### SCHEME OF INSTRUCTION & EXAMINATION
#### B.E. IV YEAR (COMPUTER SCIENCE & ENGINEERING)
Proposed scheme and syllabus with effect from the Academic year 2014-2015

**SEMESTER - II**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Syllabus Ref. No.</th>
<th>SUBJECT</th>
<th>Scheme of Instruction</th>
<th>Scheme of Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Periods per week</td>
<td>Duration In Hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>L/T</td>
<td>D/P</td>
</tr>
<tr>
<td>1</td>
<td>CS451 UE</td>
<td>THEORY Embedded Systems</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Elective-III</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Elective-IV</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>1</td>
<td>CS481 UE</td>
<td>PRACTICALS Embedded Systems Lab</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>CS482 UE</td>
<td>Seminar</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>CS483 UE</td>
<td>Project</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TOTAL</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

**Elective – III**
- CS 452 UE  Natural Language Processing
- CS 453 UE  Neural Networks
- CS 454 UE  Machine Learning
- CS 455 UE  Software Quality and Testing
- CS 456 UE  Soft Computing
- CS 457 UE  Web Service Architecture
- CS 458 UE  Data Mining
- BM 452 UE  Medical Image Processing

**Elective-IV**
- CS 461 UE  Advanced Databases
- CS 462 UE  Image Processing
- CS 463 UE  Human Computer Interaction
- CS 464 UE  Cloud Computing
- BM 454 UE  Bio Electricity
- CE 454 UE  Disaster Management
- ME 460 UE  Robotics
- LA 454 UE  Intellectual Property Rights

*Grade : S/A/B/C/D/E*
### SERVICE COURSES OFFERED TO OTHER DEPARTMENTS

**SEMESTER - II**

<table>
<thead>
<tr>
<th>SL. No.</th>
<th>Syllabus Ref. No.</th>
<th>SUBJECT</th>
<th>Scheme of Instruction</th>
<th>Scheme of Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Periods per week</td>
<td>Duration In Hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>L/T D/P</td>
<td>Univ. Exam</td>
</tr>
<tr>
<td>1.</td>
<td>CS459 UE</td>
<td>THEORY</td>
<td>4 4 3 75 25 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Information Security (Elective-III)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>CS 458 UE</td>
<td></td>
<td>4 4 3 75 25 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Data Mining (Elective – IV)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The table above provides the scheme of instruction and examination for the second semester of the B.E. IV Year (Computer Science & Engineering) course, with effect from the academic year 2014-2015.
EMBEDDED SYSTEMS

Instruction: 4 Periods per week
Duration of University Examination: 3 Hours
University Examination: 75 Marks
Sessional: 25 marks
Credits: 4

Course Objectives:
- To understand the general purpose of Embedded System Development.
- To be able to use ANSI C to develop Embedded Software.
- To develop Prototype Circuit on Board (Interfacing to Microcontroller).
- To teach interface to peripherals, knowledge of typical Interfacing standards.
- To design Real Time Embedded systems using the concepts of RTOS.

Course Outcomes:
- Students will understand the significance of Embedded Systems.
- Students will be in a position to develop software for any special case.
- Students will get expertise in various development tools.

UNIT- I
Introduction to Embedded Systems, Characteristics and quality attributes of embedded systems, Challenges in Embedded System Design, Application and Domain specific embedded systems.

UNIT –II
Embedded System Architecture: Hardware Architecture, and Communication Interfaces.

UNIT-III

UNIT-IV
Operating System for Embedded System: Real time operating systems based embedded system design, Introduction to embedded systems design with Micro C/OS- II and Vx Works.
Representative Embedded Systems: Digital Thermometer, Handheld Computer, Navigation System, IP Phone, Software-defined Radio, Smart Cards, and RF Tags.

UNIT –V
Embedded Systems development Environment: IDE, Cross compilation, Disassembler, Simulators, Emulators and Debugging, Target hardware debugging, and Boundary Scan.
Product enclosure design and development tools, Embedded Product Development life cycle- Different phases and approaches of EDLC. Trends in embedded industry.

Suggested Reading:
EMBEDDED SYSTEMS LAB

Instruction: 3 Periods per week
Duration of University Examination: 3 Hours
University Examination: 50 Marks
Sessional: 25 Marks
Credits: 4

Course Objectives:

- To develop knowledge in programming techniques using embedded C language.
- To develop programming skill in understanding the interfacing techniques.
- To gain practical knowledge in scheduling and multitasking issues for Embedded Systems.

1. Programs using Embedded C
2. Experiments to interface and to access all internal and external peripherals such as
   a. Stepper motor interface.
   b. LCD interface.
   c. LED interface.
   d. Keyboard interface.
   e. Serial and DAC system interface
3. Experiments on RTOS Applications using VxWorks
4. Practical implementation concepts of RTOS
   - Scheduling
   - Multiple Processes
CS 482 UE  

With effect from the academic year 2014-2015

SEMINAR

Instruction 3 Periods per week
Sessional 25 Marks
Credits 2

Course Objectives:

- To train and provide hands-on experience in analysis, design, and programming of information systems by means of case studies and projects.
- To expose the students to industry practices and team work.
- To provide training in soft skills and also train them in presenting seminars and technical report writing.

Oral presentation is an important aspect of engineering education. The objective of the Seminar Course is to motivate a student to do a systematic and independent study of state-of-topics in a board area of his/her interest. Seminar topics may be chosen by the student with the suggestions from the family members. Students are to be exposed to following aspects of seminar presentation.

Students are to be exposed to following aspects of seminar presentations.

- Literature survey
- Organization of material to be presented
- Preparation of power point Presentation
- Technical writing

Each student is required to

1. Submit one page synopsis of the seminar talk for display on notice board of the department.
2. Give a 20 minutes presentation with the aid of a PC, followed by a 10 minutes discussion.
3. Submit the report on the seminar topic presented along with list of reference and slides used.

Seminar is to be scheduled from the third week to the last week of the semester and any change in schedule should be discouraged.

Sessional marks will be awarded jointly or independently by at least two faculty members. The award will be on the basis of the oral presentation made, written materials submitted, active participation of the student in the proceedings as well as involvement in the discussions.
CS 483 UE  

With effect from the academic year 2014-2015

PROJECT

Instruction
Duration of University Examination
University Examination
Sessional
Credits

Course Objectives:

- To train and provide hands-on experience in analysis, design, and programming of information systems by means of case studies and projects.
- To expose the students to industry practices and team work.
- To provide training in soft skills and also train them in presenting seminars and technical report writing.

‘Solving a real life problem’ should be the focus of U.G. projects. Faculty members should propose the project briefs (scope and references) well in advance which should be made available to the students at the department library. The project should be classified as hardware, software, modeling simulation. It should involve one or many elements of techniques such as analysis, design synthesis.

The department will appoint a project coordinator who will coordinate the following:
- Grouping of students (max 3 in a group)
- Allotment of project and project guides
- Project monitoring at regular intervals

All projects allotment is to be completed by the 2nd week of 4th year 1st semester so that students get sufficient time for completion of the project.

All projects will be monitored at least twice in a semester through student presentation. Sessional marks are to be based on the grades /Marks, awarded by a monitoring committee comprising of faculty members as well as by the supervisor.

Efforts should be made that some of the projects are carried out in industries with the help of industry coordinators. Problems can also be invited from the industries to be worked out through UG projects.

Common norms will be established for the final documentation of the project report by the respective departments.

*S/A/B/C/D/E

Note: Three periods of contact load will be assigned to each project guide.
NATURAL LANGUAGE PROCESSING
(ELECTIVE-III)

Instruction ........................................ 4 Periods per week
Duration of University Examination ........... 3 Hours
University Examination ......................... 75 Marks
Sessional .......................................... 25 marks
Credits ............................................ 4

Course Objectives:
- To provide basics of probability and information theory.
- To learn linguistic concepts and use of corpora
- To gain knowledge of statistical inference and word sense disambiguation
- To provide an understanding of HMM and its use in POS tagging
- To study the concepts of PCFG
- To learn about applications in information retrieval

UNIT I
Introduction
Elementary Probability Theory
Essential Information Theory

UNIT II
Linguistic Essentials, Corpus-Based Work

UNIT III
Collocations.
Word Sense Disambiguation: Methodological Preliminaries, Supervised and unsupervised learning, Pseudo words, Upper and lower bounds on performance, Supervised Disambiguation, Bayesian classification.

UNIT IV
Evaluation Measures, Markov Models: Hidden Markov Models, Use, General form of an HMM
Part-of-Speech Tagging

UNIT V
Probabilistic Context Free Grammars: Introduction, Clustering
Information Retrieval: Background, The Vector Space Model

Suggested Reading:
NEURAL NETWORKS
(ELECTIVE-III)

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 marks
Sessional 25 marks
Credits 4

Course Objectives:
- To provide an understanding of the emergence of neural networks.
- To study the learning process.
- To gain knowledge of single and multi layer perceptrons.
- To learn Hopfield model and self organizing maps

UNIT I
Expert Systems, Introduction to Neural Networks, Human brain, Models of a Neuron, Neural Networks viewed as directed graphs, feedback, Network Architecture, Knowledge representation, Artificial Intelligence and Neural Networks, Expert system Vs Neural networks.

UNIT II
Learning Process: Introduction, Error detection learning, Memory based learning, Hebbian Learning, Competitive learning, Boltzman Learning, Credit assignment problem, Learning with a teacher, Learning without a teacher.

UNIT III

UNIT IV

UNIT V
Hopfield Model, Self–organizing maps: Introduction, Kohonen’s model, Neural Network applications.

Suggested Reading:
MACHINE LEARNING
(ELECTIVE-III)

Instruction: 4 Periods per week
Duration of University Examination: 3 Hours
University Examination: 75 Marks
Sessional: 25 marks
Credits: 4

Course Objectives:
- To provide basics of machine learning
- To train the students in both supervised and unsupervised learning techniques
- To expose the students to dimensionality reduction

UNIT-I
Introduction: Learning, Types of Machine Learning.
Learning with Trees: Constructing Decision Trees, CART, Classification Example

UNIT-II
Linear Discriminants: The Perceptron, Linear Separability, Linear Regression
Multilayer Perceptron (MLP): Going Forwards, Backwards, MLP in practices, Deriving back propagation
Support Vector Machines: Optimal Separation, Kernels

UNIT-III
Bayesian learning: Introduction, Bayes theorem, Bayes Optimal Classifier, Naïve Bayes Classifier.

UNIT-IV
Evolutionary Learning: Genetic Algorithms, Genetic Operators, Genetic Programming
Ensemble learning: Boosting, Bagging
Dimensionality Reduction: Linear Discriminant Analysis, Principal Component Analysis

UNIT-V
Clustering: Introduction, Similarity and Distance Measures, Outliers, Hierarchical Methods, Partitional Algorithms, Clustering Large Databases, Clustering with Categorical Attributes, Comparison

Suggested Reading:
5. Rajjan Shinghal, Pattern Recognition, Oxford University Press, 2006
SOFTWARE QUALITY & TESTING
(ELECTIVE-III)

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 marks
Credits 4

Course Objectives:

- To introduce concepts of software quality
- To expose the students to the use of tools in quality and defect removal
- To inculcate the importance of testing using different approaches
- To expose the students to various processes and practices in software quality assurance

Course Outcomes:

Students will learn:

- How to write a useful test plan
- How to construct test cases
- How to evaluate completeness of testing
- Importance of software quality in software development phases
- Importance of different standards and metrics for quality assurance.

UNIT - I

UNIT - II
Integrating Quality Activities in the Project Life Cycle, Assuring the Quality of Software Maintenance Components, CASE Tools and their effect on Software Quality, Procedure and Work Instructions, Supporting Quality Devices, Configuration Management, Documentation Control, Project Progress Control.

UNIT - III

UNIT - IV

UNIT - V

Suggested Reading:
1. Daniel Galin, Software Quality Assurance – From Theory to Implementation, Pearson Education
5. Dr.K.V.K.K. Prasad, Software Testing Tool, Wiley Publishers
Web Resources:

4. java-source.net/open-source/testing-tools
5. www.junit.org
6. java-source.net/open-source/web-testing-tools
CS 456 UE

SOFT COMPUTING
(ELECTIVE-III)

Instruction
Duration of University Examination
University Examination
Sessional
Credits

4 Periods per week
3 Hours
75 Marks
25 marks
4

Course Objectives:
- To provide a thorough understanding of neural networks
- To study fuzzy logic and its applications
- To gain knowledge of genetic algorithms and their applications

UNIT-I
Introduction
ANN: An Introduction
Supervised Learning Network

UNIT-II
Unsupervised Learning Networks

UNIT-III
Introduction to Classical Sets and Fuzzy Sets
Classical Relations and Fuzzy Relations
Membership functions

UNIT-IV
Fuzzy Arithmetic and Fuzzy Measures
Fuzzy Rule Base and Approximate Reasoning
Fuzzy Decision making
Fuzzy Logic Control Systems

UNIT-V
Genetic Algorithm
Applications: Optimization of TSP, Internet Search Technique

Suggested Reading:
WEB SERVICE ARCHITECTURE
(ELECTIVE-III)

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 marks
Credits 4

Course Objectives:
- To provide basics of SOA and Web Services.
- To study the SOA and WS-* Extensions
- To study service orientation
- To gain knowledge of all the phases in building of an SOA.

UNIT I:
SOA and Web Services Fundamentals: Introducing So, The Evolution of SOA, Web services and primitive SOA.

UNIT II:

UNIT III:
SOA and Service-Orientation: Principles of Service-Orientation, Service Layers.

UNIT IV:
Building SOA (Planning And Analysis) : SOA Delivery Strategies, Services-Oriented Analysis (I: Introduction), Service-Oriented Analysis (II: Service Modeling).

UNIT V:

Suggested Readings
With effect from the academic year 2014-15

DATA MINING
(ELECTIVE-IV for CSE/BME/ECE/EE/CE/ME)

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 marks
Credits 4

Course Objectives:

- To understand the different steps in data mining
- To learn the different classification techniques
- To gain knowledge of association rule mining
- To understand the techniques of clustering

UNIT-I
Introduction: Challenges – Origins of Data Mining and Data Mining Tasks
Data: Types of Data – Data Quality – Data Preprocessing – Measures of Similarity and Dissimilarity – OLAP and Multidimensional Data Analysis

UNIT-II

UNIT-III
Classification: Nearest-Neighbor classifiers – Bayesian classifiers – Artificial Neural Networks – Support vector machine – Ensemble methods – Class imbalance problem – Multiclass problem

UNIT-IV

UNIT-V

Suggested Reading:
5. Galit S, Nitin RP, Peter C Bruce. *Data Mining for Business Intelligence*. Wiley India Edition. 2007
MEDICAL IMAGE PROCESSING
(ELECTIVE-III- CSE/ECE/EEE)

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 marks
Credits 4

UNIT-I

UNIT-II

UNIT-III
Image restoration: A model of the image degradation, noise models, restoration in the presence of noise-spatial filtering, periodic noise reduction by frequency domain filtering, linear & position-invariant degradations, estimating the degradation function, inverse filtering, wiener filtering, constrained least squares filtering, geometric mean filter, medical applications

UNIT-IV
Segmentation: Points detection, line detection, edge detection methods, Histogram based image segmentation, segmentation using split and merge method, region growing method, watershed method, k-means clustering method, self-similar fractal method, comparison of all the methods, medical applications

UNIT-V
Representation, description and recognition: Representation, boundary descriptors, regional descriptors, principal component analysis, relational descriptors. Recognition based on decision-theoretic and structural methods, medical applications

Suggested Reading:
CS 461 UE          With effect from the academic year 2014-2015

ADVANCED DATABASES
(ELECTIVE-IV)

Instruction                        4 periods per week
Duration of University Examination  3 hours
University Examination             75Marks
Sessional                          25 Marks
Credits                             4

Course Objectives:
- To understand the object oriented concepts in databases
- To optimize the query processing on databases
- To learn the advanced databases like parallel, distributed, spatial and temporal

UNIT-I
Object Based Databases: Overview, Complex Data Types, Structured Types and Inheritance in SQL, Table Inheritance, Array and Multiset Types in SQL, Object-Identity and Reference Types in SQL, Implementing O-R features, Persistent Programming Languages, Object-Relational Mapping, Object-Oriented versus Object-Relational.

UNIT-II

UNIT-III

UNIT-IV
Distributed Databases : Homogeneous and Heterogeneous Database, Distributed Data Storage, Distributed Transactions, Commit Protocols, Concurrency Control in Distributed Databases, Availability, Distributed Query Processing, Heterogeneous Distributed Databases, Cloud-Based Databases, Directory Systems.

UNIT-V
Spatial and Temporal Data and Mobility: Motivation, Time in Databases, Spatial and Geographic Data, Multimedia Databases, Mobility and Personal Databases.

Suggested Reading:
With effect from the academic year 2014-2015

**IMAGE PROCESSING**

(ELECTIVE-IV)

Instruction | 4 Periods per week
Duration of University Examination | 3 Hours
University Examination | 75 marks
Sessional | 25 marks
Credits | 4

**Course Objectives:**
- To introduce basic image formation & representation of digital images
- To teach various image transformation, enhancement and segmentation techniques
- To impart image encoding and image restoration techniques

**Course Outcomes:**
- The student can understand the fundamentals of Digital Image Processing (DIP) and also significance of DIP
- The student will be in a position to apply the various techniques in DIP like Image smoothing/sharpening, Image compression etc. whenever required.
- The course enables the student to do research in the field of DIP.
- To impart image encoding and image restoration techniques

**UNIT I**

Image Processing: Introduction, Examples, Fundamental steps, Components, Elements of visual perception, Light and Electromagnetic Spectrum, Image sensing and Acquisition, Image Sampling and Quantization, Basic relationships between pixels.

Intensity Transformations and Spatial Filtering: Background, Some basic intensity transformation functions, Histogram processing, Fundamentals of Spatial filtering, Smoothing spatial filters, Sharpening spatial filters, Combining Spatial Enhancement Methods.

**UNIT II**


Image Restoration: Noise Models, Restoration in the presence of noise only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering.

**UNIT III**


**UNIT IV**


**UNIT V**

Object Recognition: Patterns and Pattern Classes, Recognition based on Decision-theoretic Methods, Structural Methods.

**Suggested Reading:**

HUMAN COMPUTER INTERACTION  
(ELECTIVE IV)

Instruction 4 Periods per week  
Duration of University Examination 3 Hours  
University Examination 75 Marks  
Sessionals 25 Marks  
Credits 4

Course Objectives:
- To provide basics of HCI.
- To learn the design of various user interfaces.
- To learn the role of feedback and internationalization
- To provide basics of graphics
- To understand Interaction design, prototyping, testing and evaluation

UNIT-I
Importance of the user interface-definition, importance of good design, brief history. Characteristics of graphical & web user interfaces-GUI, WUI, principles of interface design. User interface design process. Knowing the client-understanding how people interact, important human characteristics, human considerations. Principals of good screen design-human considerations in screen design. Develop System menus & Navigation schemes-structures, functions, content, formatting, phrasing, choices and graphical menus.

UNIT-II
Select the proper Kinds of Windows-characteristics, components, presentation styles, types, management, organizing functions, operations. Device based controls-characteristics, selection. Screen based controls-operable, text entry/read-only, selection, combination entry/selection, and other operable controls, presentation controls, selection of proper controls. Write clear Text & Messages.

UNIT-III

UNIT-IV

UNIT-V

Suggested Reading:
CS 464 UE

With effect from the academic year 2014-2015

CLOUD COMPUTING
(ELECTIVE-IV)

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 marks
Sessional 25 marks
Credits 4

Course Objectives:

- To provide introduction to need of current computing scenario
- To learn about mechanisms that enable cloud computing
- To study the architecture and standards of cloud computing
- To provide an introduction to programming and security features currently available.

Course Outcomes:

- Awareness about cloud enabling technologies such as virtualization and SOA.
- Ability to write programs in MPI and Map Reduce
- Ability to understand the security requirements of cloud
- Awareness of standards in cloud computing.

UNIT-I

UNIT-II
Virtualization: Introduction to virtualization, Virtual Machines and Virtualization of Clusters and Data Centers, Levels of Virtualization, Virtualization Structures / tools and Mechanisms, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resource Management, Virtualization Data-Center Automation.

UNIT-III

UNIT-IV

UNIT-V
Cloud Programming and Software Environments: Features of Cloud and Grid Platforms, parallel and distributed Programming Paradigms, Overview of Hadoop, MapReduce and MPI, Programming Support of
Google App Engine, Programming on Amazon AWs and Microsoft Azure, Emerging Cloud Software Environments.


**Suggested Reading:**

**Web resources:**
2. [http://code.google.com/appsengine](http://code.google.com/appsengine)
BM 454 UE

BIOELECTRICITY
(Elective-III for CSE/ECE/EEE/ME)

Instruction: 4 Periods per week
Duration of University Examination: 3 Hours
University Examination 75 Marks
Sessional: 25 Marks
Credits 4

Course Objectives:
- Electrical properties of the cell membrane
- Action potentials
- Extra cellular waveforms
- Cardiac electrophysiology
- Function stimulation (FES)

UNIT I

UNIT II

UNIT III

UNIT IV
Electro-physiology of Heart: Properties of Cardiac muscle, Heart vector, electrical activity of the heart. Standard leads, lead vectors. Recording of the ECG from the surface. Dipole theory of the heart. Relationship between the different ECG leads.

UNIT V
Application of Bio-Electric Phenomena:
Functional Neuro-muscular stimulation, impedance plethysmography, measurement of resistance of isotropic & anisotropic tissue and Electro encephalography.

Suggested Reading:
CE 461UE

With effect from the academic year 2014-2015

DISASTER MANAGEMENT
(Elective –IV for BME/CSE/CE/ECE/EE/ME)

Course Objectives:
- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction.
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR).
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity.

UNIT-I
Introduction to Disasters: Concepts and definitions of Disaster, Hazard, Vulnerability, Resilience, Risks. Natural and Manmade disasters, impact of drought, review of past disasters and drought in India, its classification and characteristics. Classification of drought, causes, Impacts (including social, economic, political, environmental, health, psychosocial, etc.

UNIT-II
Disaster: Classifications, Causes, Impacts including social, economic, political, environmental, health, psychosocial etc.

Differential impacts - in terms of caste, class, gender, age, location, disability Global trends in disasters, urban disasters, pandemics, complex emergencies, climate change.

Cyclones and Floods: Tropical cyclones & Local storms, Destruction by tropical cyclones and local storms, Cumulative atmospheric hazards/disasters, Cold waves, Heat waves, Causes of floods, Rood hazards in India.

UNIT-III
Approaches to Disaster Risk Reduction: Disaster cycle - its analysis, Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural sources, roles and responsibilities of community, Panchayati Raj Institutions/Urban Local Bodies (PRis/ULBs), states, Centre, and other stake-holders.

UNIT-IV
Inter-relationship between Disasters and Development: Factors affecting Vulnerabilities, differential impacts, impact of development projects such as dams, embankments, changes in Land-use etc. Climate Change Adaptation, Relevance of indigenous knowledge, appropriate technology and local resources.
UNIT-V

Disaster Risk Management in India: Hazard and Vulnerability profile of India Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management Institutional arrangements (Mitigation, Response and Preparedness, OM Act and Policy, other related policies, plans, programmes and legislation)

Field Work, Case Studies: The field work is meant for students to understand vulnerabilities and to work on reducing disaster risks and to build a culture of safety. Projects must be conceived creatively based on the geographic location and hazard profile of the region where the college is located.

Suggested Reading:
With effect from the academic year 2014-2015

**ROBOTICS**
(Elective –IV)

Instructions 4 periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessional 25 Marks
Credits 4

**UNIT-I**

**UNIT-II**

**UNIT-III**
Jacobian for direct and inverse kinematics. Trajectory planning for Robots. Trajectory control based on incremental inverse kinematics of kinematic equations, Static force analysis, stiffness.

**UNIT-IV**
Newton - Euler formulation of dynamic equation. Lagrangian formulation. Inertia tensor. Control schemes, individual joint control and disadvantages. Control through computed torques.

**UNIT-V**

**Suggested Reading**
INTELLECTUAL PROPERTY RIGHTS
(Elective – IV for BME/CSE/CE/ECE/EE/ME)

Instruction
4 Periods per week
Duration of University Examination
3 Hours
University Examination
75 Marks
Sessional
25 Marks
Credits
4

UNIT I
The salient features of the TRIPS Agreement. The two international institution – i) The World intellectual property organization ii) The world trade organization.

UNIT II
History of the patent system, Patents in all fields of technology.
  i. Patents on genetic resources patents on chemicals, design, patents based on software, business methods, internet patterns, etc.
  ii. Exceptions to exclusive rights conferred to a patent holder
  iii. Grounds for revocation of a patent.
  iv. Remedies for infringement of patent.

UNIT III

UNIT IV
Nature and scope of protection of design rights. Protection of layout designs ( topographies ) of Integrated circuits, Protection of undisclosed information, Protection of trade marks, domain names and geographical indications.

UNIT V
Practical aspects – drafting of a patent. Some exercises on the preliminary rules of preparing an application seeking a patent.

Suggested Reading:
SERVICE COURSES OFFERED TO OTHER DEPARTMENTS

CS 459 UE

With effect from the academic year 2014-2015

INFORMATION SECURITY
(ELECTIVE III for BME/CE/ECE/EE/ME)

Instruction 4 Periods per week
Duration of University Examination 3 Hours
University Examination 75 Marks
Sessionals 25 Marks

Course Objectives:
- To learn legal and technical issues in building secure information systems
- To provide an understanding of network security
- To expose the students to security standards and practices

UNIT-I

UNIT-II

UNIT-III

UNIT-IV
Cryptography: The basic elements of cryptography: symmetric (Symmetric Key-DES, IDEA, and AES), and public key cryptography (Public Key Encryptions-RSA).

UNIT-V
Message digest (MD-5, SHA), and digital signatures.
SSL and SET: SSL and SET protocols, Internet transactions using both SSL and SET.

Suggested Reading: