

Semester V

Course Number	Course Title	Credit Value	#Lec.	#Tut.	#Lab.	Weightage for EoTE/IA	EoTM
CC501	Soft Computing	4	3	2	-	0.7/0.3	Univ.
CC502	Finite Automata and Grammars	4	3	2	-	0.7/0.3	Univ.
CC503	Software Project Management	4	3	2	-	0.7/0.3	Univ.
EC03	Elective Course III	4	4	-	-	Continuous Assessment	Institute
EC04	Elective Course IV	4	4	-	-	Continuous Assessment	Institute
PR04	Project IV	2	-	-	4	0.7/0.3	Univ.
EL03	LAB Elective III	3	1	-	4	Continuous Assessment	Institute
GC05	General Course V	2	-	-	4	Continuous Assessment	Institute
Total		27	18	06	12		

SEMESTER VI

Course Number	Course Title	Credit Value	#Lec.	#Tut.	#Lab.	Weightage for EoTE/IA	EoTM
PR601	Internship Project	10	-	-	-	0.7/0.3	Univ.

There is no theory examination conducted by university for courses CC106, CC107, CC206, CC306, and CC406.

The four electives, the three Lab electives, and General Courses are finalized by the respective institutes.

CC501 SOFT COMPUTING

(Credit 4 , L-3, T-2)

objectives

To introduce the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience

- To become familiar with neural networks that can learn from available examples and generalize to form appropriate rules for inferencing systems
- To provide the mathematical background for carrying out the optimization associated with neural network learning
- To familiarize with genetic algorithms and other random search procedures useful while seeking global optimum in self-learning situations
- To introduce case studies utilizing the above and illustrate the intelligent behavior of programs based on soft computing

Learning Outcomes: To introduce the techniques of soft computing and adaptive neuro-fuzzy inferencing systems which differ from conventional AI and computing in terms of its tolerance to imprecision and uncertainty.

Text Books:

1. S. Rajsekaran & G.A. Vijayalakshmi Pai, “Neural Networks,Fuzzy Logic and Genetic Algorithm:Synthesis and Applications” Prentice Hall of India.
2. N.P.Padhy,”Artificial Intelligence and Intelligent Systems” Oxford University Press.

Reference Books:

3. Siman Haykin,”Neural Netowrks”Prentice Hall of India
4. Timothy J. Ross, “Fuzzy Logic with Engineering Applications” Wiley India.
5. Kumar Satish, “Neural Networks” Tata Mc Graw Hill
6. J.S.R.Jang, C.T.Sun and E.Mizutani, “Neuro-Fuzzy and Soft Computing”, PHI, 2004, Pearson Education 2004.
7. Timothy J.Ross, “Fuzzy Logic with Engineering Applications”, McGraw-Hill, 1997.
- 8.. Davis E.Goldberg, “Genetic Algorithms: Search, Optimization and Machine Learning”, Addison Wesley, N.Y., 1989.
9. S. Rajasekaran and G.A.V.Pai, “Neural Networks, Fuzzy Logic and Genetic Algorithms”, PHI, 2003.
- 10.. R.Eberhart, P.Simpson and R.Dobbins, “Computational Intelligence - PC Tools”, AP Professional, Boston, 1996.

Syllabus:

Unit-I - Neural Networks-1(Introduction & Architecture)

Neuron, Nerve structure and synapse, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks. Various learning techniques; perception and convergence rule, Auto-associative and hetro-associative memory. (10)

Unit-II - Neural Networks-II (Back propagation networks)

Architecture: perception model, solution, single layer artificial neural network, multilayer perception model; back propagation learning methods, effect of learning rule co-efficient ;back propagation algorithm, factors affecting back propagation training, applications. (10)

Unit-III - Fuzzy Logic

Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion. Membership functions, interference in fuzzy logic, fuzzy if-then rules, Fuzzy implications and Fuzzy algorithms, Fuzzyfications & Defuzzificataions, Fuzzy Controller, Industrial applications. (10)

Unit-IV - Rough Sets

Introduction, Indisnibility Relations, Decernibility Matrix, Lower Approximation, Upper Approximation, Boundary, Accuracy of Approximation, Rule Induction, Case Study

Unit-V - Genetic Algorithm (GA)

Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators, Mutation, Generational Cycle, applications. (9)

CC502: Finite Automata and Grammars (4 Credits, 3L + 2T, Level 3)

Objectives: The course introduces some fundamental concepts in automata theory and formal languages including grammar, finite automaton, regular expression, formal language, pushdown automaton, and Turing machine. Not only do they form basic models of computation, they are also the foundation of many branches of computer science, e.g. compilers, software engineering, concurrent systems, etc. The properties of these models will be studied and various rigorous techniques for analyzing and comparing them will be discussed, by using both formalism and examples. To introduce students the basic concepts in theoretical computer science, and the formal relationships among machines, languages and grammars.

Learning Outcomes: Upon successful completion of this course, students will be able to:

Sr.No. Learning Outcomes

- | | |
|----|---|
| | Knowledge |
| 1. | Explain the basic concepts of deterministic and non-deterministic finite automata, regular language, context-free language, Turing machines, Church's thesis, halting problem, computability and complexity |
| 2. | Describe the formal relationships among machines, languages and grammars |
| | Professional Skill |
| 3. | Perceive the power and limitation of a computer |
| 4. | Solve the problems using formal language |
| | Attitude |
| 5. | Develop a view on the importance of computational theory |

Textbook: J. Hopcroft, R. Motwani, and J. Ullman. Introduction to Automata Theory, Languages, and Computation, 3rd edition, 2006, Addison-Wesley.

Reference Books:

- (1) P. Linz. Introduction to Formal Languages and Automata, 5th edition, 2011 (or 4th or 3rd edition), Jones and Barlett;
- (2) Michael Sipser, Introduction to the Theory of Computation, First Edition, 1997, PWS Publishing Company.

Syllabus:

UNIT-1:

Basic concepts of finite automata and languages, deterministic finite automaton, nondeterminism, equivalence between DFA and NFA, regular expression and equivalence to FA

UNIT-2:

Algebraic laws for regular expressions pumping lemma and applications, properties of regular languages, minimization of automata and applications.

UNIT-3:

Context-free grammars and languages, parsing (or derivation) and parse trees, ambiguity of grammar and language, Chomsky normal form of CFG, pumping lemma, properties of CFLs

UNIT-4:

Pushdown automaton (PDA), various forms of PDA, equivalence between CFG and PDA, equivalence between CFG and PDA,

UNIT-5:

Turing machines and (un)decidability

CC503: Software Project Management

(4 Credits, 3L + 2T)

Objectives: To provide basic project management skills with a strong emphasis on issues and problems associated with delivering successful IT projects and how the software is tested using various techniques to improve the quality of software. This course is designed to provide an understanding of the particular issues encountered in handling IT projects and to offer students methods, techniques and 'hands-on' experience in dealing with them.

Learning Outcomes: At the end of this course, student should be able to

- Understand and practice the process of project management and its application in delivering successful IT projects;
- Evaluate a project to develop the scope of work, provide accurate cost estimates and to plan the various activities;
- Identify the resources required for a project and to produce a work plan and resource schedule;
- Understand diff. types of testing and how it is conducted.
- Practice the automated tools available for testing

Text Book(s):

A) Information Technology Project Management” Kathy schwalbe, International student edition, THOMSON course Technology, 2003

B) “Software project management “Bob Hughes and Mike Cottrell, Third edition, Tata McGraw-

C) “Microsoft office Project 2003 Bible”, Elaine Marmel, Wiley publishing Inc.

Software Requirement: Microsoft project 2003

UNIT1:

Introduction to project management: (5L)

Project, project management, Importance, characteristics of project how software projects are diff. than other projects, Problems with software projects, Phases: Initiation phase, planning phase, execution phase, monitoring and controlling phase, and closing phase. All parties involved in project, Role of Project Manager, Project management framework, Software tool for project management

UNIT2:

Project planning: (6L)

Integration management: What is integration management, plan development and execution, What is scope management, methods for selecting project, scope statement, Work Breakdown Structure, main steps in Project planning: identify project scope and objective, identify project infrastructure, analyze project characteristics, identify project products and activities, estimate effort for each activity, identify risk activity, allocate resources, review plan, execute plan. Use of software (Microsoft Project) to assist in project planning activities

UNIT3:

Project scheduling: (6L)

Time management: importance of Project schedules, schedules and activities, sequencing and scheduling activities, Network Planning models, duration estimation and schedule development, Critical path analysis, PERT, Use of software(Microsoft project) to assist in project scheduling

UNIT4:**Project cost management: (6L)**

Importance and principles of project cost management, Resource planning, Attributes to be considered in cost estimation, factors affecting the cost, various costs involved in it.

Traditional method: Estimation by analogy, Expert judgment, Parkinson, price to win, top down, bottom up. COCOMO Model, Function point analysis, Function point analysis, Cost control, Use of software(Microsoft project) to assist in cost management

UNIT5:**Project quality management: (5L)**

Quality of information technology project, Stages of software quality management, PMBOK, Quality standards, Tools and techniques for quality control.

UNIT6:**Project risk management: (5L)**

The importance, Top risk in projects, Common sources of risk in IT projects, elements in risk mgt., Risk identification, Risk quantification, Risk response development and control, using software to assist in project risk management

UNIT7:**Fundamentals of Testing: (12L)**

Fundamentals of Software quality, quality views, People challenges in testing, Principles of Verification and validation, Techniques of verification, V model, Testing process, Unit testing, Integration testing, System Testing and Acceptance testing, Testing new product versions, Testing planning: test plan, test plan template, risk analysis, Test Design, good test case, test case template, test case mistakes, Testing Execution: objectives, execution considerations, test execution activities, executing test, Defect management: what is defect, defect life cycle, defect management process, Test Metrics: purpose, characteristics of good metrics, metrics, Functional testing tools, Unit testing tools, Test management tools.

**(EC01) Elective Group: Business Intelligence
(EC0103): Business Intelligence Tools**

- Business Intelligence using MS-Excel
 - Data Cleaning
 - Editing A Workbook
 - Data Cleaning Using Text Functions
 - Using Validation To Keep Data Clean
 - Working with Multidimensional Data
 - Pivot Tables
 - Pivot Charts
 - Optimization Modeling with Solver
 - Understanding Optimization Modeling
 - Setting Up a Solver Worksheet
 - Solving an Optimization Modeling Problem
 - Reviewing the Solver Reports
 - Working With the Solver Options
 - Setting a Limit on Solver
 - Understanding the Solver Error Messages
- Data Warehousing / ETL (Extract, Transform and Load) Tools
 - Informatica
 - Oracle warehouse Builder
 - Microsoft SQL Integration
 - Pentaho
 - Talend Open Studio 3.0
- Data Mining Tools
 - R
 - Tanagra
 - Weka
 - YALE
 - KNIME
 - Orange
 - GGobi

(EC01): Elective Group: Business Intelligence
(EC0104): Applications of Business Intelligence

- CRM Domain
- Banking Domain
- Health Care Domain
- Mobile Industry Domain
- Creation of a New Product
- Providing Personalized Services
- Improving Financial Inclusions

References:

- InformationWeek, Vol. 1, No. 04, February 2012
- CSI Communications, Vol. 35, Issue No. 3, June 2011
- Businessworld, February 27, 2012
- Handout for the Teachers – Data Warehousing and Data Mining, BVU's IMED, 2007-2008

**(EC02) Elective Group: Cloud Computing
(EC0203): Cloud Solutions**

- Coriolis Technologies Private Limited
 - Virtualization of Computer Laboratories
 - Colama Powered Virtual Computer Laboratory
- vmWare
 - The vmWare Approach to the Cloud
 - vmWare vSphere 4
 - Server Consolidation and Containment
- Microsoft
 - Exploring Platform as a Service
 - Putting Platform as a Service Pedestal
 - Integrated Lifecycle Platform
 - Anchored Lifecycle Platform as a Service
 - Enabling Technologies as a Platform
- Google
 - Google App Engine
- Amazon
 - Infrastructure as a Service
 - Tracing IaaS to ISP
 - Amazon EC2
- Other Solutions
 - Infrastructure as a Service
 - Other IaaS Companies
 - IaaS-Enabling Technology
 - Issues related to Trust in Cloud
 - Infrastructure as a Service in a Business Organization

(EC02) Elective Group: Cloud Computing
(EC0204): Microsoft Azure Platform

- Introduction to Azure Platform
 - Windows Azure
 - The Service Model
 - The Virtual Machine
 - Windows Azure Storage
 - Programming Windows Azure
 - Visual Studio Templates
 - Roles Communication
 - Coding Blobs
 - Coding Tables
 - Coding Queues
 - Sending Messages between Roles
 - Coding Drives
 - The Configuration Model
 - Azure Diagnostics
 - Diagnostics Goals
 - Integration with System Diagnostics
 - Diagnostics Persistence
 - Diagnostics API
 - Management API
 - SQL Azure
 - Introduction to SQL Azure
 - Manage Database using SQL Management studio 2010 R2
 - Migrating a Database to the Cloud
 - Considerations for Data Hosting in the Cloud
 - Synchronizing with the Cloud
 - Windows Azure platform AppFabric
 - Connectivity Challenges
 - Relay Bindings.
 - Message Buffers
 - Windows Azure Platform AppFabric Portal
 - Security in Windows Azure
 - Security In the cloud
 - Role base Identity
 - Claim based Identity
 - Shared Access signature
 - Configuration security
 - Scalability and Elasticity
 - Introduction to Scalability
 - Scaling Azure Storage
 - Asynchronous Workload
 - Map Reduce
- Introduction to Elasticity & Elasticity Implementation

(EC14) Elective Group: Information Systems
(EC1403): Recommender System

Unit – I

Introduction to Basic Concepts:

Collaborative Recommendation: User Based Nearest Neighbor recommendation, Item Based Nearest Neighbor recommendation, model based and pre-processing based approaches.

Recent practical approaches and systems.

Content based Recommendation: content representation and content similarity, similarity based retrieval, other text classification methods,

Knowledge Based Recommendation: Knowledge representation and reasoning, interacting with constraint based recommenders, interacting with case based recommenders,

Unit II

Hybrid recommendation approaches: Opportunities for hybridization, Monolithic hybridization design, parallelized hybridization design, pipelined hybridization design,

Explanations in recommender systems: Explanations in constraint-based recommenders, explanation in case based recommenders, explanation in collaborative filtering recommenders.

Unit – III

Evaluating recommender systems : general properties of Evaluation research, popular evaluation designs, evaluation on historical datasets, alternate evaluation design

Unit – IV

Recent developments: Attacks on collaborative recommender systems, Online consumer decision making

Unit V

Recommender systems and the next-generation web, Recommendations in ubiquitous environments. Case studies.

Reference books

1. “Recommender systems An Introduction” by Dietmar Jannach, Markus Zanker, Alexzander Felfering, Gerhard friedrich by Cambridge university press 2011
2. Recommender Systems Handbook [Book] by Francesco Ricci, Lior Rokach, Paul B. Kantor in Books .

(EC14) Elective Group: Information Systems
(EC1404): Knowledge Management

Objective of the Course:

The objective of the course is to provide the basic skills of managing knowledge in organizations. Knowledge is an asset for retaining the competitive advantage of the organization. This course develops the capabilities of towards managing students to manage knowledge in organizations.

UNIT - I

Introduction:

- (a) Definition,
- (b) Scope and Significance of Knowledge Management
- (c) Difficulties of Knowledge Management
- (d) Techniques of KM –
- (e) Implementation of KM
- (f) Organizational knowledge,
- (g) Characteristics and Components of Organizational Knowledge.

UNIT - II

Drivers of knowledge Management:

- (a) Pillars of knowledge Management
- (b) KM framework
- (c) Supply Chain of KM
- (d) Formulation of KM strategy.

UNIT - III

Technology and KM:

- (a) Technology components of KM – IT & KM
- (b) Ecommerce and KM
- (c) TQM and KM
- (d) Bench marking and KM.

UNIT - IV

Implementation of KM:

- (a) Discussion on Roadblocks to success
- (b) Implementing a KM programme
- (c) Critical Success Factors in KM
- (d) Implementation.

UNIT - V

KM and Organizational Restructuring:

- (a) The Mystique of Learning
- (b) Organization:- Outcomes of learning
- (c) Learning and Change – Innovation,
- (d) continuous Improvements

(e) Corporate Transformation.

Reference Books:

1. Madhukar Slukla, “Competing Through Knowledge – Building a learning Organisation”, Responce Books, New Delhi.
2. Tiwana, The Knowledge Management Toolkit: Practical Techniques for building a Knowledge Management Systmes, 2/e, Pearson Edu.
3. Honey Cutt : “Knowledge Management Strategies”, PHI, New Delhi.
4. A wad, KM, Pearson Edn, 2007.
5. Barnes, Knowledge Management Systems, 1/e, Thomson 2006.
6. Ikudiro Nonka & Hirotaka Takeuchi, “ The Knowledge – Creating Company”, Oxford University Press, London.

**(EC11) Elective Group: Net-Centric Computing
(EC1103): AJAX Programming**

Introduction to AJAX	<ul style="list-style-type: none"> ▪ Introduction to Web Architecture ▪ Traditional Web Communication Processes and Technologies ▪ Introduction to AJAX
Interacting with the Web Server using XMLHttpRequest Object	<ul style="list-style-type: none"> ▪ Introduction to Interaction with Web Server ▪ Create an XMLHttpRequest Object ▪ Interact with the Web Server
Working with PHP and AJAX	<ul style="list-style-type: none"> ▪ Introduction to PHP ▪ Process Client Requests ▪ Accessing Files Using PHP
Manipulating XML Data	<ul style="list-style-type: none"> ▪ Basics of XML ▪ Create an XML Document Using DOM ▪ Retrieve Data from XML
Working with XSLT and AJAX	<ul style="list-style-type: none"> ▪ Basics of XSLT ▪ Transform Responses Using XSLT
Working with JSON	<ul style="list-style-type: none"> ▪ Introduction to JSON Format ▪ Create Data in JSON Format ▪ Implement JSON on the Server Side
Using Frameworks in AJAX	<ul style="list-style-type: none"> ▪ Understand AJAX Frameworks ▪ Use Prototype and Script.aculo.us ▪ Use jQuery
Applying Basic AJAX Techniques	<ul style="list-style-type: none"> ▪ Download Images Using AJAX ▪ Auto-Populate Select Boxes
Implementing Security and Accessibility in AJAX Applications	<ul style="list-style-type: none"> ▪ Create Secure AJAX Applications ▪ Create Accessible Rich Internet Applications

**(EC11) Elective Group: Net-Centric Computing
(EC1104): Web Services**

XML Technology Family	<ul style="list-style-type: none"> ▪ Introduction to XML ▪ Advantages of XML ▪ EDI ▪ Databases for Web ▪ XML Based Standards ▪ Structuring with Schemas: DTD, XMLSchemas ▪ XML Processing: DOM, SAX ▪ Presentation Technologies: XSL, XFORMS, XHTML ▪ Transformation: XSLT, XLINK, XPATH, XQuery
Architecting Web Services	<ul style="list-style-type: none"> ▪ Business Motivations for Web Services ▪ Technical Motivations for Web Services ▪ Limitations of CORBA and DCOM ▪ Service Oriented Architecture (SOA) ▪ Architecting Web Services ▪ Implementation View: Web Services Technology Stack ▪ Logical view: Composition of Web Services ▪ Deployment View: From Application Server to Peer to Peer ▪ Process View: Web Service Lifecycle
Building Blocks of Web Services	<ul style="list-style-type: none"> ▪ Transport Protocols for Web Services ▪ Messaging with Web Services ▪ Protocols for Web Services ▪ SOAP ▪ WSDL ▪ UDDI
Creation of Web Services	<ul style="list-style-type: none"> ▪ Web Services using .Net ▪ Web Services using J2EE
Implementing XML in e-Business	<ul style="list-style-type: none"> ▪ B2B Applications ▪ B2C Applications ▪ Different types of B2B Interactions ▪ Components of e-Business XML Systems ▪ ebXML ▪ RosettaNet ▪ Applied XML in Vertical Industry: Web Services for Mobile Devices
XML Content Management and Security	<ul style="list-style-type: none"> ▪ Semantic Web ▪ Role of Metadata in Web Content ▪ Resource Description Framework: RDF Schema ▪ Architecture of Semantic Web ▪ Content Management Workflow: XLANG, WSFL ▪ Securing Web Services