Program Outcomes (PO's)

At the end of the program, students will be able to:

1. Independently carry out research /investigation and development work to solve practical problems.
2. Write and present a substantial technical report/document.
3. Demonstrate a degree of mastery over the area of computer Networks and Information Security.

Program Specific Outcomes (PSOs)

After successful completion of the program, students will be able to:

1. Develop solutions to real world problems in the emerging areas of Computer Networks and Cyber Security.

Systematically investigate and provide network and security solutions in multi-disciplinary domains.

S. No.	Subject Code	Subject Name	Course Outcomes
M. Tech(CNIS), I Semester of 2019-20			
1	19MT C101	Computational Number Theory	1. Apply number theory concepts to cryptography. 2. Solve some of the divisor problems. 3. Understand the importance of Euler's phi function in RSA crypto system. 4. Appreciate the importance of larger primes in coding theory. 5. Apply the theory of congruences to derive some of powerful theorems in number theory.
2	19IT C103	Advanced Algorithms	1. Analyse time and space complexities of algorithms. 2. Select suitable algorithmic strategy for solving real world problems. 3. Design solutions using appropriate data structures for a given problem. 4. Formulate solutions to problems on network flows, text data and computational geometry. 5. Understand number theory and cryptographic computations.
3.	19ME C103	Research Methodology and IPR	1. Define research problem, review and asses the quality of literature from various sources 2. Improve the style and format of writing a report for technical paper/ Journal report, understand and develop various research designs 3. Collect the data by various methods: observation, interview, questionnaires 4. Analyze problem by statistical techniques: ANOVA, F-test, Chi-square 5. Understand apply for patent and copyrights.

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4	19IT E106	Ethical Hacking	1. Understand the Cyber Laws and the impact of hacking. 2. Demonstrate how to prepare and conduct a physical penetration. 3. Understand ethics behind hacking and vulnerability disclosure. 4. Exploit the vulnerabilities related to computer system and networks using state of the art tools and technologies. 5. Understand the core concepts related to malware, hardware and software vulnerabilities and their causes.
5	19IT E112	Computational Intelligence	1. Solve problems using State-Space Search and Control Strategies. 2. Apply inference methods in propositional logic to prove statements. 3. Understand expert systems and probabilistic reasoning models. 4. Apply classification and clustering techniques on data sets and understand the working of neural networks. 5. Understand syntax and semantics of the natural language.
6	19EG A101	English for Research Paper Writing	1. Interpret the nuances of research paper writing. 2. Differentiate the research paper format and citation of sources. 3. To review the research papers and articles in a scientific manner. 4. Avoid plagiarism and be able to develop their writing skills in presenting the research work. 5. Create a research paper and acquire the knowledge of how and where to publish their original research papers.
7	19IT C105	Advanced Algorithms Lab	1. Implement tree structures. 2. Solve computational problems using different design techniques. 3. Apply appropriate techniques for solving a given problem using Graphs. 4. Perform Pattern Matching for text data. 5. Implement Cryptographic techniques to ensure security
8	19IT E118	Computational Intelligence Lab	1. Construct intelligent agent to play games. 2. Build intelligent agent for search. 3. Making optimization and inference algorithm for model learning. 4. Implement Machine learning algorithms in a structured environment. 5. Implement string operations using package NLTK.

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9	19ITC101	Cryptography and Network Security	1. Understand Security Requirements for various organizations. 2. Implement symmetric and asymmetric cryptography algorithms. 3. Describe Hash functions and digital signatures for Data Integrity. 4. Learn various aspects of key management and IP Security. 5. Identify Security Protocols and methods to provide solutions for a specific Security Problem.
10	19ITC102	Adhoc and Sensor Networks	1. Understand the operating principles of cellular networks, wireless LANs and PANs. 2. Illustrate routing and transport layer protocols over wireless networks. 3. Comprehend characteristics, applications and routing protocols for MANETs. 4. Analyse TCP and QoS solutions for adhoc networks. 5. Describe the architecture of wireless sensor networks, MAC layer support and routing protocols in MANETs.
11	19ITE101	Biometric Security	1. Demonstrate the knowledge of physical, biological science and engineering principles underlying the biometric systems. 2. Understand biometric systems at the component level. 3. Identify issues associated with the design and implementation of biometric systems. 4. Describe multi biometric systems. 5. Understand the role of biometrics in ensuring security
12	19ITE113	Data Science	1. Understand programming in Python. 2. Work with packages Numpy, Pandas and various file formats. 3. Apply pre-processing on raw data. 4. Visualise data and understand inferential statistics. 5. Apply machine learning algorithms for data analysis.
13	19CE A01	Disaster Mitigation and Management	1. Ability to analyse and critically examine existing programs in disaster management regarding vulnerability, risk and capacity at different levels 2. Ability to understand and choose the appropriate activities and tools and set up priorities to build a coherent and adapted disaster management plan

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			3. Ability to understand various mechanisms and consequences of human induced disasters for the participatory role of engineers in disaster management 4. To understand the impact on various elements affected by the disaster and to suggest and apply appropriate measures for the same 5. Develop an awareness of the chronological phases of disaster preparedness, response and relief operations for formulating effective disaster management plans and ability to understand various participatory approaches/strategies and their application in disaster management
14	19ITC104	Cryptography and Network Security Lab	1. Apply basic cryptographic techniques. 2. Generate cipher text using Symmetric KeyAlgorithms. 3. Implement UseAsymmetric KeyCryptographyAlgorithms. 4. Generate Digital Signatures using standard algorithms. 5. Implement hash functions to ensure Data Integrity.
15	19ITE119	Data Science Lab	1. Identify appropriate data structures for storing and processing the data. 2. Work with multiple kinds of data and various file formats. 3. Preprocess raw data and visualize the data. 4. Apply supervised and unsupervised algorithms. 5. Provide solutions to real world problems using machine learning algorithms.
16	19ITC106	Mini Project with Seminar	1. Formulate a specific problem and give solution. 2. Develop model/models either theoretical/practical/numerical form. 3. Solve, interpret/correlate the results and discussions. 4. Conclude the results obtained. 5. Write the documentation in standard format.
M. Tech(CNIS), III Semester of 2019-20			
17	19IT E107	Intrusion Detection (Program Elective-V)	1. Enumerate common pitfalls in the creation and evaluation of new Intrusion Detection Systems. 2. Comprehend Intrusion Detection principles and approaches in order to improve the security posture of an

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			3. Understand TCP dump and examine IP header. 4. Examine network traffic to identify threats that generate unusual traffic flows. 5. Implement models to monitor the security of the system.
18	19CSO101	Business Analytics (Open Elective)	1. To understand the basic concepts of business analytics 2. Identify the application of business analytics and use tools to analyze business data 3. Become familiar with various metrics, measures used in business analytics 4. Illustrate various descriptive, predictive and prescriptive methods and techniques 5. Model the business data using various business analytical methods and techniques
19	19IT C107	Dissertation Phase-I	1. Students will be exposed to self-learning various topics. 2. Students will learn to survey the literature such as books, national/ international refereed journals and contact resource persons for the selected topic of research. 3. Students will learn to write technical reports. 4. Students will develop oral and written communication skills to present. 5. Student will defend their work in front of technically qualified audience.
M. Tech(CNIS), IV Semester of 2019-20			
20	19IT C108	Dissertation Phase-II	1. Students will be able to use different experimental techniques and will be able to use different software/ computational/analytical tools. 2. Students will be able to design and develop an experimental set up/ equipment/test rig. 3. Students will be able to conduct tests on existing set ups/equipments and draw logical conclusions from the results after analyzing them. 4. Students will be able to either work in a research environment or in an industrial environment. 5. Students will be conversant with technical report writing and will be able to present and convince their topic of study to the engineering community.

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