Shri Rawatpura Sarkar University, Raipur

Examination Scheme & Syllabus

For

Master of Technology

In

Wireless Network

Semester-III

(Effective from the session: 2022-23)

**Faculty of Engineering,
Shri Rawatpura Sarkar University, Raipur**

SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH

FACULTY OF ENGINEERING

Two Years M.TECH Programme

Scheme of Teaching and Examination

M.TECH Third Semester

Wireless Network

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	EMT08301	Information Theory & Coding	3	1	-	4	30	70	100	3 Hrs.
2	EMT08351	**Elective –II**	3	1	-	4	30	70	100	3 Hrs
3	EMT08303	Preliminary Work on Dissertation	-	-	20	10	75	175	250	3 Hrs
4	EMT08304	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	**EMT08251 A**	Modeling and Simulation
2	**EMT08251 B**	Information Retrieval System
3	**EMT08251 C**	Network Security

Course Title	INFORMATION THEORY AND CODING				
Course Code	EMT08301				
Course Credits	L	T	P	TC	
	3	1	-	4	
Prerequisites	Basic knowledge about information theory and coding.				
Course Objectives	1. Understand error–control coding. 2. Understand encoding and decoding of digital data streams. 3. Be familiar with the methods for the generation of these codes and their decoding techniques. 4. Be aware of compression and decompression techniques. 5. Learn the concepts of multimedia communication.				
Course Contents	**UNIT - I** **Coding for Reliable Digital Transmission and storage**: Mathematical model of Information, A Logarithmic Measure of Information, Average and Mutual Information and Entropy, Types of Errors, Error Control Strategies, Huffman coding.x **UNIT - II** **Linear Block Codes :** Introduction to Linear Block Codes, Syndrome and Error Detection, Minimum Distance of a Block code, Error-Detecting and Error-correcting Capabilities of a Block code, Standard array and Syndrome Decoding, Probability of an undetected error for Linear Codes over a BSC, Hamming Codes. Applications of Block codes for Error control in data storage system. **UNIT - III** **Cyclic Codes:** Description, Generator and Parity-check Matrices, Encoding, Syndrome Computation and Error Detection, Decoding, Cyclic Hamming Codes, shortened cyclic codes, Error-trapping decoding for cyclic codes, Majority logic decoding for cyclic codes. **UNIT - IV**				

	Encoding of Convolutional Codes : Structural and Distance Properties, state, tree, trellis diagrams, maximum likelihood decoding, Sequential decoding, Majority- logic decoding of Convolution codes. Application of Viterbi Decoding and Sequential Decoding, Applications of Convolutional codes in ARQ system.
	UNIT - V
	Minimum distance and BCH bounds, Decoding procedure for BCH codes, Syndrome Computation and iterative algorithm, Error Location polynomials for single and double error correction.
Course Outcomes	1. Learn measurement of information and errors.
	1. 2. Obtain knowledge in designing various source codes and channel codes.
	2. 3. Design encoders and decoders for block and cyclic codes.
	3. 4. Understand the significance of codes in various applications.
Text Books	1. Error Control Coding- Fundamentals and Applications –Shu Lin, Daniel J.Costello,Jr, Prentice Hall, Inc 2014.
	2. Error Correcting Coding Theory-Man Young Rhee, McGraw – Hill Publishing 1989.
Reference Books	1. Digital Communications- John G. Proakis, 5th ed., , TMH 2008.
	2. Introduction to Error Control Codes-Salvatore Gravano-oxford.
	3. Error Correction Coding – Mathematical Methods and Algorithms – Todd K.Moon, 2006, Wiley India.
	4. Information Theory, Coding and Cryptography – Ranjan Bose, 2nd Edition, 2009, TMH.

Course Title	MODELING AND SIMULATION				
Course Code	EMT08251 A				
Course Credits	L	T	P	TC	
	3	1	-	4	
Prerequisites	Basic knowledge about electronic and computers.				
Course Objectives	1.Define the basics of simulation modeling and replicating the practical situations in organizations. 2. Generate random numbers and random variates using different techniques. 3. Develop simulation model using heuristic methods. 4. Analysis of Simulation models using input analyzer, and output analyzer. 5. Explain Verification and Validation of simulation model.				
Course Contents	**UNIT - I** **Introduction to Simulation:** Simulation, Advantages, Disadvantages, Areas of application, System environment, components of a system, Model of a system, types of models, steps in a simulation study. Simulation Examples: Simulation of Queuing systems, Simulation of Inventory System, Other simulation examples. **UNIT - II** **General Principles:** Concepts in discrete - event simulation, event scheduling/ Time advance algorithm, simulation using event scheduling. **Random Numbers:** Properties, Generations methods, Tests for Random number- Frequency test, Runs test, Autocorrelation test. **UNIT - III** **Random Variate Generation:** Inverse Transform Technique- Exponential, Uniform, Weibull, Triangular distributions, Direct transformation for Normal and log normal Distributions, convolution methods- Erlang distribution, Acceptance Rejection Technique **Optimisation Via Simulation:** Meaning, difficulty, Robust Heuristics, Random Search. **UNIT - IV** **Analysis of Simulation Data Input Modelling:** Data collection, Identification and				

	distribution with data, parameter estimation, Goodness of fit tests, Selection of input models without data, Multivariate and time series analysis. **Verification and Validation of Model** : Model Building, Verification, Calibration and Validation of Models. **UNIT - V** **Output Analysis** – Types of Simulations with Respect to Output Analysis, Stochastic Nature of output data, Measures of Performance and their estimation, Output analysis of terminating simulation, Output analysis of steady state simulations. **Simulation Softwares:** Selection of Simulation Software, Simulation packages, Trend in Simulation Software.
Course Outcomes	After completion of this course the students will be able to - 1. Describe the role of important elements of discrete event simulation and modeling paradigm. 2. Conceptualize real world situations related to systems development decisions, originating from source requirements and goals. 3. Develop skills to apply simulation software to construct and execute goal-driven system models. 4. Interpret the model and apply the results to resolve critical issues in a real world environment.
Text Books	1. System Design, Modeling, and Simulation using Ptolemy II, Ptolemy.org, 2014. 2. Simulation modeling and analysis / Averill M. Law, President Averill M. Law & Associates, Inc.
Reference Books	1. Jerry Banks, John S Carson, II, Berry L Nelson, David M Nicol, Discrete Event system Simulation, Pearson Education, Asia, 4th Edition, 2007, ISBN: 81-203-2832-9. 2. Geoffrey Gordon, System Simulation, Prentice Hall publication, 2nd Edition, 1978, ISBN: 81-203-0140-4. 3. Narsingh Deo, Systems Simulation with Digital Computer, PHI Publication (EEE), 3rd Edition, 2004, ISBN : 0-87692-028-8.

Course Title	INFORMATION RETRIEVAL SYSTEM				
Course Code	**EMT08251 B**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	The main objective of this course is to present the scientific support in the field of information search and retrieval.				
Course Objectives	1. Students must have the minimal concept of Data Base Management Systems. 2. They must also have the concept of different types of algorithms used for searching data. 3. They must also have the minimal knowledge of Natural language such as thesaurus, synonyms etc.				
Course Contents	**UNIT - I** **Introduction to Information Retrieval Systems:** Definition of Information Retrieval System, Objectives of Information Retrieval Systems, Functional Overview, Relationship to Database Management Systems, Digital Libraries and Data Warehouses **Information Retrieval System Capabilities:** Search Capabilities, Browse Capabilities, Miscellaneous Capabilities **UNIT - II** **Cataloging and Indexing:** History and Objectives of Indexing, Indexing Process, Automatic Indexing, Information Extraction **Data Structure:** Introduction to Data Structure, Stemming Algorithms, Inverted File Structure, N-Gram Data Structures, PAT Data Structure, Signature File Structure, Hypertext and XML Data Structures, Hidden Markov Models. **UNIT - III** **Automatic Indexing:** Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept Indexing, Hypertext Linkages **Document and Term Clustering:** Introduction to Clustering, Thesaurus Generation, Item Clustering, Hierarchy of Clusters				

	UNIT - IV **User Search Techniques:** Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of Boolean Systems, Searching the INTERNET and Hypertext **Information Visualization:** Introduction to Information Visualization, Cognition and Perception, Information Visualization Technologies. **UNIT - V** **Text Search Algorithms:** Introduction to Text Search Techniques, Software Text Search Algorithms, Hardware Text Search Systems **Multimedia Information Retrieval:** Spoken Language Audio Retrieval, Non-Speech Audio Retrieval, Graph Retrieval, Imagery Retrieval, Video Retrieval.
Course Outcomes	1. Describe the objectives of information retrieval systems. 2. Describe models like vector-space, probabilistic and language models to iidentify the similarity of query and document. 3. Implement clustering algorithms like hierarchical agglomerative clustering and k-means algorithm. 4. Understand relevance feedback in vector space model and probabilistic model. 5. Illustrate how N-grams are used for detection and correction of spelling errors.
Text Books	1. David A. Grossman, OphirFrieder, Information Retrieval – Algorithms and Heuristics, Springer, 2nd Edition(Distributed by Universal Press), 2004.
Reference Books	1. Gerald J Kowalski, Mark T Maybury Information Storage and Retrieval Systems: Theory and Implementation, Springer, 2004. 2. SoumenChakrabarti, Mining the Web : Discovering Knowledge from Hypertext Data, Morgan – Kaufmann Publishers, 2002. 3. Christopher D Manning, PrabhakarRaghavan, HinrichSchutze, An Introduction to Information Retrieval By Cambridge University Press, England, 2009.

Course Title	NETWORK SECURITY
Course Code	EMT08251 C
Course Credits	L T P TC
	3 1 - 4
Prerequisites	The students will be able to know advanced attacking techniques.
Course Objectives	1. To make student know, the essentials of computer security, also to provide the basic knowledge of security issues.
	2. To make students know, different cryptography techniques namely public and private key cryptography.
	3. To make students understand, network security protocol including firewall.
Course Contents	**UNIT- I**
	FOUNDATION OF CRYPTOGRAPHY AND SECURITY: -The OSI Security Architecture, A model for network Security, Symmetric cipher model Substitution techniques Mathematical Tools for Cryptography.
	Modular Arithmetic, Euclid's Algorithm. Design Principle of Block ciphers: Theory of Block Cipher Design, Feistel ciphers, DES and Triple DES, Strength Of DES, Modes of Operation (ECB, CBC, OFB, CFB).
	UNIT-II
	PUBLIC KEY CRYPTOGRAPHY: Prime Numbers and Testing for Primality, Principles of public key Cryptosystems RSA, Key Management Diffie- Hellman, key exchange, Hashes and Message Digests: Message Authentication codes, MD5, SHA-1, HMAC.
	UNIT- III
	DIGITAL SIGNATURES, CERTIFICATES, AND STANDARDS: Digital Signature Standard (DSS and DSA),Authentication: Kerberos V4, Electronic Mail Security: Pretty Good Privacy (PGP).
	System Security: Computer Virus, Firewall and Design Principles, Electronic Commerce Security: Secure Electronic Transaction (SET).
	UNIT-IV
	CYBER SECURITY FUNDAMENTALS & ATTACKING TECHNIQUES: Security Concepts: Cyber Crimes and Criminals: Definition of cyber-crime, types of cyber-crimes

	and types of cyber-criminals. Anti- forensics: Use of proxies, use of tunneling techniques. Fraud techniques: Phishing and malicious mobile code, Rogue antivirus, Click fraud. Threat Infrastructure: Botnets, Fast Flux and advanced fast flux. **UNIT-V** **CYBER SECURITY POLICY CATALOG:** Cyber Governance Issues, Internet Names and Numbers, Copyrights and Trademarks, Email and Messaging, Cyber User Issues, Cyber Crime, Geo location, Privacy, Cyber Conflict Issues, Intellectual Property Theft, Cyber Espionage.
Course Outcomes	1. The students will be able to understand cyber security fundamentals. 2. The students will have basic understanding of cryptography techniques and function. 3. The students will have in depth understanding of network security algorithms including Firewall. 4. The students will be able to know various advanced attacking techniques. 5. The students will be able to know various cyber security policies.
Text Books	1. Cryptography and Network Security, William Stalling, PHI. 2. Atul Kahate, "Cryptography and Network Security", Tata McGraw Hill, 2003. 3. Cyber Security Essentials, James Graham, Richard, Ryan CRC press, 2011
Reference Books	1. Cyber Security policy Guidebook, Jennifer, Jason, Paul, Marcus, Jeffery, Joseph. Wiley Publication,2012. 2. Robertra Bragg "Network Security: The Complete Reference", Tata McGraw Hill.

Course Title	PRELIMINARY WORK ON DISSERTATION				
Course Code	EMT08303				
Course Credits	L	T	P	TC	
	-	-	20	10	
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.
	 9.The thesis must be completed as per the following format:(Next Page).				

Text Books					
Reference Books					

Binding of thesis	Cover	Five Hard Cover Binding and two Soft Cover Binding
	Colour	Light Blue
	Margin Top	4 Cm
	Margin Bottom	4 Cm
	Margin Left	4 Cm
	Margin Right	2 Cm
	Printing on the Top	Title of the thesis in capital letters (24 font size) Times New Roman
	Printing in the middle of cover	Name of the candidate in capital letters (18 font size) Times New Roman
	Printing on Bottom	THESIS Submitted to SRU Raipur for the award of the Degree of Master of Technology in………………………………… (subject) with Specialization …………… Month, Year
	Printing on the Binding edge	The binding edge of the jacket should contain the name of the candidate, year and thesis title.
Inside of thesis	Printing	In 1 ½ space, All text in 11 Size with Ariel font and all equations and symbols in 12 size with Times Roman font.
	Margin Top	3 Cm
	Margin Bottom	3 Cm
	Margin Left	4 Cm
	Margin Right	2 Cm
	Quality of paper	Good quality (Executive of 85 GSM)
	Size of paper	29 cms long, 23 cms wide
	Table of contents	(i) Printing of cover to be repeated on first page
		(ii) Certificate of the supervisor(s)
		(iii) Acknowledgement
		(iv) Synopsis -To convey briefly the content of the thesis to draw attention to all new information and to the main conclusions. It should be factual and should be suitable for copying, quoting or indexing by information services.
		(v)Contents
		(vi) List of Tables
		(vii) List of Figures
		(viii)List of symbols and abbreviations, if any-The text which follows should have suitable titles and sub-titles with pages numbered at the top right hand corner 1 cm from top and 1 cm from right edge. First chapter should be 'Introduction' Second chapter should be "Review of Related Work" Third chapter should be "Problem Formulation and Solution Methodology" Fourth chapter should be "Experimental Results and Discussions" Fifth chapter should be "Applications of the work" and the last chapter should be 'Conclusions and Further Scope of the Work' Appendix (if any) can be kept after Bibliography
	Bibliography	Either the Harvard system, in which the names and dates given in the body of the text and the references to be alphabetically listed at the end of the thesis or a system in which numbers are inserted in the text e.g. [3], and references to those are given at the end of the thesis in as BIS system.
	List of Publications	**At least one UGC listed Journals and one International Conferences (All peer reviewed) must be there. Here the first author must be the Research Scholar and the other authors must be his/hers Supervisor (s).**

Course Title	TECHNICAL PAPER WRITING AND SEMINAR				
Course Code	EMT08303				
Course Credits	**L**	**T**	**P**	**TC**	
	-	-	4	2	
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	• Understand that how to improve your writing skills and level of readability • Learn about what to write in each section • Understand the skills needed when writing a Title • Ensure the good quality of paper at very first-time submission				
Text Books	1. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman'sbook 2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University.				

Reference Books	1. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman'sbook
	2. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011