INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES
DEVI AHILYA UNIVERSITY, INDORE

MCA (6 Years)

IX SEMESTER

JULY-DECEMBER 2012

Sub. Code	Sub. Name	Credits
IC-901	Theory of Computation	4
IC-902	Object Oriented Analysis & Design	4
IC-903	Software testing & Quality & Assurance	4
IC-904	Managerial Economics	4
IC-905	Project Viva	6
IC-906	Comprehensive Viva	4

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
MCA (6 Years) IX SEMESTER
IC-901: Theory of Computation

Aim of Course: To make students know about the basic concepts of Computation and learn to work with mathematical abstractions of computers called a model of computation.

Objectives:

The course is designed to make students:

- Understand regular expressions, which are used to specify string patterns in many contexts, from office productivity software to programming languages.
- Study finite automata, another formalism mathematically equivalent to regular expressions, Finite automata are used in circuit design and in some kinds of problem-solving.
- Learn Context-free grammars that used to specify programming language syntax.
- Understand computability theory and decision problems.

Course Contents:

UNIT I

Formal languages: Introduction to Computation & Languages: Natural Languages, Computer Programming Langauges and Formal Languages. Language Concepts: alphabet, strings, properties of Strings, kleene closure. Properties of Formal Languages.

Grammar: Chomsky Hierarchy of grammar, languages represented by type 0,1,2,3 grammars.

UNIT II

Regular languages and finite automata-recursive definition, regular expression and corresponding languages, Pumping Lemma for non-regular languages. Finite automata, kleene's theorem, non-deterministic finite automata. Equivalence of FAs and NFAs. Minimal state finite automata, Mealy machine and Moore machine, Regular grammar and their equivalence to finite automata.

UNIT III

Context free languages Parsing, ambiguity, parse trees, parsing methods: Bottom up and top down, Simplification of grammar. Normal form of CFGs: Chomsky Normal Form and Greibach Normal Form, CKY algorithm, Closure Properties of CFLs

UNIT IV

Push Down Automata: definition, examples, deterministic PDA, non-deterministic PDA, Parsing and PDAs, PDA and Context Free Languages

UNIT V

Turing machines – models of computations, definition, Representation of Turing Machines, TMs as language acceptors, Techniques for TM construction, Church - Turing thesis, Universal Turing machines, Variants of Turing machine.

Unsolvable Decision Problems- Decidability, Decidable Languages, Undecidable Languages Halting Problem of Turing Machine.

Reference Books:

1. Hopcraft and Ullman, Introduction to Automata Theory, Languages and Computation, Narosa Publishing House.
2. K.L.P. Mishra, N. Chandrasekaran, Theory of Computer Science (Automata,

Languages and Computation), Prentice Hall of India.
3.   Peter Linz, An Introduction to Formal Languages and Automata, Narosa Publishing House.
4.   Cohen Daniel I.A., Introdution to Computer Theory, John Weley and Sons , inc New York
5.   Martyn John C, Introduction to Languages and Theory of Computation, McGraw Hill, N.Y. (Internal Edition McGraw Hill)
6.   Mandrioli Dino, Ghezzio Carlo, Theoretical Fundamentals of Computer Science, John Weley and Sons, Inc , New York.

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IC-902: Object Oriented Analysis & Design

Aim of Course: To enable the students to have a thorough understanding of the activities in development projects using Object Oriented Analysis and Design techniques.

Objectives:

The course is designed to make students:

- Develop a working understanding of formal object-oriented analysis and design processes.
- Develop the skills to determine which processes and OOAD techniques should be applied to a given project.
- Develop an understanding of the application of OOAD practices from a software project management perspective

Course Contents:

UNIT I

Software engineering best practices. UML: its road map.

UNIT II

Introduction to the Rational Unified process: Workflow and Lifecycle.

Introduction to Object Orientations, using UML modeling mechanisms.

UNIT III

Requirements Management: key concepts, problem statement,

Glossary, use case model, supplementary specification.

UNIT IV

Analysis and design overview: architectural analysis-layers.

Use case Analysis- Responsibilities, attributes and association.

Architectural design.

UNIT V

Describe concurrency.

Describe distribution, Use case design, Subsystem Design, Class design.

Reference Books:

1. P.Kruchen, The Rational Unified Process: An Introduction, Pearson Education Asia, 2000.
2. G. Booch. I. Jacobson, J. Raumbaugh, The Unified Modeling Language- User's Guide, Addison Wesley, 1999.
3. W.Boggs and M. Boggs, Mastering UML with Rational Rose, BPB Publications, 1999.
4. G. Booch, Object oriented Analysis and Design with Applications, Addison Wesley, 1994.

INTERNATIONAL INSTITUTE OF PROFESSIONAL STUDIES, DAVV, INDORE
MCA (6 Years) IX SEMESTER
IC-903: Software Testing & Quality Assurance

Aim of Course: To enable the students understand software testing process, planning, strategy, criteria, and testing methods, as well as software quality assurance concepts & control process.

Objectives:

The course is designed to make students:

- To study software testing and quality control concepts, principles, methodologies, management strategies and techniques.
- Understand test models, test design techniques (black box and white-box testing techniques), testing strategies and advanced testing techniques.

Course Contents:

UNIT I

SOFTWARE TESTING PRINCIPLES: Need for testing - Psychology of testing - Testing economics – Various software development Life cycles (SDLC) – Principles of testing

UNIT II

WHITE BOX TESTING: White box testing techniques - Statement coverage - Branch Coverage - Condition coverage - Decision/Condition coverage - Multiple condition coverage - Dataflow coverage - Mutation testing - Automated code coverage analysis

UNIT III

Black box testing techniques - Boundary value analysis - Robustness testing - Equivalence partitioning -Syntax testing - Finite state testing - Levels of testing – Unit testing- Integration Testing

UNIT IV

TESTING STRETAGIES: System testing - Functional testing-non-Functional testing-acceptance testing- performance testing –Factors   and Methodology for Performance testing, Regression testing-Methodology for Regression testing.

UNIT V

ADVANCE SOFTWARE TESTING METHOD (OBJECT ORIENTED TESTING): Syntax testing - Finite state testing - Levels of testing - Unit, Integration and System Testing. Challenges - Differences from testing non-OO Software - Class testing strategies - State-based Testing

Reference Books:

1. Srinivasan Desikan & Gopalswamy Ramesh "Software testing Principles and Practices", Pearson education, 2006
2. R. Patton; Software Testing; Techmedia (SAMS) 2000
3. Glenford J.Myers, " The Art of Software Testing ", John Wiley & Sons
4. Boris Beizer, " Software Testing Techniques (2nd Edition) ", Van Nostrand Reinhold, 1990
5. Robert V.Binder, " Testing Object-Oriented Systems: Models Patterns and Tools ", Addison Wesley, 2000
6. Boris Beizer, Black-Box Testing: " Techniques for Functional Testing of Software and Systems ", John Wiley & Sons
7. William E.Perry, " Effective Methods for Software Testing (2nd Edition) ", John Wiley & Sons, 2000

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IC-904: Managerial Economics

Aim of Course: To provide students with a basic understanding of the economic theory that will have application in their professional life**.**

Objectives:

The course is designed to make students:

- Understanding economic concepts that have direct managerial applications.
- Sharpen analytical skills through integrating knowledge of the economic theory with decision making techniques.
- Students will learn to use economic models to isolate the relevant elements of a managerial problem, identify their relationships, and formulate them into a managerial model to which decision making tools can be applied.
- Learn a variety of techniques that will allow them to solve business problems relating to costs, prices, revenues, profits, and competitive strategies.

Course Contents:

UNIT I

Managerial Economics and its role in management, Economic Concepts such as Utility, Marginal Utility, Total Utility, Equimarginal Utility

UNIT II

Laws of Demand and Supply, Elasticity of Demand and Supply, Substitutions, Revenue and Cost, Laws of Returns, Return to Scale. Different market Structure: Perfect Competition, Price Output determination, Industry equilibrium, and Individual firm equilibrium.

UNIT III

Monopoly price determination, Discriminating monopoly, Monopolistic competition Meaning, price determination, Oligopolistic competition meaning, Price determination under different Oligopolistic market structures.

UNIT IV

Managerial theories of firm, Modern theory of profit, Theories of rent, Wages and Interest, Determinants of national income (GDP, GNP, NNP, PI, PDI)

UNIT V

Consumption, Saving, Investment, Inflation, Trade Cycles, Monetary Policy, Fiscal Policy, Application of Managerial Economics.

Reference Books:

1.   H.C. Petersen, Managerial Economics
2.   G.S. Gupta, Managerial Economics
3.   R. L. Varsney, Managerial Economics
4.   P.L. Mehta, Managerial Economics