Shri Rawatpura Sarkar University Raipur

Examination Scheme & Syllabus

For

Master of Technology
(Computer Science Engineering)

Semester- III

(Effective from the session: 2022-23)

SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH
FACULTY OF ENGINEERING
Department of Computer Science & Engineering

Scheme of Teaching and Examination
M.Tech. III Semester

Specialization- Computer Science Engineering

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(Effective from the Academic Year 2022-2023)

S.No.	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			Sem End Exam Duration (Hrs)
			L	T	P		Continuous Evaluation	Sem End Exam	Total	
1	EMT04301	Advanced AI & Edge Computing	3	1	-	4	30	70	100	3 Hrs.
2	EMT04351	**Elective –II**	3	1	-	4	30	70	100	3 Hrs
3	EMT04303	Preliminary Work on Dissertation	-	-	20	10	75	175	250	3 Hrs
4	EMT04304	Technical Paper Writing and Seminar	-	-	4	2	15	35	50	3 Hrs.
Total Contact hr. per week: 20			**Total Credit**			**20**	**150**	**350**	**500**	

Table – II		
Elective - II		
Sr. No	**Subject Code**	**Subject Name**
1	EMT04351A	Evolutionary Computing
2	EMT04351B	Cellular and Mobile Computing
3	EMT04351C	Secure Communication

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Course Title	Advanced AI & Edge Computing				
Course Code	EMT04301				
Semester	M.Tech-CSE- 3rd Sem				
Course Credit	L	T	P	TC	
	3	1	-	4	
Prerequisites	Principles of AI and Edge Computing .				
Course Objectives	1.To understand the principles of artificial intelligence this is one of the key learning techniques for current era technology. 2. To understand uncertainty handling in symbolic reasoning through different reasoning techniques. 3.To understand the concept of Natural language processing. 4.To understand the concept of Edge computing.				
Course Contents	**Unit- I INTRODUCTION** – Agents and Objects, Evaluation of Agents, Agent Design Philosophies, Multiagent System, Mobile Agents, Agent Communication, Knowledge query and Manipulation Language. What is AI? The Foundations of Artificial Intelligence; INFERENCE IN FIRST-ORDER LOGIC – Syntax and Semantics of First-Order Logic, Using FirstOrder Logic, Knowledge Engineering in First-Order Logic; Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution. **Unit- II SYMBOLIC REASONING UNDER UNCERTAINTY** – Introduction to Nonmonotonic Reasoning, Logics for Nonmonotonic Reasoning, Implementation Issues, BAYESIAN LEARNING – Bayes theorem, Concept learning, Bayes Optimal Classifier, Naïve Bayes classifier, Bayesian belief networks, EM algorithm; **Unit-III NATURAL LANGUAGE PROCESSING** – Phrase Structure Grammars, Syntactic Analysis (Parsing), Augmented Grammars and Semantic Interpretation, Machine Translation, Speech Recognition. **Unit- IV Introduction to Edge Computing Scenario's and Use cases** - Edge computing purpose and definition, Edge computing use cases, Edge computing hardware architectures, Edge platforms, Edge vs Fog Computing, Communication Models - Edge, Fog and M2M.				

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	Unit- V IoT Architecture and Core IoT Modules-A connected ecosystem,IoT versus machine-to-machine versus, SCADA, The value of a network and Metcalfe's and Beckstrom's laws, IoT and edge architecture, Role of an architect, Understanding Implementations with examples-Example use case and deployment, Case study – Telemedicine palliative care, Requirements, Implementation, Use case retrospective.
Course Outcomes	1. Learn the foundations of reinforcement learning for robotics CO2 Understand basic probabilistic principles behind Robotics intelli 2. Learn different measurement techniques for robotics 3. Implement principles of robotics intelligence for solving real world problems
Text Books	1. Francis X. Govers, Artificial Intelligence for Robotics, Packt,2018 2. FranzBaader, Ian Horrocks, Carsten Lutz, Uli Sattler, An Introduction to Description Logic, CambridgeUniversityPress,FirstEdition,2017
Reference Books	1. Fog and Edge Computing: Principles and Paradigms by Rajkumar Buyya, Satish Narayana Srirama, wiley publication, 2019, ISBN: 9781119524984. 2. David Jensen, "Beginning Azure IoT Edge Computing: Extending the Cloud to the Intelligent Edge, MICROSOFT AZURE

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Course Title	**Elective – II Evolutionary Computing**
Course Code	**EMT04351A**
Semester	**M.Tech-CSE- 3rd Sem**

Course Credit	**L**	**T**	**P**	**T C**	
	3	**1**	**-**	**4**	

Prerequisites	Optimization Techniques .
Course Objectives	Knowledge of evolutionary computation techniques and methodologies set in the context of modern heuristic methods An idea of how to apply these techniques to optimisation problems and problems that require machine learning
Course Contents	Unit- I Historical Development, Features, Classification and Components of Evolutionary Computing, Advantages, Applications. Simulated Annealing : Annealing Schedule Unit- II Hill Climping: Mathematical Description, Local and Global Maxima, Ridges, Plateau, Applications. Genetic Algorithms: Biological Background, Schema, Theorem, GA Operators: Crossover, Mutation and Its Types-GA Algorithm, Variations Of GA: Adaptive GA and Real Coded GA Unit- III Ant Colony Optimization: Ant Foraging Behavior, Theoretical Considerations, Convergence Proofs, ACO Algorithm, ACO And Model Based Search, Variations Of ACO: Elitist Ant System (EAS), Minmax Ant System (MMAS) And Rank Based Ant Colony System (RANKAS). Unit- IV Particle Swarm Optimization: Principles of Bird Flocking and Fish Schooling , Evolution of PSO , Operating Principles , PSO Algorithm , Neighborhood Topologies , Convergence Criteria , Variations of PSO Univ-V Artificial Bee Colony (ABC) Optimization: Behaviour Of Real Bees, ABC Algorithm, Variations of ABC: Abcgbest and Abcgbestdist Case Study: Travelling Salesman Problem, Knapsack Problem, N Queens

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Course Outcomes	Students who successfully complete this course will gain 1. Knowledge in matching various evolutionary computing methods and algorithms for particular classes of computational problems. 2. Knowledge of utilization of evolutionary computing. 3. To learn about the different optimization techniques.
Text Books	1. Marco Dorigo and Thomas Stutzle, "Ant Colony optimization", Prentice Hall of India, New Delhi 2005.
Reference Books	1. Goldberg D E, "Genetic Algorithms in search", Optimization and machine learning, Addison-Wesley 2005. 2. Kenneth A DeJong, "Evolutionary Computation A Unified Approach", Prentice Hall of India, New Delhi, 2006. 3. Elaine Rich, Kevin Knight, " Artificial Intelligence" Tata McGraw Hill Education Private Limited, 2011.

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Course Title	Cellular and Mobile Computing				
Course Code	EMT04351B				
Semester	M.Tech-CSE- 3rd Sem				
Course Credit	L	T	P	TC	
	3	1	-	4	
Prerequisites	Mobile Computing, Cellular Networks.				
Course Objectives	1. Introduce of wireless communication and mobile communication standards. 2. Provide understanding of advanced multiple access techniques, Mobile radio Propagation Models and modulation tech-niques 3. Provide understanding of digital cellular systems (GSM, CDMA, GPRS, W-CDMA etc.)				
Course Contents	**Unit- I** Introduction to cellular mobile systems – Basic Cellular System – Cellular communication infrastructure: Cells – Clusters – Cell Splitting – Frequency reuse concept and reuse distance calculation – Cellular system components – Operations of cellular systems – Handoff/Handover – Channel assignment – Fixed and dynamic – Cellular interferences: Co-Channel and adjacent channel and sectorization. **Unit-II MOBILE RADIO PROPAGATION MODELS** Radio wave propagation issues in personal wireless systems, Propagation models, Multipath fading and Base band impulse respond models, parameters of mobile multipath channels, Antenna systems in mobile radio. **Unit –III MODULATION TECHNIQUES** Overview analog and digital modulation techniques, Performance of various modulation techniques-Spectral efficiency, Error-rate, Power Amplification, Equalizing Rake receiver concepts, Diversity and space-time processing, Speech coding and channel coding.				

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	Unit- IV Channel Models: Properties of mobile radio channels – Intersymbol interference – Multipath and fading effects – Interleaving and diversity – Multiple access schemes (TDMA, FDMA, CDMA, SDMA) – Interuser interference – Traffic issues and cell capacity – Power control strategies – Channel assignment – Handoff **Unit –V** Introduction to modern cellular standards – 2G Architecture such as GSM and CDMA based – 2.5G – GPRS: GPRS and its features – GPRS network architecture – GPRS protocol architecture – GPRS backbone network – 3G standard details such as UMTS – Introduction to LTE.
Course Outcomes	1. Understand principles of wireless communication and, various mobile network architecture. 2. Understand various Modulation techniques for Mobile Radio. 3. Understand the information theoretical aspects (such as the capacity) of wireless channels 4. Realize various wireless and mobile cellular communication systems 5. Implement practical mobile applications.
Text Books	1. Theodore S. Rappaport, "Wireless Communications Principles and Practice", Second Edition, 2002. 2. Gottapu Sasibhushana Rao, "Mobile Cellular Communication" Pearson Education, 2012. 3. S. Rappaport, Wireless digital communications; Principles and practice, Prentice Hall, NJ, 1996. 4. Schiller, Mobile Communications; Pearson Education Asia Ltd., 2000.
Reference Books	1. Andrea Goldsmith, "Wireless Communications", Cambridge University Press, First Edition, 2005 2. William Stallings, "Wireless Communication and Networking", PHI, 2003. 3. C. Y. Lee, Mobile communications engineering: Theory and Applications, Second Edition, McGraw Hill, New York.1998.

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Course Title	Secure Communication				
Course Code	EMT04351C				
Semester	M.Tech-CSE- 3rd Sem				
Course Credit	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Computer Communication				
Course Objectives	1. To impart the students about the theory and technology behind the secure communication. 2. To be able to secure a message over insecure channel by various means. 3. To learn about how to maintain the Confidentiality, Integrity and Availability of a data. 4. To understand various protocols for network security to protect against the threats in the networks.				
Course Contents	Unit- I Introduction on security, security goals and types of attacks: Passive attack, active attack, attacks on confidentiality, attacks on integrity and availability, Security services and mechanisms. Unit- II Modular arithmetic: Groups, Ring, Fields. The Euclidean algorithm, Finite fields of the form GF(p) Polynomial arithmetic: Finite fields of the form GF (2n). Uniy- III Symmetric Ciphers, Symmetric Cipher Model Substitution Techniques, Caesar Cipher, Mono alphabetic Cipher, Play fair cipher, Hill cipher, Poly alphabetic Cipher, one time pad Unit- III Transposition techniques ,Block Ciphers, Data encryption Standards, DES Encryption, DES decryption 3 15% Differential and Linear Crypt analysis Advanced Encryption standard 2 The AES Cipher, substitute bytes transformation, Shift row transformation, Mix Column transformation Unit-IV Public key cryptosystem, Application for Public key cryptosystem requirements 2 20% RSA algorithm, Key management, Distribution of public key, public key certificates, Distribution of secret keys.				

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	Unit-V Intruders: Intrusion techniques, Intrusion detection, Statistical anomaly detection, Rule based intrusion detection, Distributed intrusion detection, Honey pot, Intrusion detection exchange format. 5 20% Password management: Password protection, password selection strategies.
Course Outcomes	Exposed to the different approaches that handle security and the algorithms in use for maintaining data integrity and authenticity. ii. Enabled student to appreciate the practical aspects of security features design and their implementation.
Text Books	1. Behrouz A. Forouzan, Cryptography and Network security Tata McGraw-Hill, 2008 2. William Stallings, Cryptography and Network security: principles and practice", 2nd Edition, Prentice Hall of India, New Delhi, 2002
Reference Books	1. Douglas A. Stinson, Cryptography, Theory and Practice, 2/e, Chapman & Hall, CRC Press Company, Washington, 2005. 2. Lawrence C. Washington, Elliptic Curves: Theory and Cryptography, Chapman & Hall, CRC Press Company, Washington, 2008. 3. N. Koeblitz: A course in Number theory and Cryptography, 2008 4. Thomas Koshy: Elementary Number Theory with Applications, 2/e, Academic Press, 2007 5. Tyagi and Yadav , Cryptography and network security, Dhanpatrai, 2012

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Course Title	**Preliminary Work on Dissertation**
Course Code	**EMT04303**
Semester	**M.Tech – CSE 3rd Sem**
Course Credit	<table><tr><td>**L**</td><td>**T**</td><td>**P**</td><td>**TC**</td></tr><tr><td>-</td><td>-</td><td>20</td><td>10</td></tr></table>
Prerequisites	-
Course Objectives	1. Demonstrate of well-defined selected project problem. 2. Encourage preparing one International Journal and attends two International Conferences related to their Final project. 3. Present effectively each part of the dissertation in terms of motivation, literature, methodology, experimentation and final conclusions

Course Contents	**A preliminary work must be completed as per the following:-**
	1. Well-defined Engineering Research – based Problem must be selected.
	2. Motivation to select such problem.
	3. Literature Survey: Part 1 (What other researchers have done so far?) .
	4. Literature Survey: Part 2 (What are the Voids found?).
	5. Problem Formulation (As per the voids detected).
	6. Solution Methodology with respect to the :
	    a. Flowchart and Algorithm.
	    b. What methods have been applied?
	    c. Why they have been applied?
	    d. How they have been applied?
	    e. Mathematical formulations to justify the work.
	    f. Case based studies (if any).
	    g. Results and Discussions (must be thorough).
	7. So far Observations and further planning's.
	8. Any help to the Society through the selected research based problem.

Text Books	-
Reference Books	-

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Course Title	Technical Paper Writing and Seminar			
Course Code	EMT04304			
Semester	M.Tech –CSE-3rd Semester			
Course Credits	**L**	**T**	**P**	**TC**
	4	**-**	**-**	**4**
Prerequisites	--			
Course Objectives	1. To build effective presentation skills 2. To develop writing reports and proposals			
Course Contents	Planning and Preparation, Word Order, Breaking up long sentences, Structuring Paragraphs and Sentences, Being Concise and Removing Redundancy, Avoiding Ambiguity and Vagueness. Clarifying Who Did What, Highlighting Your Findings, Hedging and Criticising, Paraphrasing and Plagiarism, Sections of a Paper, Abstracts. Introduction Review of the Literature, Methods, Results, Discussion, Conclusions, The Final Check key skills are needed when writing a Title, key skills are needed when writing an Abstract, key skills are needed when writing an Introduction, skills needed when writing a Review of the Literature skills are needed when writing the Methods, skills needed when writing the Results, skills are needed when writing the Discussion, skills are needed when writing the Conclusions useful phrases, how to ensure paper is as good as it could possibly be the first-time submission			
Course Outcomes	At the end of the course, the student will be able to: 1. Understand that how to improve your writing skills and level of readability 2. Learn about what to write in each section 3. Understand the skills needed when writing a Title 4. Ensure the good quality of paper at very first-time submission			

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Text Books	1.Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books)
	2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University
Reference Books	3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman'sbook
	4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011