

FINAL YEAR (2018-19)

| COURSE CODE | UNIVERSITY CODE | COURSE NAME |
|--------------------|------------------------|-----------------------------------|
| C-401 | NOE-075 | MOBILE APPLICATIONS DEVELOPMENT |
| C-402 | NCS-701 | DISTRIBUTED SYSTEMS |
| C-403 | NCS-702 | ARTIFICIAL INTELLIGENCE |
| C-404 | NCS-071 | SOFTWARE TESTING AND AUDIT |
| C-405 | NCS-072 | NEURAL NETWORKS |
| C-406 | NIT-701 | CRYPTOGRAPHY & NETWORK SECURITY |
| C-407 | NCS-751 | DISTRIBUTED SYSTEMS LAB |
| C-408 | NCS-752 | PROJECT |
| C-409 | NCS-753 | INDUSTRIAL TRAINING |
| C-410 | NOE-081 | NON-CONVENTIONAL ENERGY RESOURCES |
| C-411 | NCS-801 | DIGITAL IMAGE PROCESSING |
| C-412 | NCS-080 | PATTERN RECOGNITION |
| C-413 | NCS-081 | HIGH PERFORMANCE COMPUTING |
| C-414 | NCS-088 | SEMANTIC WEB AND WEB SERVICES |
| C-415 | NCS-851 | SEMINAR |
| C-416 | NCS-852 | PROJECT |
| C-417 | GP-701/ GP-801 | GP |

Mobile Applications (NOE-075): C-401

Year of Study: 2018-19

| | |
|----------------|---|
| C-401.1 | Students are able to understand, identify and create mobile applications with most suitable type and also able to perform requirements gathering, validation, publishing and delivery. |
| C-401.2 | Students are able to evaluate and justify the type and architecture they have chosen for their work and also able to analyze and compare their work with existing work in the field. |
| C-401.3 | Students understand, learn and apply designing applications with multimedia & web capabilities and integrate them with GPS, social media. They also learn about cloud environments and design patterns for mobile applications. |
| C-401.4 | Students get the knowledge of development of applications using android platform. They are also able to understand and remember various aspects of android environment, creating interfaces, data persistence using SQLite database and interaction with server-side apps through Google maps, GPS, WI-FI & social media. |
| C-401.5 | Students understand and gain knowledge for Objective-C, iOS features, UI and touch frameworks, data persistence using SQLite. Also learn introduction to swift its features and iOS marketplaces. |

Mobile Applications (NOE-075): C-401

Year of Study: 2018 – 19

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|----------|----------|----------|-----|----------|----------|----------|-----|-----|----------|------|----------|
| C401.1 | 2 | | | | | | | | | | | 3 |
| C401.2 | 3 | 2 | 2 | | | | 3 | | | 2 | | |
| C401.3 | 3 | 2 | | | | 2 | | | | 3 | | |
| C401.4 | 3 | 3 | 3 | | 3 | 3 | 3 | | | 3 | | |
| C401.5 | 3 | 2 | 3 | | 3 | 3 | 3 | | | 3 | | |
| C401 | 3 | 2 | 3 | | 3 | 3 | 3 | | | 3 | | 3 |

Mobile Applications (NOE -075): C-401

Year of Study: 2018 – 19

| CO | PSO1 | PSO2 |
|-------------|----------|----------|
| C-401.1 | 2 | |
| C-401.2 | 2 | 2 |
| C-401.3 | 3 | 2 |
| C-401.4 | 3 | 3 |
| C-401.5 | 3 | 3 |
| C401 | 3 | 3 |

Distributed Systems (NCS-701): C-402**Year of Study: 2018-19**

| | |
|----------------|---|
| C-402.1 | Students are able to understand the fundamental concepts, message passing and functioning of logical clocks in a distributed environment. |
| C-402.2 | Students are able to understand, analyze and resolve the resource sharing problem which occur in distributed systems. Students are able to analyze problems that comes in synchronization to avoid deadlock. |
| C-402.3 | Students are able to recognize faulty processors and the algorithm that deals with the distributed file system. Students are able to understand the algorithm that deals with distributed shared memory. |
| C-402.4 | Students are able to identify and evaluate the problems in developing distributed applications with fault tolerance and response recovery in case of a faulty system, |
| C402.5 | Students are able to understand the terminology of transactions and different locks in a concurrent environment. They are able to create their own log schedule with the fully understanding of applying different locks. |

Distributed Systems (NCS-701): C-402**Year of Study: 2018 – 19**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C402.1 | 3 | 2 | | 3 | 3 | 3 | | | | | 2 | 2 |
| C402.2 | 3 | 2 | | 2 | 3 | 3 | | | | | 2 | 2 |
| C402.3 | 3 | 2 | | 3 | 3 | 2 | | | | | 2 | 2 |
| C402.4 | 2 | 2 | | 3 | 3 | 3 | | | | | 2 | 2 |
| C402.5 | 3 | 2 | | 3 | 2 | 3 | | | | | 2 | 2 |
| C402 | 3 | 2 | | 3 | 3 | 3 | | | | | 2 | 2 |

Distributed Systems (NCS-701): C-402**Year of Study: 2018 – 19**

| CO | PSO1 | PSO2 |
|-------------|-------------|-------------|
| C402.1 | 3 | 3 |
| C402.2 | 3 | 3 |
| C402.3 | 3 | 3 |
| C402.4 | 3 | 3 |
| C402.5 | 3 | 3 |
| C402 | 3 | 3 |

Artificial Intelligence (NCS-702): C-403**Year of Study: 2018 – 19**

| | |
|----------------|---|
| C-403.1 | Students are able to understand, describe the key components of the artificial intelligence field and its importance in Computer Science in terms of intelligent agents. |
| C-403.2 | Students are able to analyze, formalize the problem as a state space, graph, design heuristics and selection of different search or game-based techniques to solve them. |
| C-403.3 | Students are able to apply the fundamentals of knowledge representation and evaluate the working knowledge of reasoning in the presence of incomplete and/or uncertain information. |
| C-403.4 | Students are able to understand and apply machine learning techniques to real-world problems on both complete and hidden data. |
| C-403.5 | Students are able to create the basics of pattern recognition process, classification techniques and apply the same on real world problems. |

Artificial Intelligence (NCS-702): C-403**Year of Study: 2018– 19**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C403.1 | 2 | 2 | | | | | | | | | | 3 |
| C403.2 | 3 | 3 | 3 | 3 | 3 | | | | 2 | | | 3 |
| C403.3 | 3 | 3 | 3 | 3 | 2 | | | | | | | 3 |
| C403.4 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | | 2 | | 3 | 3 |
| C403.5 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | | 2 | | 3 | 3 |
| C403 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | | 2 | | 3 | 3 |

Artificial Intelligence (NCS-702): C-403**Year of Study: 2018 – 19**

| CO | PSO1 | PSO2 |
|-------------|-------------|-------------|
| C-403.1 | 3 | 2 |
| C-403.2 | 3 | 3 |
| C-403.3 | 3 | 3 |
| C-403.4 | 3 | 3 |
| C-403.5 | 3 | 3 |
| C403 | 3 | 3 |

Software Testing & Audit (NCS 071): C- 404

Year of Study: 2018-2019

| | |
|----------------|--|
| C-404.1 | Students are able to understand the basics of a test plan and test oracles. Students are able to apply the Verification and Validation process. |
| C-404.2 | Students are able to analyze and apply different testing techniques. They are imparted with the skill to perform functional and structural testing. |
| C-404.3 | Students acquire skills to evaluate regression testing and are able to reduce the number of test cases, and perform Risk Analysis. |
| C-404.4 | Students get knowledge about various activities involved in software testing. They are able to generate automated test cases using genetic algorithm and software data generation tools. |
| C-404.5 | Students are able to exemplify testing of Object Oriented and Web based application. They understand the concept of Usability Testing, Security Testing and Post Deployment Testing. |

Software Testing & Audit (NCS 071): C- 404

Year of Study: 2018-2019

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C404.1 | 2 | 2 | | | | | | | | | | 3 |
| C404.2 | 3 | 3 | 3 | 3 | 3 | | | | 2 | | | 3 |
| C404.3 | 3 | 3 | 3 | 3 | 2 | | | | | | | 3 |
| C404.4 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | | 2 | | 3 | 3 |
| C404.5 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | | 2 | | 3 | 3 |
| C404 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | | 2 | | 3 | 3 |

Software Testing & Audit (NCS 071): C- 404

Year of Study: 2018-2019

| CO | PSO1 | PSO2 |
|--------------|-------------|-------------|
| C-404.1 | 3 | 2 |
| C-404.2 | 3 | 3 |
| C-404.3 | 3 | 3 |
| C-404.4 | 3 | 3 |
| C-404.5 | 3 | 3 |
| C-404 | 3 | 3 |

Neural Networks (NCS 073): C-405

Year of Study: 2018-2019

| | |
|----------------|--|
| C-405.1 | Students recall statistical concepts to analyze a classification problem and design tentative empirical solutions, they compare them and have skills to approve them and demonstrate through simulation results on Scilab/ Python. |
| C-405.2 | Students acquire skills, to be demonstrated through experimental assignments on Scilab, to analyze the AND/ OR and EX-OR problems and chose a suitable Perceptron/ MLP model, design it and justify the model so chosen. The students investigate the data set and apply the dimension reduction techniques to deduce a simpler model. |
| C-405.3 | Students learn the concepts of delta learning rule and are able to analyze/ synthesize MLP model with delta learning rule for application in regression problems. The students learn to exemplify the limitations and be able to rectify them and demonstrate the same on Scilab presentations. |
| C-405.4 | Students learn and acquire skills to apply the concepts Recurrent Neural Networks and Self Organizing maps to analyze a problem of dynamical nature in image processing/ meteorology, medical imaging, deduce the model design, apply the model and demonstrate, through Scilab experiments, that essential dynamics/ features of the system have been captured. |
| C-405.5 | Students learn the latest developments in allied subjects, which are demonstrated through class assignments and presentations. They prepare summary reports of comparison of various models based on their design complexity and approve them for application in various scenarios. |

Neural Networks (NCS-073): C-405

Year of Study: 2018– 19

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C-405.1 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 2 | 3 | 3 |
| C-405.2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 2 | 3 | 3 |
| C-405.3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 2 | 3 | 3 |
| C-405.4 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 2 | 3 | 3 |
| C-405.5 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 2 | 3 | 3 |
| C405 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 2 | 3 | 3 |

Neural Networks (NCS-073): C-405

Year of Study: 2018 – 19

| CO | PSO1 | PSO2 |
|-----------|-------------|-------------|
| C-405.1 | 3 | 3 |
| C-405.2 | 3 | 3 |
| C-405.3 | 3 | 3 |
| C-405.4 | 3 | 3 |

| | | |
|-------------|----------|----------|
| C-405.5 | 3 | 3 |
| C405 | 3 | 3 |

Cryptography & network security (NIT-701): C-406

Year of Study: 2018 – 19

| | |
|----------------|---|
| C-406.1 | Students are able to understand security attacks and apply classical encryption techniques and mechanisms to counterfeit them. |
| C-406.2 | Students are able to demonstrate the ability to interpret the mathematics behind different security standards like AES, PKI, RSA. |
| C-406.3 | Student identifies authentication requirements for network security with ability to analyze and apply various crypto hash functions, message authentication codes & digital signature algorithms. |
| C-406.4 | Students interpret various digital signature standards with ability to apply key distribution techniques for real-world applications. |
| C-406.5 | Students are able to understand and compare various techniques and standards for network, transport and application layer security, like IPSec, SSL, SET. |

Cryptography & network security (NIT-701): C-406

Year of Study: 2018 – 19

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|----------|----------|----------|----------|----------|----------|----------|-----|----------|------|------|----------|
| C-406.1 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | | 2 | | | 3 |
| C-406.2 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | | 2 | | | 2 |
| C-406.3 | 3 | 3 | 3 | 3 | 2 | 3 | 2 | | 3 | | | 2 |
| C-406.4 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | | 3 | | | 2 |
| C-406.5 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | | 3 | | | 2 |
| C406 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | | 3 | | | 2 |

Cryptography & Network Security (NIT-701): C-406

Year of Study: 2018 – 19

| CO | PSO1 | PSO2 |
|-------------|----------|----------|
| C-406.1 | 2 | 2 |
| C-406.2 | 2 | 2 |
| C-406.3 | 3 | 3 |
| C-406.4 | 2 | 3 |
| C-406.5 | 2 | 2 |
| C406 | 2 | 2 |

Distributed Systems lab (NCS -751): C-407**Year of Study: 2018 – 19**

| | |
|----------------|---|
| C-407.1 | Students are able to perform Resource allocation and deadlock detection and avoidance techniques in the distributed system. |
| C-407.2 | Students are able to understand remote procedure call for various applications. |
| C-407.3 | Students are able to understand IPC mechanism in distributed system. |
| C-407.4 | Students are able to Design and build application programs on distributed systems. |
| C-407.5 | Students are able to design and build newer distributed file systems for any OS |

Distributed Systems Lab (NCS -751): C-407**Year of Study: 2018 –19**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C-407.1 | 3 | 3 | | 3 | 3 | 3 | | | | | 2 | 2 |
| C-407.2 | 3 | 3 | | 3 | 3 | 3 | | | | | 2 | 2 |
| C-407.3 | 3 | 3 | | 3 | 3 | 3 | | | | | 2 | 2 |
| C-407.4 | 3 | 3 | | 3 | 3 | 3 | | | | | 2 | 2 |
| C-407.5 | 3 | 3 | | 3 | 3 | 3 | | | | | 2 | 2 |
| C407 | 3 | 3 | | 3 | 3 | 3 | | | | | 2 | 2 |

Distributed Systems Lab (NCS-751): C-407**Year of Study: 2018 – 19**

| CO | PSO1 | PSO2 |
|-------------|-------------|-------------|
| C-407.1 | 3 | 2 |
| C-407.2 | 3 | 2 |
| C-407.3 | 3 | 2 |
| C-407.4 | 3 | 2 |
| C-407.5 | 3 | 2 |
| C407 | 3 | 2 |

Project (NCS-752): C-408**Year of Study: 2018 – 19**

| | |
|----------------|--|
| C-408.1 | The students are able to work effectively in teams to accomplish a common goal. |
| C-408.2 | The students are able to develop the ability to communicate effectively with a wide range of audience. |
| C-408.3 | The students acquire the knowledge to undertake technical, research tasks and ethical response responsibilities to develop a software or hardware product. |
| C-408.4 | The students apply the knowledge for developing a business plan for an entrepreneurial venture and its implementation. |
| C-408.5 | The students develop the ability of self-learning and apply it in life- long learning. |

Project (NCS-752): C-408**Year of Study: 2018 – 19**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C-408.1 | | | 3 | 3 | 3 | 2 | | | 3 | 3 | 3 | 3 |
| C-408.2 | | | | | | | | | 3 | 3 | 2 | 3 |
| C-408.3 | 3 | 3 | 3 | 3 | 3 | 2 | | 3 | 3 | 3 | 3 | 3 |
| C-408.4 | 3 | 3 | 3 | 3 | 3 | | 2 | 3 | 2 | 3 | 3 | 2 |
| C-408.5 | 3 | 3 | 3 | 2 | 3 | | 2 | | 3 | | 2 | 3 |
| C408 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 |

Project (NCS-752): C-408**Year of Study: 2018 – 19**

| CO | PSO1 | PSO2 |
|-------------|-------------|-------------|
| C-408.1 | 3 | 2 |
| C-408.2 | 2 | 3 |
| C-408.3 | 3 | 3 |
| C-408.4 | 3 | 3 |
| C-408.5 | 3 | 3 |
| C408 | 3 | 3 |

Industrial Training (NCS-753): C-409**Year of Study: 2018– 19**

| | |
|----------------|--|
| C-409.1 | Students acquire 'real' working environment and get acquainted with the organization structure, business operations and administrative functions. |
| C-409.2 | Students develop hands-on experience in the student's related field so that they can relate and reinforce what has been taught at the institute. |
| C-409.3 | Students acquire knowledge of cooperation and to develop synergetic collaboration between industry and the institute in promoting a knowledgeable society. |
| C-409.4 | Students get stage for the future recruitment by the potential employers. And get awareness of the social, cultural, global and environmental responsibility as an engineer. |
| C-409.5 | Students acquire presentation and demonstration skills to effectively communicate the progress of the work to peers and superiors using audio/video, software tools. |

Industrial training (NCS-753):C-409**Year of Study: 2018– 19**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C-409.1 | | 3 | 3 | 2 | | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| C-409.2 | | | 2 | | | 3 | 3 | 3 | 3 | 3 | 3 | 2 |
| C-409.3 | | 2 | | | 3 | 2 | 3 | 3 | 2 | 3 | 2 | 3 |
| C-409.4 | | | 3 | | | 3 | 3 | 3 | 3 | 3 | 2 | 2 |
| C-409.5 | 2 | 2 | 2 | 2 | 3 | | 2 | 2 | 2 | | 3 | 2 |
| C409 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |

Industrial training (NCS-753):C-409**Year of Study: 2018– 19**

| CO | PSO1 | PSO2 |
|-------------|-------------|-------------|
| C-409.1 | 2 | 2 |
| C-409.2 | 3 | 3 |
| C-409.3 | 2 | 2 |
| C-409.4 | 2 | 2 |
| C-409.5 | 3 | 3 |
| C409 | 2 | 2 |

Non-Conventional Energy Resources (NOE-081): C-410**Year of Study: 2018– 19**

| | |
|----------------|--|
| C-410.1 | Students get awareness about causes of energy scarcity, its solution and availability of Non-Conventional sources of energy technologies. |
| C-410.2 | Students understand various renewable energy technologies and systems. |
| C-410.3 | Students are imparted with the knowledge of generation of energy from sun, water, wind, geothermal system, biomass, waves, tides and ocean thermal energy. |
| C-410.4 | Students are equipped with knowledge and understanding of various possible mechanisms about renewable energy projects and apply them in their fields. |
| C-410.5 | Students are able to analyze the performance and testing of batteries, characterization and durability of fuel cells. |

Non-conventional energy resources (NOE-081): C-410**Year of Study: 2018 – 19**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C-410.1 | 2 | 3 | 2 | | | 3 | 2 | | | | | 2 |
| C-410.2 | 2 | 3 | 2 | 2 | | 2 | 2 | | | | | 2 |
| C-410.3 | 2 | 2 | 2 | 2 | | | | | | | | 2 |
| C-410.4 | 3 | 2 | 2 | 2 | | | 3 | | | | | 2 |
| C-410.5 | 2 | 2 | 2 | 2 | | | 3 | | | | | 2 |
| C410 | 2 | 2 | 2 | 2 | | 3 | 3 | | | | | 2 |

Non-conventional energy resources (NOE-081): C-410**Year of Study: 2018 – 19**

| CO | PSO1 | PSO2 |
|-------------|-------------|-------------|
| C-410.1 | 2 | 2 |
| C-410.2 | 2 | 2 |
| C-410.3 | 3 | 2 |
| C-410.4 | 2 | 3 |
| C-410.5 | 2 | 2 |
| C410 | 2 | 2 |

Digital Image Processing (NCS-801): C-411**Year of Study: 2018 – 19**

| | |
|----------------|--|
| C-411.1 | The students demonstrate knowledge to perform basic operations like sampling and quantization. Students get knowledge about applications of digital image processing in different fields. |
| C-411.2 | The students acquire the skills to apply various image enhancement techniques and are able to compare and contrast the use of various filters in frequency domain. |
| C-411.3 | The students are able to utilize methods like histogram equalization, arithmetic/logic operations and filters for image enhancement in spatial domain |
| C-411.4 | The students develop skill to understand the issues encountered in image restoration. They are able to analyze different types of noise and apply various filters and morphological operations required for image restoration |
| C-411.5 | Student demonstrates the ability to apply techniques for image segmentation. Also, understands the concepts of image registration, a techniques often used in computer vision, medical imaging and for compiling and analyzing images from satellites. |

Digital Image Processing (NCS-801): C-411**Year of Study: 2018 – 19**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C-411.1 | 3 | 2 | | | | | | | | | | |
| C-411.2 | 3 | 3 | 3 | 2 | 3 | 2 | | | 2 | | | |
| C-411.3 | 3 | 3 | 3 | 2 | 3 | 2 | | | 2 | | | |
| C-411.4 | 3 | 3 | 3 | 3 | 3 | 2 | | | 2 | | | 2 |
| C-411.5 | 2 | 3 | 2 | 3 | 3 | 2 | | | 2 | | | 2 |
| C411 | 3 | 3 | 3 | 3 | 3 | 2 | | | 2 | | | 2 |

Digital Image Processing (NCS-801): C-411**Year of Study: 2018 – 19**

| CO | PSO1 | PSO2 |
|-------------|-------------|-------------|
| C-411.1 | 3 | 3 |
| C-411.2 | 3 | 3 |
| C-411.3 | 2 | 3 |
| C-411.4 | 3 | 3 |
| C-411.5 | 2 | 3 |
| C411 | 3 | 3 |

Pattern Recognition (NCS -080): C-412

Year of Study: 2018 – 19

| | |
|----------------|--|
| C-412.1 | Students are able to recall the basics of probability theory and develop skills, to be demonstrated through class assignments, to solve questions on the same. |
| C-412.2 | Students are able to demonstrate, through programming assignments, skills to classify a given sample based on some feature values |
| C-412.3 | Students are able to deduce the density parameters from a set of samples. Students are able to interpret the dimension of the data set from a given problem and demonstrate the skills, through lab assignments, to reduce the data dimension. |
| C-412.4 | Students are able to estimate the values of the parameters of an unknown distribution and demonstrate the same through lab assignments |
| C-412.5 | Students are able to infer the proximity among patterns and demonstrate, through lab assignments, his skills to separate the patterns |

Pattern Recognition (NCS-080): C-412

Year of Study: 2018 – 19

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C412.1 | 2 | 3 | 2 | 2 | 3 | 2 | | | | 2 | 2 | 3 |
| C412.2 | 2 | 3 | 3 | 3 | 3 | 3 | | | | 2 | 2 | 3 |
| C412.3 | 3 | 3 | 3 | 3 | 3 | 3 | | | | 2 | 2 | 3 |
| C412.4 | 3 | 3 | 3 | 3 | 3 | 3 | | | | 3 | 2 | 3 |
| C412.5 | 3 | 3 | 3 | 3 | 3 | 3 | | | | 3 | 3 | 3 |
| C412 | 3 | 3 | 3 | 3 | 3 | 3 | | | | 2 | 2 | 3 |

Pattern Recognition (NCS-080): C-412

Year of Study: 2018– 19

| CO | PSO1 | PSO2 |
|-------------|-------------|-------------|
| C412.1 | 3 | 3 |
| C412.2 | 3 | 3 |
| C412.3 | 2 | 3 |
| C412.4 | 3 | 3 |
| C412.5 | 3 | 3 |
| C412 | 3 | 3 |

High Performance Computing (NCS-081): C-413**Year of Study: 2018 – 19**

| | |
|----------------|---|
| C-413.1 | Students learn the concepts of parallel processing, as it pertains to high performance computing. |
| C-413.2 | Students acquire the skills to apply different Grid computing model. They execute security considerations in GLOBUS toolkit. |
| C-413.3 | Students are able to implement existing and new Cluster computing models with its architecture and functionalities of its components. |
| C-413.4 | Students develop skill to create Beowulf cluster model and different parallel programming libraries. They execute efficient and high performance parallel virtual machines. |
| C-413.5 | Students demonstrates the ability to interpret cloud computing model, its architecture, and are able to communicate about classification and functionalities of its components. |

High Performance Computing (NCS-081): C-413**Year of Study: 2018 – 19**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C-413.1 | 3 | 2 | | | | | | | | | | |
| C-413.2 | 3 | 3 | 3 | 2 | 3 | 2 | | | 2 | | | |
| C-413.3 | 3 | 3 | 3 | 2 | 3 | 2 | | | 2 | | | |
| C-413.4 | 3 | 3 | 3 | 3 | 3 | 2 | | | 2 | | | 2 |
| C-413.5 | 2 | 3 | 2 | 3 | 3 | 2 | | | 2 | | | 2 |
| C413 | 3 | 3 | 3 | 3 | 3 | 2 | | | 2 | | | 2 |

High Performance Computing (NCS-081): C-413**Year of Study: 2018– 19**

| CO | PSO1 | PSO2 |
|-------------|-------------|-------------|
| C-413.1 | 3 | 3 |
| C-413.2 | 3 | 3 |
| C-413.3 | 2 | 3 |
| C-413.4 | 3 | 3 |
| C-413.5 | 2 | 3 |
| C413 | 3 | 3 |

Semantic Web and Web Services (NCS-088):C-414

Year of Study:2018-19

| | |
|----------------|--|
| C-414.1 | The students get an exposure of Semantic Web, reasons of its origin, challenges and benefits of this emerging technology. Students are able to compare syntactic web and semantic web and also able to sketch an overall architecture of Semantic web. |
| C-414.2 | The students acquire skills to write and validate XML documents using DTDs (Document Type Definitions) and XML Schema. Students evaluate the concepts of graph-based RDF model, XML syntax-based RDF model, and RDF Schema. |
| C-414.3 | The students develop and analyze skills to model, create and reuse ontologies using Web Ontology Language (OWL). |
| C-414.4 | The students understand the concept of information retrieval in search engines and the methods to evaluate the performance of various searching techniques. Students are able to differentiate basic IR model with Semantic IR model. |
| C-414.5 | The students understand and acquire skills to apply logic and reasoning on the semantic web to provide user oriented search. |

Semantic Web and Web Services (NCS-088): C-414

Year of Study: 2018 – 19

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C-414.1 | | 2 | 2 | 2 | 3 | | | | | | 3 | 3 |
| C-414.2 | | 2 | 3 | 2 | 2 | | | | | | 3 | 2 |
| C-414.3 | | 2 | 2 | 2 | 2 | | | | | | 3 | 2 |
| C-414.4 | | 3 | 3 | 2 | 3 | | | | | | 2 | 3 |
| C-414.5 | | 2 | 3 | 2 | 2 | | | | | | 3 | 2 |
| C414 | | 2 | 3 | 2 | 2 | | | | | | 3 | 2 |

Semantic Web and Web Services (NCS-088): C-414

Year of Study: 2018 – 19

| CO | PSO1 | PSO2 |
|-------------|-------------|-------------|
| C-414.1 | 3 | 2 |
| C-414.2 | 3 | 2 |
| C-414.3 | 3 | 2 |
| C-414.4 | 3 | 2 |
| C-414.5 | 3 | 2 |
| C414 | 3 | 2 |

Seminar (NCS-851): C415**Year of Study: 2018 – 19**

| | |
|----------------|--|
| C-415.1 | Students are able to focus on presentations in a variety of formats. |
| C-415.2 | Students understand the need of personality growth, development and communication skills. |
| C-451.3 | Students get skills like extrovert in nature to maintain better interpersonal relationship on the job and off the job. |
| C-415.4 | Students acquire all round development to suit the industry needs. |
| C-415.5 | Students develop the skill to explore latest happening in technology and survey on selected topics, addressing issues of science in society today. |

Seminar (NCS-851): C-415**Year of Study: 2018 – 19**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C-415.1 | | 3 | | 2 | 2 | | 3 | 2 | 3 | 2 | 3 | 2 |
| C-415.2 | | 3 | | 3 | 2 | | 2 | | 3 | 3 | 3 | 2 |
| C-415.3 | | 3 | | 3 | 2 | | 2 | 2 | 3 | 2 | 3 | |
| C-415.4 | | 3 | | 3 | 3 | | 3 | | 3 | 3 | 3 | 2 |
| C-415.5 | | 3 | | 2 | 2 | | 2 | 2 | 3 | 3 | 3 | 2 |
| C415 | | 3 | | 3 | 2 | | 2 | 2 | 3 | | 3 | 2 |

Seminar (NCS-851): C-415**Year of Study: 2018 – 19**

| CO | PSO1 | PSO2 |
|--------------|-------------|-------------|
| C-415.1 | 3 | 3 |
| C-415.2 | 2 | 2 |
| C-415.3 | | |
| C-415.4 | 3 | 3 |
| C-415.5 | 3 | 3 |
| C-415 | 3 | 3 |

Project (NCS-852): C-416**Year of Study: 2018 – 19**

| | |
|----------------|--|
| C-416.1 | The students are able to work effectively in teams to accomplish a common goal. |
| C-416.2 | The students are able to develop the ability to communicate effectively with a wide range of audience. |
| C-416.3 | The students acquire the knowledge to undertake technical, research tasks and ethical response responsibilities to develop a software or hardware product. |
| C-416.4 | The students apply the knowledge for developing a business plan for an entrepreneurial venture and its implementation. |
| C-416.5 | The students develop the ability of self-learning and apply it in life- long learning. |

Project (NCS-852): C-416**Year of Study: 2018 – 19**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C-416.1 | | | 3 | 3 | 3 | 2 | | | 3 | 3 | 3 | 3 |
| C-416.2 | | | | | | | | | 3 | 3 | 2 | 3 |
| C-416.3 | 3 | 3 | 3 | 3 | 3 | 2 | | 3 | 3 | 3 | 3 | 3 |
| C-416.4 | 3 | 3 | 3 | 3 | 3 | | 2 | 3 | 2 | 3 | 3 | 2 |
| C-416.5 | 3 | 3 | 3 | 2 | 3 | | 2 | | 3 | | 2 | 3 |
| C416 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 |

Project (NCS-852): C-416**Year of Study: 2018 – 19**

| CO | PSO1 | PSO2 |
|-------------|-------------|-------------|
| C-416.1 | 3 | 2 |
| C-416.2 | 2 | 3 |
| C-416.3 | 3 | 3 |
| C-416.4 | 3 | 3 |
| C-416.5 | 3 | 3 |
| C416 | 3 | 3 |

General Proficiency (GP-701/801): C-417**Year of Study: 2018 – 19**

| | |
|----------------|---|
| C-417.1 | Students develop communication skills in order to encourage them to participate in extra curriculum activities. |
| C-417.2 | Students is appreciated for the sincerity and regularity. |
| C-417.3 | Students develop the overall personality in terms of human values and confidence. |
| C-417.4 | Students are prepared to face the challenges in the corporate world. |
| C-417.5 | Students identify their personal hobbies, so they can sharpen their personality as an individual, if not good in academics. |

G.P. (GP-701/GP-801): C-417**Year of Study: 2018 – 19**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C-417.1 | | | | | | | 2 | 2 | 2 | 3 | 2 | 3 |
| C-417.2 | | | | | | | | | | 3 | | 2 |
| C-417.3 | | | | | | 2 | | 3 | 2 | 3 | | 3 |
| C-417.4 | | | | | | 2 | 3 | 3 | 2 | 3 | 2 | 3 |
| C-417.5 | | | | | | 2 | 2 | 3 | 2 | 3 | 2 | 3 |
| C417 | | | | | | 2 | 2 | 3 | 2 | 3 | 2 | 3 |

G.P (GP-701/GP-801): C-417**Year of Study: 2018 – 19**

| CO | PSO1 | PSO2 |
|-------------|-------------|-------------|
| C-417.1 | 2 | 2 |
| C-417.2 | 2 | 2 |
| C-417.3 | 2 | 2 |
| C-417.4 | 2 | 2 |
| C-417.5 | 3 | 2 |
| C417 | 2 | 2 |

Entrepreneurship Development (NOE -071): C-418**Year of Study: 2018 – 19**

| | |
|----------------|--|
| C-418.1 | Students understand the problems of small-scale industries, their starts up and knowledge of various government organizations that support SSI. It helps to demonstrate the ability to provide a self-analysis in the context of an entrepreneurial career |
| C-418.2 | Students are able to analyze global and local business environment. It helps the students to demonstrate the ability to develop a well-presented feasible business plan, analyze the various financial aspects and sources for funding SSI. |
| C-418.3 | Students have better understanding of the financial aspects of starting an SSI. It helps in the preparation of financial accounts for SSI. It helps the students in understanding of diverse fields like inventory, quality, marketing and industrial relations applicable to start a SSI and for a better project management. |
| C-418.4 | Students are able to use critical thinking skills in business situations. It helps in applying effective written and oral communication skills and ability to apply the investigation and evaluation skills to various engineering projects. |
| C-418.5 | Students are able to apply the ethical understanding and perspective to business situations by understanding various entrepreneurial laws. |

Entrepreneurship development (NOE -071): C-418**Year of Study: 2018 – 19**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|-------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C-418.1 | - | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 2 |
| C-418.2 | - | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 |
| C-418.3 | - | 3 | 3 | 3 | 2 | 2 | 3 | 2 | 2 | 3 | 3 | 3 |
| C-418.4 | - | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 |
| C-418.5 | - | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 2 |
| C418 | - | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 |

Entrepreneurship development (NOE -071): C-418**Year of Study: 2018 – 19**

| CO | PSO1 | PSO2 |
|-------------|-------------|-------------|
| C-418.1 | | 2 |
| C-418.2 | | 2 |
| C-418.3 | | 2 |
| C-418.4 | | 2 |
| C-418.5 | | - |
| C418 | | 2 |

**Course Outcome Mapping With Program Outcome(PO) & Program Specific Outcome(PSO) –
Final Year (2018-19)**

Program Level Course –PO matrix of all Courses Final Year (2018-19)

| C O | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
|--------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| C-401 | 3 | 2 | 3 | | 3 | 3 | 3 | | | 3 | | 3 |
| C-402 | 3 | 2 | | 3 | 3 | 3 | | | | | 2 | 2 |
| C-403 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | | 2 | | 3 | 3 |
| C-404 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | | 2 | | 3 | 3 |
| C-405 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 0 | 3 | 2 | 3 | 3 |
| C-406 | 3 | 3 | 3 | 2 | 2 | 3 | 2 | | 3 | | | 2 |
| C-407 | 3 | 3 | | 3 | 3 | 3 | | | | | 2 | 2 |
| C-408 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 |
| C-409 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 2 |
| C-410 | 2 | 2 | 2 | 2 | | 3 | 3 | | | | | 2 |
| C-411 | 3 | 3 | 3 | 3 | 3 | 2 | | | 2 | | | 2 |
| C-412 | 3 | 3 | 3 | 3 | 3 | 3 | | | | 2 | 2 | 3 |
| C-413 | 3 | 3 | 3 | 3 | 3 | 2 | | | 2 | | | 2 |
| C-414 | | 2 | 3 | 2 | 2 | | | | | | 3 | 2 |
| C-415 | | 3 | | 3 | 2 | | 2 | 2 | 3 | | 3 | 2 |
| C-416 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 3 |
| C-417 | | | | | | 2 | 2 | 3 | 2 | 3 | 2 | 3 |
| C-418 | | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 3 | 3 | 2 |

Program Level Course –PSO matrix of all Courses Final Year (2018-19)

| CO | PSO1 | PSO2 |
|--------------|-------------|-------------|
| C-401 | 3. | 3 |
| C-402 | 3 | 3 |
| C-403 | 3 | 3 |
| C-404 | 3 | 3 |
| C-405 | 3 | 3 |
| C-406 | 2 | 2 |
| C-407 | 3 | 2 |
| C-408 | 3 | 3 |
| C-409 | 2 | 2 |
| C-410 | 2 | 2 |
| C-411 | 3 | 3 |
| C-412 | 3 | 3 |
| C-413 | 3 | 3 |
| C-414 | 3 | 2 |
| C-415 | 3 | 3 |
| C-416 | 3 | 3 |

| | | |
|--------------|---|---|
| C-417 | 2 | 2 |
| C-418 | | 2 |