, Diffie-Hellman Key Exchange.

Unit 3: Message Authentication

Unit 4: Network Security practice

Effective From: Academic Year 2016-17
Unit 5: System Security
Intruders – Intruders, Intruder detection, Password Management, Malicious Software – Viruses and Related Threats, Virus Countermeasures, Firewall design principles, trusted system.

Unit 6: Issues in digital securities:
Legal, Privacy and Ethical issues in digital security Program and data Protection by patents, copyrights and trademarks, information and the law, computer crime, privacy, ethical issues in digital security and codes of professional ethics.

Text Books:
1. Williams Stallings – Cryptography and Network security principles and practices. Pearson Education (LPE)

Reference Books:
3. Cryptography and network security – AtulKahate (TMGH)
Course Description:

Big Data Analytics allow organizations to build competitive strategies around data-driven insights and derive value from vast amounts of untapped data. Whether you are tracking the efficiency of a warehouse or predicting how and when to modify staffing levels in a call center. This course provides the knowledge and training to use new Big Data tools and techniques as well as learn ways of storing information that will allow for efficient processing and analysis for informed business decision-making.

Course Learning Outcomes:

On successful completion of course, the student should able to:

1. Able to understand big data for business intelligence
2. Able to learn business case studies for big data analytics
3. Able to Understand No sql big data management
4. Able to manage Big data without SQL
5. Able To understanding map-reduce analytics using Hadoop and related tools

Course Prerequisites:

1. Knowledge of Java
2. Basics of Data Structure
3. Basics of Linux/Unix

Effective From: Academic Year 2016-17
SYLLABUS

Unit 1: Understanding Big Data
What is big data – why big data – convergence of key trends, unstructured data, industry examples of big data – web analytics, big data and marketing, fraud and big data, risk and big data, credit risk management, big data and algorithmic trading, big data and healthcare, big data in medicine, advertising and big data, big data technologies Introduction to Hadoop – open source technologies, cloud and big data, mobile business intelligence, Crowd sourcing analytics – inter and trans firewall analytics

Unit 2: NOSQL Data Management
Introduction to NoSQL – aggregate data models – aggregates – key-value and document data models, relationships – graph databases, schemaless databases, materialized views, distribution models, sharding, master-slave replication, peer-peer replication – sharding and replication. Consistency-relaxing consistency -- version stamps, MapReduce, partitioning and combining -- Composing MapReduceCalculations

Unit 3: Basics of Hadoop

Unit 4: Mapreduce Applications
MapReduce workflows, unit tests with MapReduce Unit test data and local tests, anatomy of MapReduce job run, classic Map-reduce – YARN, failures in classic Mapreduce and YARN – job scheduling – shuffle and sort – task execution MapReduce types –inputformats – output formats
Unit 5: **Hadoop Related Tools**

Introduction to Hbase: The Dawn of Big Data, the Problem with Relational Database Systems. Introduction to Cassandra: The Cassandra Elevator Pitch. Introduction to Pig, Hive – data types and fileformats – HiveQL data definition – HiveQL data manipulation – HiveQL queries

Unit 6: **Hadoop Ecosystem Security**

Steps to secure big data – Classifying Data – Protecting – Big Data, Configuring Kerberos for Hadoop ecosystem components – Pig, Hive, Oozie, Flume, HBase, Sqoop

**Text Books:**


**References:**


Semester-VIII

Program Elective-III CS4061: Internet of Things

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<th>Teaching Scheme</th>
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<td>MSE  30  40%</td>
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<td>ESE  50  40%</td>
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Course Description:

The Internet of Things (IoT) is the network of physical objects or "things" embedded with electronics, software, sensors, and network connectivity, which enables these objects to collect and exchange data. The Internet of Things allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration between the physical world and computer-based systems, and resulting in improved efficiency, accuracy and economic benefit when IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, smart homes, intelligent transportation and smart cities. Each thing is uniquely identifiable through its embedded computing system but is able to interoperate within the existing Internet infrastructure. Experts estimate that the IoT will consist of almost 50 billion objects by 2020.

The explosive growth of the "Internet of Things" is changing our world and the rapid drop in price for typical IoT components is allowing people to innovate new designs and products at home. IoT design considerations, constraints and interfacing between the physical world and your device will also be covered. You will also learn how to make design trade-offs between hardware and software. We'll also cover key components of networking to ensure that students understand how to connect their device to the Internet.
Course Learning Outcomes:

On successful completion of course, the student should able to:

1. Identify the components of IoT
2. Design a middleware for IoT
3. Identify business intelligence and information security for IoT
4. Analyze various protocols for IoT
5. Establish the communication to the cloud through Wi-Fi / Bluetooth
6. Develop IoT application to solve social problems

Course Prerequisites:

1. Basic knowledge of Distributed systems
2. Basic knowledge of Java programming
3. Basic knowledge of Programming of application for mobile devices

SYLLABUS

Unit 1:  Fundamentals of Internet of Things (IoT)  
Definitions and Functional Requirements, Characteristics-Physical design, Logical design, Enabling technologies in IoT, IoT Levels, Domain Specific IoTs, IoTv vs M2M. Components in internet of things: Control Units, Sensors, Communication modules, Power Sources, Mobile Internet, Governance in the era of IoT.

Unit 2:  IoT Design Methodology
IoT systems management, IoT Design Methodology: Specifications Integration and Application Development.

Unit 3:  IoT Protocols
NFC, Bluetooth, RFID, CoAP, 6LoWPAN, Zigbee, Thread, REST, MQTT, DTLS, LTE-A, Z-Wave, LoRaWAN, Neul, WiMAX.
Unit 4: Building IoT with RASPBERRY PI and GALILEO/ARDUINO

Unit 5: The Internet of Things to The Web of Things

Unit 6: IoT Applications and Case Studies
Various Real time applications of IoT, Connecting IoT to cloud, Cloud Storage for IoT, Data Analytics for IoT – Software & Management Tools for IoT, Smart Metering, Health Body Area Networks, Smart Home Automation, Smart Cards, IoT in Sports, IoT in Cities/Transportation, Smart Irrigation, Smart printer, Smart Lab.

Text Books:

References:


7. Charalampos Doukas, Building Internet of Things with the Arduino, Create space, April 2002


# Program Elective-III CS4081: Principles and Practices for IT Management

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course</th>
<th>Teaching Scheme</th>
<th>Evaluation Scheme</th>
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**Course Description:**

This course describes and planning IT project. It gives organization of an IT project using various project network methods. It describes analysis of a business ethics and social responsibility issues also analyze the role of creativity in organizations and assess the importance of managing positively in a changing environment.

**Course Learning Outcomes:**

1. To describe concepts of requirements analysis, risk management, budgeting a project, creating a work breakdown structure.
2. To apply Critical path method for project tracking and progress project.
3. To demonstrate Resource allocation and scheduling concept.
4. To apply Strategies, policies & Strategic management in Project Development.
5. To classify Intellectual property Rights and related laws.
6. To develop IT Application for marketing, health care, insurance, banking, agriculture and service sector.

**Course Prerequisites:**

1. Basic knowledge of IT projects and it's development phases.
SYLLABUS

Unit 1: Preliminary planning of an IT Project
Gathering project Information, defining the project goals, establishing project priorities, Requirements analysis, Risk management, budgeting a project, creating a work breakdown structure, Estimation.

Unit 2: Organizing an IT Project
Project management, activity, Project schedule, Project network diagram- creation and analysis. Critical path method (CPM), Project constraints, tracking, project progress

Unit 3: The project plan
Revising the project plan-Need for revision, Establishing change control, implementing the project changes, coping with project delays, Time Estimates, Resource allocation and scheduling (Gantt chart)

Unit 4: TQM & ISO
Strategies, policies & Strategic management, Quality Audit, Quality function Diplomat, Business policy, Business ethics, Social responsibilities, Process and project quality standards, Six sigma, CMM levels

Unit 5: Modern approaches to management
Concept of Knowledge management, Change management, Supply chain management, Introduction to Intellectual property Rights (IPR), Introduction to Intellectual property Rights (IPR), Cyber laws.

Unit 6: Applications of IT in management
Application of IT in functions like finance and accounting, Stores, purchase, product design and development, quality control, Logistics, customer relationship, marketing, Health care, insurance, Banking, agriculture and service sector

Effective From: Academic Year 2016-17
Text Books:

Reference Books:
### Semester-VIII

**Program Elective-III CS4101: Cyber Laws & Forensics**

<table>
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<th>Course Code</th>
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<td>ESE 50 40%</td>
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**Course Description:**

This course provides elementary introduction about cyber laws and forensics. Purpose of this course is to make students aware about cybercrimes, IT Act. Cyber Forensics is the Scientific Process of identification, collection and preservation of digital crime scene evidence. This course also emphasizes on student awareness in handling suspected digital evidence.

**Course Learning Outcomes:**

1. To describe concepts like cyberspace cyber ethics and laws.
2. To differentiate Intellectual property Rights with its laws.
3. To identify IT Act, 2000 with its amendment and limitations.
4. To demonstrate fundamentals of cyber forensics.
5. To investigate the forensics for Web, E-mail, Server log, Social websites, Browsers.
6. To handle real world cyber & forensics investigations

**Course Prerequisites:**

1. Basics of Computer Network
2. Mathematics
3. Basics of Information Security

Effective From: Academic Year 2016-17
SYLLABUS

Unit 1: Introduction to Cyber Law
Evolution of Computer Technology, Emergence of Cyberspace, Cyber Jurisprudence, jurisprudence & Law, need for cyber Law, Cyber Crimes, Cyber laws, cyber ethics, cyber jurisdiction, Hierarchy of Courts, Web hosting & Web Development agreements, Domain name, Internet as Tool for global access.

Unit 2: Cyber Law Issues & Related Legislations

Unit 3: Information Technology Act 2000
Overview of IT Act, 2000, Amendments and Limitations of IT Act, IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code, Relevant Sections of Indian Evidence Act, Relevant Sections of Bankers Book Evidence Act, Relevant Sections of Indian Penal Code, Relevant Sections of Reserve Bank of India Act, Law Relating To Employees And Internet, Alternative Dispute Resolution, Online Dispute Resolution (ODR).

Unit 4: Fundamentals of Cyber Forensics

Unit 5: Post-mortem & Live Forensics

Effective From: Academic Year 2016-17
Unit 6: Financial Crime Issues & Legal Documentation


Text Books:
1. “Cyber Law in India “By Farooq Ahmad – Pioneer Books

Reference Books:
3. Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspective by sunit Belapure, Nina Godbole, Wiley India
4. Cyber Law in India by Farooq Ahmad- Pioneer Books
Course Description:

Mobile application development covers theory and technologies for the development of distributed applications for mobile devices as well as introducing design principles for applications for small devices. It addresses android for mobile devices. The subject also provides a basis for understanding how different techniques can be used to develop distributed mobile applications. The core modules of this course include designing, developing, testing, signing, packaging and distributing high quality mobile apps. This course aims to teach mobile application development using Android as the development platform.

Course Learning Outcomes:

1. Develop an application that uses GUI components, Font and Colors.
2. Develop an application that uses Layout Managers and event listeners.
3. Write an application that draws basic graphical primitives on the screen.
4. Develop an application that makes use of database.
5. Develop a multimedia player application.
6. Implement an application that implements Multithreading.
7. Develop a native application that uses GPS location information.
8. Implement an application that writes data to the SD card.
9. Implement an application that creates an alert upon receiving a message.
10. Write a mobile application that creates alarm clock and calculator application
11. Develop an application that uses Notification Manager and Broadcast receiver Manager Class
   and SMS sending and receiving.
12. Develop android mobile games.

Course Prerequisites:
1. Basics of Core Java
2. Working knowledge of XML
3. Knowledge of RDBMS

SYLLABUS

Unit 1: Introduction
Mobility, mobile devices vs. desktop devices, mobile platform, mobile application
development, overview of android platform, android OS architecture, building
simple “hello word application.

Unit 2: Building blocks of mobile apps
App user interface designing-mobile UI resources-Layout, UI elements, Draw-able
menu, Activity states & life cycle, Intent & intent filter, Interaction amongst
activities

Unit 3: Application Functionality
Threads, A sync task, Services—state & life cycle, Notification, Broadcast receiver,
Telephony & SMS APIs

Unit 4: Native data handling
On device file I/O, Creating Private and Shared Preferences, Searching and Reading
Preferences, Adding, Upgrading, and Deleting Preferences, Storing Structured Data
Using SQLite Databases Creating a SQLite Database, Creating, Upgrading, and
Deleting Database, Records.

Unit 5: Multimedia Programming using Android
Working with image button controls & click event, Multimedia – audio/video playback and record, location awareness, and native hardware access

Unit 6: Android Game Development
Android Game Development Framework, Building the Game.

Text Books:
1. Mobile application development – Anubhav Pradhan, Anil V Deshpande
2. Teach Yourself Android Application Development In 24 Hours – Lauren Darcy, Shane Conder, SAMS Publication Second Edition
3. Android Application Development All in one for Dummies - Barry Burd, Wiley’s Publication.

Reference Books:
1. Android Essential – Chris Haseman, Apress Publication
2. The Android Developer’s Cookbook, J. Steele, N. To, Addison-Wesley (2011)
Course Description:

This course aims study of different Parallel programming models and develops applications based on it. Student should use MPICH, OpenMP, CUDA C/C++, etc. as programming language to implement different parallel algorithms and applications. This course focuses on the implementation of parallel algorithms for multi-core and many-core systems. The algorithms will be analyzed with different performance metrics.

Course Learning Outcomes:

Upon successful completion of the course students should be able to:

1. Design different parallel algorithms to solve problems.
2. Use different parallel programming languages on multi-core and many-core architecture systems.
3. Perform the analysis with different performance metrics.

Course Prerequisites:


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<th>Course Code</th>
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<th>Teaching Scheme</th>
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<td>CS4541</td>
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|            | ISE                   |     |     |     |         |        | 50     |               | 50     | 50%             |
|            | MSE                   |     |     |     |         |        | --     |               | --     | --              |
|            | ESE                   |     |     |     |         |        | 50     |               | 50     | 50%             |
SYLLABUS

The lab work should consist of 8-10 practical assignments based on OpenMP/CUDA C, etc. The practical assignments are to be given and evaluated by the respective course coordinator. A journal is to be prepared by individual student and to be submitted to the department at the end of the semester.
K.E. Society's
Rajarambapu Institute of Technology, Rajaramnagar.
An Autonomous Institute-Affiliated to Shivaji University, Kolhapur

Final Year B. Tech.

Semester-VIII

CS4561: Project Phase –II

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<th>Course Code</th>
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* Average contact hours/week/group.

Course Description:

Project management & Project planning is a very essential task in project development. So, to achieve goal, this course helps students to analyze the real world problems and design the practical solutions for the same. It also helps to improve project management’s skills within the students.

Course Learning Outcomes:

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

1. Apply knowledge of computer science for real world problem.
2. Possess Professional, Practical and reflective practitioner skills.
3. Upgrade and apply the knowledge through continuous learning.
4. Effectively apply Design Thinking Processes and Template to structure learning lifecycle in the development of a prototype.
5. To develop project management and time management skills.
6. To formulate a process whereby to keep the end-user or customer in mind throughout the project lifecycle.

Course Prerequisites:

Students should have completed Literature survey and SRS of the project chosen in last semester.

Effective From: Academic Year 2016-17
SYLLABUS

The group will continue to work on the project selected during the Semester-VII.

The tentative presentations for B. Tech Project is given as below,

<table>
<thead>
<tr>
<th>Sr. No.</th>
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<th>Presentation Details</th>
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<tbody>
<tr>
<td>01</td>
<td>Presentation – I</td>
<td>Presentation will be based on implementation of algorithms and testing of project</td>
</tr>
<tr>
<td>02</td>
<td>Presentation – II</td>
<td>Presentation will be based on final report</td>
</tr>
</tbody>
</table>

Submit the completed project work to the department at the end of Semester-VIII.

The project report in the bound journal complete in all respect with the following:

a) Problem specifications.
b) System definition – requirement analysis.
c) System design – dataflow diagrams, database design.
d) System implementation – algorithm, code documentation.
e) Test results and test report.
f) In case of object oriented approach – appropriate process be followed.

term work will be jointly assessed by a panel of faculties.

Note:

1. Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.

2. Timely mid-term evaluations should be done, which includes presentations and demos of the work done.