

# **Shri Rawatpura Sarkar University, Raipur**



## **Examination Scheme & Syllabus**

**For**

## **Master of Computer Application**

### **Semester-IV**

(Effective from the session: 2022-23)

Department of Computer Science & Engineering



**SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH**

**FACULTY OF ENGINEERING**

**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**MCA -4<sup>th</sup> Semester**

S.No	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			Sem End Exam Duration (Hrs)
			L	T	P		Continuou s Evaluatio n	Sem End Exam	Total	
1	SMC04401	Data Privacy	4	1	-	5	30	70	100	3 Hrs.
2	SMC04451	<b>Elective-IV</b>	3	1	-	4	30	70	100	3 Hrs
3	SMC04452	<b>Elective V</b>	3	1	-	4	30	70	100	3 Hrs
4	SMC04491	Major Project / Internship	-	-	24	12	90	210	300	3 Hrs.
<b>Total Contact hr. per week: 37</b>			<b>Total Credit</b>			<b>25</b>	<b>180</b>	<b>420</b>	<b>600</b>	

<b>Table – I</b>		
<b>Elective - IV</b>		
<b>Sr. No</b>	<b>Course Code</b>	<b>Course Title</b>
1	SMC04451A	Game Theory
2	SMC04451B	Modern Application Development
3	SMC04451C	Computer Graphics & Animation

<b>Table – II</b>		
<b>Elective - V</b>		
<b>Sr. No</b>	<b>Course Code</b>	<b>Course Title</b>
1	SMC04252A	Human Computer Interaction
2	SMC04252B	Simulation & Modeling
3	SMC04252C	Block chain Technology



<b>Course Title</b>	<b>Data Privacy</b>				
<b>Course Code</b>	<b>SMC04401</b>				
<b>Semester</b>	<b>4<sup>th</sup></b>				
<b>Course Credit</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>TC</b>	
	<b>4</b>	<b>1</b>	<b>-</b>	<b>5</b>	
<b>Prerequisites</b>					
<b>Course Objectives</b>	<p>The objective of this course is</p> <ol style="list-style-type: none"> <li>1. To create architectural, algorithmic and technological foundations for the maintenance of the privacy of individuals.</li> <li>2. The confidentiality of organizations, and the protection of sensitive information, despite the requirement that information be released publicly or semi-publicly.</li> </ol>				
<b>Course Contents</b>	<p><b>Unit- I Introduction-</b>  Fundamental Concepts, Definitions, Statistics, Data Privacy Attacks, Data linking and profiling, access control models, role based access control, privacy policies, their specifications, languages and implementation, privacy policy languages, privacy in different domains- medical, financial, etc.</p> <p><b>Unit- II Data explosion-</b>  Statistics and Lack of barriers in Collection and Distribution of Person-specific information, Mathematical model for characterizing and comparing real-world data sharing practices and policies and for computing privacy and risk measurements, Demographics and Uniqueness.</p> <p><b>Unit- III Protection Models-</b> Null-map, k-map, Wrong map Survey of techniques- Protection models (null-map, k-map, wrong map), Disclosure control, Inferring entity identities, Strength and weaknesses of techniques, entry specific databases.</p> <p><b>Unit- IV Computation systems for protecting delimited data-</b> MinGen, Datafly, Mu-Argus, k-Similar, Protecting textual documents: Scrub.</p>				



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	<p><b>Unit- V Technology, Policy, Privacy and Freedom</b></p> <p>- Medical privacy legislation, policies and best practices, Examination of privacy matters specific to the World Wide Web, Protections provided by the Freedom of Information Act or the requirement for search warrants.</p>
<b>Course Outcomes</b>	<p>After successful completion of this course, students will be able to:</p> <ol style="list-style-type: none"><li>1. Understand the concepts of privacy in today's environment.</li><li>2. Obtain the understanding of how automation is changing the concepts and expectations</li><li>3. Concerning privacy and the increasingly interconnected issue of security.</li><li>4. Obtain the knowledge of the role of private regulatory and self-help efforts.</li><li>5. Have an understanding of how emerging issues are affecting society and business, with a concentration on how information security must shape corporate practices.</li></ol>
<b>Text Books</b>	<ul style="list-style-type: none"><li>• B. Raghunathan, The Complete Book of Data Anonymization: From Planning to Implementation, Auerbach Pub, 2013.</li></ul>
<b>Reference Books</b>	<ul style="list-style-type: none"><li>• L. Sweeney, Computational Disclosure Control: A Primer on Data Privacy Protection, MIT Computer Science, 2002.</li></ul>



<b>Course Title</b>	<b>Elective – IV Game Theory</b>				
<b>Course Code</b>	<b>SMC04451A</b>				
<b>Semester</b>	<b>4<sup>th</sup></b>				
<b>Course Credit</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>T C</b>	
	<b>3</b>	<b>1</b>	<b>-</b>	<b>4</b>	
<b>Prerequisites</b>					
<b>Course Objectives</b>	<ol style="list-style-type: none"> <li>1. To teach students some strategic considerations to take into account making their choices.</li> <li>2. To predict how other people or organizations behave when they are in strategic settings.</li> <li>3. To apply these tools to settings from economics and from elsewhere.</li> </ol>				
<b>Course Contents</b>	<p>Unit I : Introduction- Fundamental Concepts, Definitions, and Classification of Games. Games with Sequential moves-Game tree representation, Actions &amp; Strategies, Advantage in moving first or last, Backward Induction.</p> <p>Unit- II Simultaneous moves Games (Pure strategies)-Normal form representation, Nash equilibrium, Dominance, Minimax solution concept for Zerosum Games, Rationalizability, Multiple equilibria, No equilibria, Discrete and Continuous strategies, 3-player games.</p> <p>Unit- III Simultaneous and Sequential moves Games- Converting game trees to Normal form, and vice versa. Changing order of moves, Games with both Sequential and Simultaneous moves. Simultaneous moves games (Mixed strategies)-Mixing to keep the opponent guessing, Mixing in non-Zero-sum games, Expected values &amp; utility, Mixing with 3 strategies.</p> <p>Unit- IV Prisoners’ Dilemma, Repeated Games and Collective Action- Finite and Infinite repetition, Leadership, Folk Theorem, Application: Price Matching, Collective Action and Inaction.</p> <p>UNIT- V Application Voting-Voting Rules, Paradoxes, Strategic Manipulation. Application Bargaining-Nash Bargaining Solution, Ultimatum game, Alternating-offers game, Threat Points, Bargaining Shares.</p>				
<b>Course Outcomes</b>	<p>After successful completion of this course, students will be able to:</p> <ol style="list-style-type: none"> <li>1. Train in the logic and strategic decision making involved in the theory of games.</li> <li>2. To solve strategic games between two and more agents in non-cooperative scenario.</li> </ol>				



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	<ol style="list-style-type: none"><li>3. To analyze and solve both simultaneous-moves and sequential-moves games and will be familiarized with different solution concepts.</li><li>4. Learn different methods to solve games.</li><li>5. Apply the concepts and ideas that constitute these various game types and their solutions and apply them to the problems at hand</li></ol>
<b>Text Books</b>	<ol style="list-style-type: none"><li>1. (IGT) Martin Osborne, An Introduction to Game Theory, Oxford University Press, 2003</li><li>2. (AT) Vijay Krishna, Auction Theory, Academic Press.</li><li>3. (SG) PrajitDutta, Strategies and Games, MIT Press</li><li>4. (Website 1) <a href="http://www.ece.stevens-tech.edu/~ccomanic/ee800c.html">http://www.ece.stevens-tech.edu/~ccomanic/ee800c.html</a></li><li>5. (GTWE) Allan MacKenzie, Game Theory for Wireless Engineers, Synthesis lectures on Communications, 2006</li></ol>
<b>Reference Books</b>	<ol style="list-style-type: none"><li>1. Thomas Ferguson, Game Theory, World Scientific, 2018.</li><li>2. Stef Tijs. Introduction to Game Theory, Hindustan Book Agency.</li><li>3. Allan MacKenzie, Game Theory for Wireless Engineers, Synthesis Lectures On Communications.</li></ol>



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<b>Course Title</b>	<b>Modern Application and Development</b>				
<b>Course Code</b>	<b>SMC044451B</b>				
<b>Semester</b>	<b>4<sup>th</sup></b>				
<b>Course Credit</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>TC</b>	
	<b>3</b>	<b>1</b>	<b>-</b>	<b>4</b>	
<b>Prerequisites</b>					
<b>Course Objectives</b>					
<b>Course Contents</b>	<p>UNIT-I Introduction: Introduction to mobile applications – Embedded systems - Market and business drivers for mobile applications – Publishing and delivery of mobile applications – Requirements gathering and validation for mobile applications.</p> <p>UNIT-II Basic design: Introduction – Basics of embedded systems design – Embedded OS - Design constraints for mobile applications, both hardware and software related – Architecting mobile applications – User interfaces for mobile applications – touch events and gestures – Achieving quality constraints – performance, usability, security, availability and modifiability.</p> <p>UNIT-III Advanced design: Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications.</p> <p>UNIT-IV Technology in android: Introduction – Establishing the development environment – Android architecture – Activities and views – Interacting with UI – Persisting data using SQLite – Packaging and deployment – Interaction with server side applications – Using Google Maps, GPS and Wi-fi – Integration with social media applications.</p> <p>UNIT-V TECHNOLOGY II – IOS: Introduction to Objective C – iOS features – UI implementation – Touch frameworks – Data persistence using Core Data and SQLite – Location aware applications using Core Location and Map Kit – Integrating calendar and</p>				



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	address book with social media application – Using Wifi - iPhone marketplace. Swift: Introduction to Swift features of swift.
<b>Course Outcomes</b>	
<b>Text Books</b>	<ol style="list-style-type: none"><li>1. Charlie Collins, Michael Galpin and Matthias Kappler, “Android in Practice”, DreamTech, 2012</li><li>2. AnubhavPradhan , Anil V Despande Composing Mobile Apps,Learn ,explore,apply</li><li>3. James Dovey and Ash Furrow, “Beginning Objective C”, Apress, 2012</li></ol>
<b>Reference Books</b>	<ol style="list-style-type: none"><li>1. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012</li><li>2. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, “Beginning iOS</li><li>3. Development: Exploring the iOS SDK”, Apress, 2013</li></ol>





<b>Course Title</b>	<b>Elective- IV Computer Graphics &amp; Animation</b>				
<b>Course Code</b>	<b>SMC04451C</b>				
<b>Semester</b>	<b>4<sup>th</sup></b>				
<b>Course Credit</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>TC</b>	
	<b>3</b>	<b>1</b>	<b>-</b>	<b>4</b>	
<b>Prerequisites</b>					
<b>Course Objectives</b>	<ul style="list-style-type: none"> <li>•</li> </ul>				
<b>Course Contents</b>	<p>UNIT-I: Introduction to Computer Graphics: What is Computer Graphics, Computer Graphics Applications, Computer Graphics Hardware and software, two-dimensional Graphics Primitives: Points and Lines, Line drawing algorithms: DDA, Bresenham's Circle drawing algorithms: Using polar coordinates, Bresenham's circle drawing, mid-point circle drawing algorithm; Filled area algorithms: Scan line: Polygon filling algorithm, boundary filled algorithm.</p> <p>UNIT-II: Two/Three-Dimensional Viewing: The 2-D viewing pipeline, windows, viewports, window to view port mapping; Clipping: point, clipping line (algorithms): - 4-bit code algorithm, Sutherland-Cohen algorithm, parametric line clipping algorithm (Cyrus Beck). Polygon clipping algorithm: Sutherland-Hodgeman polygon clipping algorithm. Two dimensional transformations: transformations, translation, scaling, rotation, reflection, composite transformation. Three dimensional transformations: Three-dimensional graphics concept, Matrix representation of 3 D Transformations, Composition of 3-D transformation.</p> <p>UNIT-III: Viewing in 3D: Projections, types of projections, mathematics of planner geometric projections, coordinate systems. Hidden surface removal: Introduction to hidden surface removal. Z- buffer algorithm, scanline algorithm, area subdivision algorithm.</p> <p>UNIT-IV: Representing Curves and Surfaces: Parametric representation of curves: Bezier curves, B-Spline curves. Parametric representation of surfaces; Interpolation</p>				



	<p>method. Illumination, shading, image manipulation: Illumination models, shading models for polygons, shadows, transparency. What is an image? Filtering, image processing, geometric transformation of images.</p> <p>UNIT- V: Animation; Fundamentals of computer animation, Animation Techniques. Animation and Flash Overview, Using Layer and Creating Animation</p>
<b>Course Outcomes</b>	<ol style="list-style-type: none"><li>1. Describe underlying graphic hardware, architecture, graphic primitives and their attributes and apply algorithms for implementing (drawing) these primitives.</li><li>2. Develop applications applying mathematical concepts of geometric transformations, polygon filling and clipping in 2 dimensions.</li><li>3. Compare the different types of projections of 3D objects and the methods to identify visible surfaces of those projected images, rendering them using illumination models.</li></ol>
<b>Text Books</b>	<ol style="list-style-type: none"><li>1. Procedural Elements for Computer Graphics – David F. Rogers, 2001, T.M.H Second Edition.</li><li>2. Fundamentals of 3Dimensional Computer Graphics by Alan Watt, 1999, Addison Wesley.</li><li>3. Computer Graphics: Secrets and Solutions by Corrign John, BPB</li><li>4. M.C. Trivedi, NN Jani, Computer Graphics, Jaico Publications</li><li>5. Rishabh Anand, Computer Graphics- A practical Approach, Khanna Publishing House</li></ol>
<b>Reference Books</b>	<ol style="list-style-type: none"><li>1. Principles of Multimedia by Ranjan Parekh, McGrawHill Education</li><li>2. Computer Graphics Principles and Practices second edition by James D. Foley, Andeies van Dam, StevanK. Feiner and Johb F. Hughes, 2000, Addison Wesley.</li><li>3. Computer Graphics by Donald Hearn and M.Pauline Baker, 2nd Edition, 1999, PHI</li><li>4. Computer graphics, Multimedia and Animation by Malay. K.Pakhira, PHI, 2nd Edition, 2010</li></ol>



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<b>Course Title</b>	<b>Human Computer Interface</b>				
<b>Course Code</b>	<b>SMC04452A</b>				
<b>Semester</b>	<b>4<sup>th</sup></b>				
<b>Course Credit</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>TC</b>	
	<b>3</b>	<b>1</b>	<b>-</b>	<b>4</b>	
<b>Prerequisites</b>					
<b>Course Objectives</b>	1.				
<b>Course Contents</b>	<p>UNIT-1 Introduction: Importance of user Interface – definition, importance of 8 good designs. Benefits of good design. A brief history of Screen design. The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.</p> <p>UNIT-II Design process – Human interaction with computers, importance of 8 human characteristics human consideration, Human interaction speeds, understanding business junctions.</p> <p>UNIT-III Screen Designing : Design goals – Screen planning and purpose, 8 organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.</p> <p>UNIT-IV Windows: New and Navigation schemes selection of window, 8 selection of devices based and screen based controls. Components – text and messages, Icons and increases – Multimedia, colors, uses problems, choosing colors.</p> <p>UNIT-V Software tools: Specification methods, interface – Building Tools. 8 Interaction Devices – Keyboard and function keys – pointing devices – speech recognition digitization and generation – image and video displays – drivers.</p>				



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<b>Course Outcomes</b>	<ol style="list-style-type: none"><li>1. Understand basic concepts of Usability Engineering</li><li>2. Understand the fundamental aspects of interaction and designing the interaction.</li><li>3. Understand basic concepts of Dialog Designing aspects in Human Computer Interaction.</li><li>4. Understand the aspect of Rich Context Modeling</li></ol>
<b>Text Books</b>	1. Sharp, H., Rogers, Y., and Preece, J, "Interaction Design: Beyond Human – Computer Interaction", Third Edition, John Wiley & Sons, Inc., 2011.
<b>Reference Books</b>	<ol style="list-style-type: none"><li>1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale Human Computer Interaction, 3rd Edition Prentice Hall, 2004.</li><li>2. Jonathan Lazar Jinjuan Heidi Feng, Harry Hochheiser, Research Methods in HumanComputer Interaction, Wiley, 2010.</li><li>3. Ben Shneiderman and Catherine Plaisant Designing the User Interface: Strategies for Effective HumanComputer Interaction (5th Edition, pp. 672, ISBN 0- 321-53735-1, March 2009), Reading, MA: Addison-Wesley Publishing Co.</li></ol>



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**MCA -4<sup>th</sup> Semester**

<b>Course Title</b>	<b>Simulation and Modeling</b>				
<b>Course Code</b>	<b>SMC04452B</b>				
<b>Semester</b>	<b>4<sup>th</sup></b>				
<b>Course Credit</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>TC</b>	
	<b>3</b>	<b>1</b>	<b>-</b>	<b>4</b>	
<b>Prerequisites</b>					
<b>Course Objectives</b>					
<b>Course Contents</b>	<p>UNIT-1 System definition and components, stochastic activities, continuous and discrete systems, system modeling, types of models, static and dynamic physical models, static and dynamic mathematical models, full corporate model, types of system study.</p> <p>UNIT-II System simulation, why &amp; when to simulate, nature and techniques of simulation, comparison of simulation and analytical methods, types of system simulation, real time simulation, hybrid simulation, simulation of pure-pursuit problem, single server queuing system and an inventory problem, Monte-Carlo simulation, Distributed Lag models, Cobweb model.</p> <p>UNIT-III Simulation of continuous systems, analog vs. digital Simulation, Simulation of water reservoir system, Simulation of a servo system, simulation of an autopilot, Discrete system simulation, fixed time-step vs. even to even model, generation of random numbers, test for randomness, Monte-Carlo computation vs. stochastic simulation. UNIT-IV System dynamics, exponential growth models, exponential decay models, modified exponential growth models, logistic curves, generalization of growth models, system dynamic diagrams, Introduction to SIMSCRIPT: Program, system concepts, origination, and statements, defining the telephone system model.</p> <p>UNIT-V Simulation of PERT Networks, critical path computation, uncertainties in activity duration, resource allocation and consideration. Simulation languages and software, continuous and discrete simulation languages, expression-based languages, object-oriented simulation, general purpose vs. application - oriented simulation</p>				



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	packages, CSMP-III, MODSIM-III
<b>Course Outcomes</b>	At the end of the course, the students will be able to: <ol style="list-style-type: none"><li>1. Apply functional modeling to model the activities of a static system.</li><li>2. Understand the behavior of a dynamic system and create a model for a dynamic system.</li><li>3. Simulate the real systems.</li></ol>
<b>Text Books</b>	
<b>Reference Books</b>	<ol style="list-style-type: none"><li>1. Geoffrey Gordon, "System Simulation", PHI</li><li>2. Jerry Banks, John S. C Barry L. Nelson David M. Nicol, "Discrete Event System Simulation", Pearson Education</li><li>3. V P Singh, "System Modeling and simulation", New Age International.</li><li>4. Averill M. Law, W. David Kelton, "System Modeling and simulation and Analysis", TMH</li></ol>



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<b>Course Title</b>	<b>Block Chain Technology</b>				
<b>Course Code</b>	<b>SMC04452C</b>				
<b>Semester</b>	<b>4<sup>th</sup></b>				
<b>Course Credit</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>TC</b>	
	<b>3</b>	<b>1</b>	<b>-</b>	<b>4</b>	
<b>Prerequisites</b>	1.				
<b>Course Objectives</b>	2.				
<b>Course Contents</b>	<p>Unit- I Basics: The Double-Spend Problem, Byzantine Generals’ Computing Problems, Public-Key Cryptography, Hashing, Distributed Systems, Distributed Consensus.</p> <p>Unit II Technology Stack: Blockchain, Protocol, Currency. Bitcoin Blockchain: Structure, Operations, Features, Consensus Model, Incentive Model.</p> <p>UNIT- III Ethereum Blockchain: Smart Contracts, Ethereum Structure, Operations, Consensus Model, Incentive Model.</p> <p>Unit- IV Tiers of Blockchain Technology: Blockchain 1.0, Blockchain 2.0, Blockchain 3.0, Types of Blockchain: Public Blockchain, Private Blockchain, Semi-Private Blockchain, Sidechains.</p> <p>Unit- V Types of Consensus Algorithms: Proof of Stake, Proof of Work, Delegated Proof of Stake, Proof Elapsed Time, Deposit-Based Consensus, Proof of Importance, Federated Consensus or Federated Byzantine Consensus, Practical Byzantine Fault Tolerance. Blockchain Use Case: Supply Chain Management.</p>				
<b>Course Outcomes</b>					



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<b>Text Books</b>	<ol style="list-style-type: none"><li>1. Kirankalyan Kulkarni, Essentials of Bitcoin and Blockchain, Packt Publishing.</li><li>2. Anshul Kaushik, Block Chain &amp; Crypto Currencies, Khanna Publishing House.</li><li>3. Tiana Laurence, Blockchain for Dummies, 2nd Edition 2019, John Wiley &amp; Sons.</li><li>4. Mastering Blockchain: Deeper insights into decentralization, cryptography, Bitcoin, and popular Blockchain frameworks by Imran Bashir, Packt Publishing (2017).</li></ol>
<b>Reference Books</b>	<ol style="list-style-type: none"><li>1. Blockchain: Blueprint for a New Economy by Melanie Swan, Shroff Publisher O'Reilly Publisher Media; 1st edition (2015).</li><li>2. Mastering Bitcoin: Programming the Open Blockchain by Andreas Antonopoulos.</li></ol>





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<b>Course Title</b>	<b>Major Project / Internship</b>				
<b>Course Code</b>	<b>SMC04491</b>				
<b>Semester</b>	<b>4<sup>th</sup></b>				
<b>Course Credit</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>TC</b>	
	-	-	24	12	
<b>Prerequisites</b>					
<b>Course Objectives</b>	Project work shall consist of report / thesis submitted based on the topic of one good Engineering/ Computer Application / Research based problem.				
<b>Course Contents</b>	<p>1. Formation of team, selection of topic : Presentation on different project topics, Team formation including students and guide, Literature review in Library and internet on different project topics, Selection of Project topic and objectives.</p> <p>2. Site Visits (If required): Before undertaking the project design, team should visit sites where the project is already implemented and get acquainted with different perspectives. They should meet experienced personalities in the area and take their advice.</p> <p>3. Preliminary Design: After selection of topic, the team should carry out further literature review and then come out with the preliminary design of the project in the form of drawing and explanation.</p> <p>4. Semester Project Progress Report: A semester project progress report should be prepared comprising the work done as said above. The report should be presented before the Department faculty and subject experts.</p> <p><b>The Report / Thesis must contain the following:-</b></p> <ol style="list-style-type: none"> <li>1. Well-defined Case – based Problem</li> <li>2. Motivation to select such problem</li> <li>3. General approach to solve such problems</li> <li>4. Methods Applied to Solve such Problems</li> <li>5. Flowchart and Algorithm to solve Problem</li> <li>6. Basic Software and Hardware required to solve such problem</li> <li>7. Practical Applications</li> </ol>				



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	<p>8. Final Observations and Conclusions</p> <p>9. Any help to the Society through the above said Problem.</p> <p>Please Note: - Based on the above work a power point presentation must be given by the candidate and defended with positive attitude. The candidate will be appreciated if he / she present his / her work in a Conference or publish his / her work in a reputed Journal</p>
<b>Course Outcomes</b>	



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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**

**MCA -4<sup>th</sup> Semester**