

Semester - VI				
Course	Type	Course Code	Course Name	Credit
Core Course -13	Theory	CMS-A-CC-6-13-TH	Software Engineering	4
Core Course -14	Theory	CMS-A-CC-6-14-TH	Theory of Computation	4
	Practical	CMS-A-CC-6-14-P	Project Work	4
Semester - VI (DSE)				
Discipline Specific Elective Course - DSE-A(3&4)& DSE-B (3&4) (Candidates have to opt one course from DSE-A & one course from DSE-B)				
Course	Type	Course Code	Course Name	Credit
DSE-A-3	Theory	CMS-A-DSE-A-3-TH	Embedded Systems	4
	Practical	CMS-A-DSE-A-3-P	Embedded Systems Lab	2
DSE-A-4	Theory	CMS-A-DSE-A-4-TH	Multimedia and its Application	4
	Practical	CMS-A-DSE-A-4-P	Multimedia and its Application Lab	2
DSE-B-3	Theory	CMS-A-DSE-B-3-TH	Introduction to Computational Intelligence	4
	Practical	CMS-A-DSE-B-3-P	Computational Intelligence Lab	2
DSE-B-4	Theory	CMS-A-DSE-B-4-TH	Advance Java	4
	Practical	CMS-A-DSE-B-4-P	Advance Java Lab	2

CMS-A-CC-6-13-TH: Software Engineering.

Core Course-13: Theory, Credit:04, Contact hours 60.

Introduction Defining system, open and closed system, modeling of system through computer hardware, communication systems, external agents and software systems; Importance of Engineering Methodology towards computerization of a system.	03 hours
Software Life Cycle Classical and Iterative Waterfall Model; Spiral Model; Prototype Model; Evolutionary model and its importance towards application for different system representations, Comparative Studies.	07 hours
Software Requirement and Specification Analysis Requirements Principles and its analysis principles; Specification Principles and its representations Software Design Analysis – Different level of DFD Design, Physical and Logical DFD, Use and Conversions between them, Decision Tables and Trees, Structured analysis, Coupling and Cohesion of different modules Software Cost Estimation Modeling –COCOMO.	23 hours
Software Testing Software Verification and Validation; Testing objectives, Testing Principles, Testability; Error and Faults; Unit Testing, White Box and Blank Box Testing, Test Case Design: Test Vector, Test Stub.	17 hours
Software Quality Assurances Concepts of Quality, Quality Control, Quality Assurance, IEEE Standard for Statistical Software Quality Assurances (SSQA) criterions.	10 hours

Text/ Reference Books

1. Software Engineering: A Practitioner's Approach by R.S. Pressman, McGraw-Hill.
2. An Integrated Approach to Software Engineering by P. Jalote, Narosa Publishing House.
3. Software Engineering by K.K. Aggarwal and Y. Singh, New Age International Publishers.
4. Software Engineering by I. Sommerville, Addison Wesley.
5. Software Engineering for Students by D. Bell, Addison-Wesley.
6. Fundamentals of Software Engineering by R. Mall, PHI.

CMS-A-CC-6-14-TH: Theory of Computation.**Core Course-14: Theory, Credit:04, Contact hours: 60.**

Finite Automata Definition of a Finite Automaton, Model, Representation, Classification – with respect to output function Mealy and Moore Machines, with respect to State Transition – Deterministic and Non-Deterministic Machine, Examples, conversion algorithms Mealy to Moore and Moore to Mealy, Finite and Infinite state machines, Finite Automaton, Deterministic and Non-Deterministic Finite automaton, Non-Deterministic to equivalent Deterministic Automaton-Optimized and Non-optimized technique ideas and algorithms, Acceptability of String by a Finite Automaton.	15 hours
Formal Languages and Grammar Introduction to Formal Grammar and Language, Chomsky's Classification of Grammar – Type-0, Type-1 or Context Sensitive, Type-2 or Context Free and Type-3 or Regular Grammar, Illustration of each of these classes with example, Sentential form, Sentences – Languages or strings, Derivations, Ambiguous Grammar and Language, Designing of Grammar for a language, Find the Language for given Grammar, Definition and basic idea about Push Down Automaton.	15 hours
Regular Expression: Basic Idea and Definition, Regular Expression basic Identities, Arden's Theorem – Statement (without Proof) and application for reduction of equivalent regular expressions, Regular expression to Finite Automata conversion, State Transition System to Regular Expression conversion algorithm by Arden's Algebraic Method, FA to Regular Grammar and Regular Grammar to FA conversion algorithms and applications.	15 hours
Turing Machine Concepts of Turing Machine, Formal Definitions, Classifications – Deterministic and Non-Deterministic Turing Machines, Simple Design of Turing Machines: Odd / even count and concepts of Universal Turing Machines, Difference and Similarities between Turing Machine and a General Purpose Computer, Definition and significance of Halting Problem in Turing Machine.	15 hours

Text/ Reference Books:

1. Introduction to Automata Theory, Languages, and Computation by John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, 3rd Edition, Pearson.
2. Theory of Computer Science (Automata, Languages & Computation) by K L P Misra&

Text/ Reference Books:

1. An Embedded software primer, David E. Simon, Pearson Education.
2. The 8051 Microcontroller, Kenneth J. Ayala, Thomson.
3. Embedded Systems, Raj Kamal, TMH.
4. Microcontroller, Raj Kamal, Pearson Education.
5. A VHDL Primer, J. Bhasker, Prentice Hall
6. FPGA Prototyping by VHDL Examples: Xilinx Spartan-3 Version, Pong P. Chu, Wiley-Interscience.

CMS-A-DSE-A--4-TH: Multimedia and its Applications**DSE-A: Choice-4, Theory, Credit:04, Contact hours: 60.**

Multimedia Introduction to multimedia, Components, uses of multimedia.	04 hours
Making Multimedia Stages of a multimedia project, requirements to make good multimedia, Multimedia Hardware - Macintosh and Windows production Platforms, Hardware peripherals - Connections, Memory and storage devices, Multimedia software and Authoring tools.	06 hours
Text Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools, Hypermedia & Hypertext.	04 hours
Images Still Images – Bitmaps, Vector Drawing, 3D Drawing & rendering, Natural Light & Colors, Computerized Colors, Color Palettes, Image File Formats.	06 hours
Sound Digital Audio, MIDI Audio, MIDI vs Digital Audio, Audio File Formats.	06 hours
Video How Video Works, Analog Video, Digital Video, Video File Formats, Video Shooting and Editing.	06 hours
Animation Principle of Animations. Animation Techniques, Animation File Formats.	08 hours
Multimedia System An overview of multimedia system and media streams, Source representation and compression techniques text, speech and audio, still image and video, Graphics and animation.	10 hours
Multi-modal Communication Video conferencing, networking support, Trans-coding.	10 hours

CMS-A-DSE-A--4-P: Multimedia and its Applications Lab.**DSE-A: Choice-4: Practical, Credit:02, Contact hour: 40.**

Sample practical problems can be included related to theory.

Text/ Reference Books:

1. Multimedia: Making it work by Tay Vaughan, TMH.
2. Multimedia: Computing, Communications Applications by R Steinmetz and K Naharstedt, Pearson.
3. Multimedia Handbook by Keyes, TMH.
4. Multimedia System Design by K. Andleigh and K. Thakkar, PHI.

Discipline Specific Elective Course B: DSE-B.**Introduction to Computational Intelligence/ Advanced Java.****CMS-A-DSE-B--3-TH:Introduction to Computational Intelligence****DSE-B: Choice-3, Theory, Credit:04, Contact hours: 60.**

Introduction Introduction to Artificial Intelligence, Brief History and Application, Structures and Strategies for state space search- Data driven and goal driven search, Heuristic search, Depth First and Breadth First search, Iterative deepening, A* algorithm, Game playing (Minimax), Rule-based system, Semantic Nets, Frames, Scripts, Conceptual Dependency, Introduction to PROLOG.	20 hours
Neural Network Basics of Artificial Neural Network, Characteristics and Comparison with biological neural network, Basic model of Artificial Neural Network: Single layer Perceptron model, Learning, Feed Forward Neural Network, Error, Back Propagation and weight updation, Perceptron, Bayesian Networks, Neural computational model- Hopfield Nets. .	20 hours
Rough sets Basic difference between Rough sets and Fuzzy sets	02 hours
Fuzzy Logic and Application Fuzzy sets, application – basic operations, Properties, Fuzzy Relations, Fuzzy inference, Notion of Fuzziness, Operations on Fuzzy sets, Fuzzy Numbers, Brief overview of crisp sets, Crisp relations, Fuzzy relations, Max*-composition of fuzzy relation, Max*-transitive closure, Probability measures of fuzzy events, Fuzzy expected value, Approximate reasoning, Different methods of role aggregation and defuzzification.	18 hours

CMS-A-DSE-B-3-P:Computational Intelligence Laboratory**DSE-B: Choice 3, Practical, Credit: 02, Contact hours: 40.**

Computational intelligence lab using Prolog / LISP

Text/ Reference Books:

1. Pattern Recognition and Machine Learning, Christopher M. Bishop.
2. Artificial Intelligence, E, Rich and K. Knight, Tata McGraw Hill.
3. A Brief Introduction to Neural Network, David Kriesel.
4. Fuzzy Set Theory – and its Applications, H.J. Zimmermann.
5. Rough Set Data Analysis : A road to Non-invasive Knowledge Discovery, Methods, Ivo Duntsch & Gunther Gediga.