OP JINDAL UNIVERSITY

Raigarh-Chhattisgarh

Scheme and Syllabus

of

B. Tech(01UG020)

Department of

Computer Science and Engineering

School of Engineering

Batch 2020-2024

Computer Science and Engineering
L: Lecture, T: Tutorial, P: Practical, C: Credit

Scheme of Teaching and Examination
B. Tech (Computer Science and Engineering) Prog. Code- 01UG020

Academic Semester VII & VIII

S. No.	Subject Code	Board of Study	SUBJECT	Periods per week			Scheme of Examination and Marks				Credit L+(T+P)/2 (L+P+T)
				L	T	P	PRE**		ESE*	Total Marks	
							Mid Sem	TA			
1	SOE-B-CSE-19-F01	CSE	Long term Industrial Internship	_	_	40		300	200	500	22
2	SOE-B-CSE-19-F02	CSE	Major Project	_	_	24		150	100	250	8
3	SOE-B-CSE-19-F03(1-3)	CSE	Elective IV	3	0	0	20	15	40	75	3
4	SOE-B-CSE-19-F04(1-3)	CSE	Elective V	3	0	0	20	15	40	75	3
5	SOE-B-CSE-19-F05(1-3)	CSE	Elective VI	3	0	0	20	15	40	75	3
6	SOE-B-CSE-19-F06(1-2)	CSE	Elective lab IV	0	0	2	0	30	20	50	2
7	SOE-B-CSE-19-F07(1-2)	CSE	Elective lab V	0	0	2	0	30	20	50	2
			Total	**9**	**0**	**68**	**60**	**555**	**460**	**1075**	**43**

* End Semester Examination
** Progress Review Examination

S. No.	Subject Code	Board of Study	SUBJECT	Periods per week			Scheme of Examination and Marks				Credit L+(T+P)/2 (L+P+T)
				L	T	P	PRE** Mid Sem	PRE** TA	ESE*	Total Marks	
	Academic Semester VII										
1	SOE-B-CSE-19-F01	CSE	Long term Industrial Internship	_	_	40		300	200	500	22
	Academic Semester VIII										
1	SOE-B-CSE-19-F02	CSE	Major Project	_	_	24		150	100	250	8
2	SOE-B-CSE-19-F03(1-3)	CSE	Elective IV	3	0	0	20	15	40	75	3
3	SOE-B-CSE-19-F04(1-3)	CSE	Elective V	3	0	0	20	15	40	75	3
4	SOE-B-CSE-19-F05(1-3)	CSE	Elective VI	3	0	0	20	15	40	75	3
5	SOE-B-CSE-19-F06(1-2)	CSE	Elective lab IV	0	0	2	0	30	20	50	2
6	SOE-B-CSE-19-F07(1-2)	CSE	Elective lab V	0	0	2	0	30	20	50	2
			Total	**9**	**0**	**28**	**60**	**255**	**260**	**575**	**21**

S. No.	Subject Code	Board of Study	SUBJECT	Periods per week			Scheme of Examination and Marks				Credit L+(T+P)/2 (L+P+T)
				L	T	P	PRE** Mid Sem	PRE** TA	ESE*	Total Marks	
	Academic Semester VII										
1	SOE-B-CSE-19-F03(1-3)	CSE	Elective IV	3	0	0	20	15	40	75	3
2	SOE-B-CSE-19-F04(1-3)	CSE	Elective V	3	0	0	20	15	40	75	3
3	SOE-B-CSE-19-F05(1-3)	CSE	Elective VI	3	0	0	20	15	40	75	3
4	SOE-B-CSE-19-F06(1-2)	CSE	Elective lab VI	0	0	2	0	30	20	50	2
5	SOE-B-CSE-19-F07(1-2)	CSE	Elective lab V	0	0	2	0	30	20	50	2
			Total	**9**	**0**	**4**	**60**	**105**	**160**	**325**	**13**
	Academic Semester VIII										
1	SOE-B-CSE-19-F01	CSE	Long term Industrial Internship	_	_	40		300	200	500	20
2	SOE-B-CSE-19-F02	CSE	Major Project	_	_	24		150	100	250	8
			Total	**0**	**0**	**64**		**450**	**300**	**750**	**28**

OR

Elective IV	
SOE-B-CSE-19-F03(1)	Human computer Interaction
SOE-B-CSE-19-F03(2)	Distributed System
SOE-B-CSE-19-F03(3)	Software Project Management

Elective V	
SOE-B-CSE-19-F04(1)	Soft Computing
SOE-B-CSE-19-F04(2)	Cyber Forensics and Malware
SOE-B-CSE-19-F04(3)	Semantic web and Social Network

Elective VI	
SOE-B-CSE-19-F05(1)	Signal Processing and data Analytics
SOE-B-CSE-19-F05(2)	Mobile Application Development
SOE-B-CSE-19-F05(3)	Natural Language Processing

Elective lab V	
SOE-B-CSE-19-F06(1)	Soft Computing Lab
SOE-B-CSE-19-F06(2)	Cyber Forensics Lab

Elective lab VI	
SOE-B-CSE-19-F07(1)	Natural Language Processing Lab
SOE-B-CSE-19-F07(2)	Signal Processing and data Analytics Lab

Detailed Syllabus

Programme	:	**B. Tech**	**Semester**	:	**Final Year**
Name of the Course	:	**Long term Industrial Internship**	**Course Code:**		**SOE-B-CSE-19-F01**
			No of Hours	:	**20 Hrs. / Week**
Credits	:	**20**			
Max Marks	:	**500**			

Course description:

As a part of the B. Tech curriculum, Industrial Training and seminar is a Practical course, which the students of CSE should undergo in reputed Private / Public Sector / Government organization / companies as industrial training of minimum four weeks to be undergone by the student in the summer vacation.

Course Outcomes (COs)

Course Outcomes: At the end of the course, the student will be able to:

CO Number	Course Outcome
CO1	To expose students to the 'real' working environment and get acquainted with the organization structure, business operations and administrative functions
CO2	To have hands-on experience in the students' related field so that they can relate and reinforce what has been taught at the university.
CO3	To promote cooperation and to develop synergetic collaboration between industry and the university in promoting a knowledgeable society
CO4	To set the stage for future recruitment by potential employers.

Procedures:

- Call up the company first before sending out the application letters.
- Find out whether there is a vacancy for industrial trainees.
- If the company has vacancies, you have to ask for the person in charge. The person in charge may be from the HR department, training department, or any other departments of the company.
- Try to get the name of the person so that you can address the letter to the person in charge correctly in your application letter.
- Choose a company and send the application letter received from your departmental training in-charge to the company directly.
- Wait for the company's response.
- If you don't get a response from the company within about 2 weeks or so, give them a call and enquire on your application status.
- It is your responsibility to contact and follow-up with the company of your choice.
- If you are not getting the company for training, immediately contact your training in-charge.

Note:

- Presentation will take place the following week after you complete your training. The presentation is evaluation by your class in-charge and a panel.
- Report must be submitted during presentation. The report evaluation is done by your class in-charge.
- A Viva voce comprising comprehensive questions based on your presentation and training undergone will be put forth after your presentation.

Grading:

- The training is graded based on:
- Presentation: 25%
- Student's reports: 30%
- Viva voce: 25%
- Student's Attendance: 20%

Task:

- Discuss with your company supervisor about any project or assignment/tasks.
- Try to understand the systems in your workplace - Organization, administrative or practical
- Record all the work done or knowledge gained
- Maintain logbook
- Email to lecturer softcopy every week

CO-PO/PSO Mapping

Course Name: Long term Industrial Internship												
Course Outcome	Program Outcome								PSO			
	1	2	3	4	5	6	7	8	1	2	3	4
CO1	2	2	-	3	3	3	2	2	2	2	2	2
CO2	2	2	1	2	2	2	2	2	1	2	2	1
CO3	2	1	2	2	1	1	2	2	1	2	2	1
CO4	-	-	-	2	1	2	2	2	1	2	2	1

Programme	**:**	**B. Tech.**	**Semester**	**:**	**Final Year**
Name of the Course:		**Major Project**	**Course Code:**		**SOE-B-CSE-19-F02**
Credits	**:**	**12**	**No of Hours**	**:**	**12 Hrs. / Week**
Max Marks	**:**	**300**			

Course Description:

The project work can be an investigative analysis of a technical problem in the relevant area, planning and/or design project, experimental project or computer application based project on any of the topics. Each project group will submit project synopsis by the end of eighth semester. Project evaluation committee consisting of three or four faculty members specialized in the various fields shall study the feasibility of each project work before giving consent.

Course Outcomes:

After Completion of the course Students will be able to:

CO Number	Course Outcome
CO1	gain in-depth knowledge and use adequate methods in the major subject/field of study.
CO2	create, analyze and critically evaluate different technical/research solutions
CO3	clearly present and discuss the conclusions as well as the knowledge and arguments that form the basis for these findings
CO4	identify the issues that must be addressed within the framework of the specific dissertation in order to take into consideration
CO5	apply principles of ethics and standards, skill of presentation and communication techniques.

Contents

Project work is of duration of one semester and is expected to be completed in the eighth semester. Each student group consisting of not more than four members is expected to design and develop a complete system or make an investigative analysis of a technical problem in the relevant area. The project batches are expected to fix their topics, complete preliminary studies like literature survey, field measurements etc. in the seventh semester.

Student shall study the topic of project work and define problem statement. The student shall evolve design and/or do experimental study and/or fabricate engineered device to obtain solution to the identified problem. The student shall prepare a report and shall present a seminar on the basis of work done at the end of semester.

CO-PO/PSO Mapping

Course Name: Major Project												
CO Number	**Program Outcome**								**PSO**			
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**
CO1	3	2	2	2	-	2	2	2	3	2	1	1
CO2	3	2	1	1	1	1	1	2	2	3	3	2
CO3	1	2	1	3	2	-	-	1	1	3	-	1
CO4	1	1	1	-	1	-	3	2	1	2	3	2
CO5	-	1	-	3	2	-	3	1	1	3	1	1

Note: 1: Low 2: Moderate 3: High

Programme	**:**	**B. Tech(01UG020)**	**Semester**	**:**	**Final Year**
Name of the Course:		**Human Computer Interaction**	**Course Code:**		**SOE-B-CSE-19-F03(1)**
			No of Hours :		**3 Hrs. / Week**
Credits	**:**	**3**			
Max Marks	**:**	**75**			

Course Description:

This course will discuss fundamental concepts and tools in designing an interactive system. This includes designing of menus, commands, natural languages, quality of service, User Documentation and Online Help. Document searching and visualization is also an integral part of this course.

Course Outcomes:

After Completion of the course Students will be able to:

CO Number	Course Outcome
CO1	Explain the capabilities of both humans and computers from the viewpoint of human information processing.
CO2	Describe typical human–computer interaction (HCI) models, styles, and various historic HCI paradigms.
CO3	Apply an interactive design process and universal design principles to designing HCI systems.
CO4	Describe and use HCI design principles, standards and guidelines.
CO5	Analyze and identify user models, user support, socio-organizational issues, and stakeholder requirements of HCI systems.

Syllabus:

Unit-I: Introduction to HCI

Usability of Interactive Systems- introduction, usability goals and measures, usability motivations, universal usability, goals for our profession Managing Design Processes: Introduction, Organizational design to support usability, Four pillars of design, development methodologies, Ethnographic observation, Participatory design, Scenario Development, Social impact statement for early design review, legal issues, Usability Testing and Laboratories.

Unit-II: Interaction with the Application:

Menu Selection, Form Fill-In and Dialog Boxes: Introduction, Task- Related Menu Organization,
Single menus, Combinations of Multiple Menus, Content Organization, Fast Movement Through
Menus, Data entry with Menus: Form Fill-in, dialog Boxes, and alternatives, Audio Menus and menus for Small Displays.

Unit-III: Command and Natural Languages:

Introduction, Command organization Functionality, Strategies and Structure, Naming and Abbreviations, Natural Language in Computing Interaction Devices: Introduction, Keyboards and Keypads, Pointing Devices, Speech and Auditory Interfaces, Displays- Small and large.

Unit-IV: Quality of Service

Introduction, Models of Response-Time impacts, Expectations and attitudes, User Productivity, Variability in Response Time, Frustrating Experiences Balancing Function and Fashion: Introduction, Error Messages, Non-anthropomorphic Design, Display Design, Web Page Design, Window Design, Color.

Unit-V: User Documentation and Online Help

Introduction, Online Vs Paper Documentation, reading from paper Vs from Displays, Shaping the content of the Documentation, Accessing the Documentation, Online tutorials and animated documentation, Online communities for User Assistance, The Development Process. Information Search: Introduction, searching in Textual Documents and Database Querying, Multimedia Document Searches, Advanced Filtering and Searching Interfaces Information Visualization: Introduction, Data Type by Task Taxonomy, Challenges for Information Visualization.

Text Books

- Ben Shneiderman, Catherine Plaisant, Maxine Cohen, Steven M Jacobs, "Designing the User Interface, Strategies for Effective Human Computer Interaction", 5th Edition, Pearson
- Wilbert O Galitz, "The Essential guide to user interface design", 2nd Edition, , Wiley DreamaTech

Reference Books

- Dan R.Olsan, "Human Computer Interaction", Cengage ,2010
- Ben Shneidermann, "Designing the user interface", 4th Edition, PEA.
- Soren Lauesen, "User Interface Design", PEA
- Prece, Rogers, Sharps, "Interaction Design", Wiley

CO-PO&PSO Correlation

Course Name: Human Computer Interaction												
	Program Outcomes								PSOs			
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**
CO1:		**2**	**2**			**1**			**2**		**1**	**2**
CO2:		**1**	**2**			**1**			**1**		**1**	**2**
CO3:		**2**	**2**			**1**			**1**		**1**	**2**
CO4:		**1**	**2**			**1**			**2**		**1**	**2**
CO5:		**2**	**2**			**1**			**2**		**1**	**2**

Note: 1: Low 2.: Moderate 3: High

Programme	**:**	**B. Tech (01UG020)**	**Semester**	**:**	**Final Year**
Name of the Course:		**Distributed System**	**Course Code:**		**SOE-B-CSE-19-F03(2)**
Credits	**:**	**3**	**No of Hours**	**:**	**3 Hrs. / Week**
Max Marks	**:**	**75**			

Course Description:

The study of basic techniques in the design and development of Distributed Systems and understanding solutions of the fundamental problems in distributed systems like mutual exclusion, deadlock detection, termination detection, leader election, fault tolerance, etc.

Course Outcomes:

After Completion of the course Students will be able to:

CO Number	Course Outcome
CO1	Identify models of distributed system.
CO2	analyze the current popular distributed systems such as peer-to-peer (P2P) systems.
CO3	Analyze algorithms for coordination, communication, security and synchronization in distributed systems.
CO4	Classify distributed shared memory models.

Syllabus:

Unit-I: Introduction

Various Paradigms in Distributed Applications, Remote Procedure Call, Remote Object Invocation, Message-Oriented Communication, Unicasting, Multicasting and Broadcasting, Group Communication.

Unit-II: Issues in Distributed Operating System

Threads in Distributed Systems, Clock Synchronization, Causal Ordering, Global States, Election Algorithms, Distributed Mutual Exclusion, Distributed Transactions, Distributed Deadlock, Agreement Protocols.

Unit-III: Distributed Shared Memory

Data-Centric Consistency Models, Client-Centric Consistency Models, Ivy, Munin, Distributed Scheduling, Distributed File Systems, Sun NFS.

Unit-IV: Introduction to Fault Tolerance

Distributed Commit Protocols, Byzantine Fault Tolerance, Impossibilities in Fault Tolerance.

Unit-V: Case Studies:

Distributed Object-Based System, CORBA, COM+, Distributed Coordination-Based

System, JINI.

Text Books:

- George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems Concepts and Design Ⅲ", 5th Edition, Pearson Education, 2012
- Pradeep K Sinha, "Distributed Operating Systems: Concepts and Design", Prentice Hall of India, 2007

Reference Books:

- Hagit Attiya, Jennifer Welch, "Distributed Computing: Fundamentals, Simulations and Advanced Topics", Wiley Edition 2004
- Mukesh Singhal, Niranjan Shivaratri, "Advanced Concepts in Operating Systems", McGraw Hill Series in Computer Science, 1994
- A.S.Tanenbaum, M.Van Steen, "Distributed Systems", Pearson Education, 2004
- Kshemkalyani, Ajay D, Mukesh Singhal. "Distributed computing: principles, algorithms, and systems", Cambridge University Press, 2011

CO-PO & PSO Correlation

Course Name: Distributed System												
	Program Outcomes								PSOs			
Course Outcomes	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	2					2			2	1	1	
CO2:	2	2	1	2		1			2	1	1	
CO3:	2	3		3	2	1			2	2		2
CO4:	2		2							2		

Note: 1: Low 2.: Moderate 3: High

Programme	**:**	**B. Tech (01UG020)**	**Semester**	**:**	**Final Year**
Name of the Course:		**Software project management**	**Course Code:**		**SOE-B-CSE-19-F03(3)**
			No of Hours	**:**	**3 Hrs. / Week**
Credits	**:**	**3**			
Max Marks	**:**	**75**			

Course Description:

This course offers lectures, tutorials, case studies, laboratory, and online interaction to provide a foundation in software engineering concepts. It includes representing information with the traditional and modern approaches in software engineering including knowledge of CASE tools. This course further explains concepts of software development process, agile, scrum and DevOps development process, software project management, software requirement and design engineering, development, quality assurance, automated testing, operational support, and software maintenance.

Course Outcomes:

After Completion of the course Students will be able to:

CO Number	Course Outcome
CO1	Understand various software process models such as waterfall, Spiral and evolutionary models
CO2	Demonstrate effective teamwork and strong working knowledge of ethics and professional responsibility for managing the software projects. .
CO3	Demonstrate effective project execution, quality control and risk management techniques that result in successful projects.
CO4	Conduct project planning activities that accurately forecast project costs, timelines and quality.
CO5	Conduct standard tests and measurements for validation of projects; to conduct, analyze, and interpret results; and to apply results to improve processes.

Syllabus:

Unit-I: Introduction Software Engineering

Software Engineering definition; S/W characteristics, applications, Life Cycle Models – Waterfall (classical and iterative), Spiral Model with quadrants and its scope, Prototyping, RAD Models

Comparison of above models and their applications

Unit-II: Requirements Analysis and Specifications

Requirements Engineering-Crucial steps; types of requirements, Requirements documentation – Nature of SRS, characteristics of a good SRS, Use case approach with

guidelines, Problems on Use Case diagram, DFD (Level 0, 1, 2 and 3)

Unit-III: Software Project Planning
Size Estimation – LOC and Function Count, Albrecht FPA, Cost estimation– Static, Single variable and Multivariable Models (SEL, Watson Felix model), The Constructive Cost model: basic, intermediate model, Cost-benefit evaluation techniques (Net Profit, Payback period, ROI, NPV computation).

Unit-IV: Software Metrics
Understanding metrics: definition, process metrics, product and project metrics, areas of applications, Product metrics – Metrics for source code; metrics for testing (Halstead metrics); Metrics for maintenance.

Unit-V: Project Quality and Risk Management
Understanding Software Quality attributes, McCall Model. ISO 9126 and CMM Model Software Risk Management: Types of Risks involved Phases of Risk Management.

Textbooks:

- Software Engineering, New Age International Third Edition, Aggarwal, K. K. & Singh, Yogesh
- Software Project Management, Tata Mcgraw Hill, New Delhi, Fifth Edition, Bob Hughes and Mike Cotterell

Reference Books:

- Fundamentals of Software Engineering by Rajib Mall
- Software Engineering by Ian Sommerville, Pearson Education, New Delhi
- Software Engineering Principles and Practices, OXFORD, New Delhi by Deepak Jain
- Software Project Management – A Concise Study by S.A. Kelkar.

CO-PO & PSO Correlation

Course Name: Software project management												
	Program Outcomes								**PSOs**			
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**
CO1:	**1**	**3**	**1**							**2**	**1**	**1**
CO2:	**1**	**2**							**1**		**1**	
CO3:	**2**	**2**							**1**		**1**	**1**
CO4:	**1**	**2**	**1**						**1**	**1**	**1**	**1**
CO5:										**2**	**2**	**2**

Note: 1: Low 2.: Moderate 3: High

Programme	**:**	**B. Tech (01UG020)**	**Semester**	**:**	**Final Year**
Name of the Course:		**Soft Computing**	**Course Code:**		**SOE-B-CSE-19-F04(1)**
Credits	**:**	**3**	**No of Hours**	**:**	**3 Hrs. / Week**
Max Marks	**:**	**75**			

Course Description:

This course covers the theory and applications of neural networks, fuzzy logic, evolutionary strategies and genetic algorithms in developing intelligent systems with examples and practical applications.

Course Outcomes:

After Completion of the course Students will be able to:

CO Number	Course Outcome
CO1	Apply basic principles of AI in solutions that require problem solving, inference, perception, knowledge representation, and learning.
CO2	Demonstrate proficiency in applying scientific method to models of machine learning and to build intelligent systems through soft computing techniques.
CO3	Recognize the feasibility of applying a soft computing methodology for a particular problem.
CO4	Develop intelligent machines to provide solutions to real world problems, which are not modeled or too difficult to model mathematically.
CO5	Exploit the tolerance for Approximation, Uncertainty, Imprecision, and Partial Truth in order to achieve close resemblance with human like decision making.

Syllabus:

Unit-I:

Overview & Search Techniques: Introduction to AI, Problem Solving, State space search, Blind search: Depth first search, Breadth first search, Informed search: Heuristic function, Hill climbing search, Best first search, A* & AO* Search, Constraint satisfaction. Game tree, Evaluation function, Mini-Max search, Alpha-beta pruning, Games of chance.

Unit-II:

Knowledge Representation (KR): Introduction to KR, Knowledge agent, Predicate logic, WFF, Inference rule & theorem proving forward chaining, backward chaining, resolution; Propositional knowledge, Boolean circuit agents. Rule Based Systems, Forward

reasoning: Conflict resolution, backward reasoning: Use of Back tracking, Structured KR: Semantic Net - slots, inheritance, Frames- exceptions and defaults attached predicates, Conceptual Dependency formalism and other knowledge representations.

Unit-III:

Neural Networks Neuron, Artificial Neuron and its model, activation functions, Neural network architecture: single layer and multilayer feed forward networks, recurrent networks. Various learning techniques; perception and convergence rule, Auto-associative and hetro-associative memory. Architecture: perceptron model, solution, single layer artificial neural network, multilayer perception model; back propogation learning methods, effect of learning rule co-efficient; back propagation algorithm, factors affecting backpropagation training, applications.

Unit-IV:

Fuzzy Logic Basic concepts of fuzzy logic, Fuzzy sets and Crisp sets, Fuzzy set theory and operations, Properties of fuzzy sets, Fuzzy and Crisp relations, Fuzzy to Crisp conversion. Membership functions, interference in fuzzy logic, fuzzy if-then rules, Fuzzy implications and Fuzzy algorithms, Fuzzyfications & Defuzzificataions, Fuzzy Controller, Industrial applications.

Unit-V:

Genetic Algorithm Basic concepts, working principle, procedures of GA, flow chart of GA, Genetic representations, (encoding) Initialization and selection, Genetic operators: Crossover, Mutation, Generational Cycle, GA optimization problem, applications.

Text Books:

- Elaine Rich, Kevin Knight, “Artificial Intelligence”, Tata MeGraw Hill.
- Dan W.Patterson, “Introduction to Artificial Intelligence and Expert Systems”, Prentice Hall of India
- S N Sivanandam, S N Deepa, “Principles of Soft Computing”, Wiley India, 2007.
- Fakhreddine 0 Karray, Clarence D Silva, “Soft Computing and Intelligent System Design”, Pearson Edition, 2004.

Reference Books:

- Nils J.Nilsson, “Principles of Artificial Intelligence”, Narosa Publishing house
- Clocksin & C.S. Melish, “Programming in PROLOG”, Narosa Publishing house
- M. Sasikumar, S.Ramani, et. al., “Rule based Expert Systems-A practical Introduction”, Narosa Publishing House
- Siman Haykin, “Neural Netowrks”, Prentice Hall of India
- Timothy J. Ross, “Fuzzy Logic with Engineering Applications”, Wiley India

CO-PO & PSO Correlation

Course Name: Soft Computing												
	Program Outcomes								PSOs			
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**
CO1:	**1**	**2**				**1**			**1**	**2**		
CO2:	**1**	**2**				**1**			**1**	**2**		
CO3:	**1**	**2**				**1**			**1**		**1**	
CO4:	**1**		**1**			**1**			**1**		**1**	
CO5:	**1**	**2**				**1**			**1**		**1**	

Note: 1.: Low 2.: Moderate 3.: High

Programme	**:**	**B. Tech(01UG020)**	**Semester**	**:**	**Final Year**
Name of the Course:		**Cyber Forensics and Malware**	**Course Code:**		**SOE-B-CSE-19-F04(2)**
			No of Hours	**:**	**3 Hrs. / Week**
Credits	**:**	**3**			
Max Marks	**:**	**75**			

Course Description:

This course is designed to introduce the principles and practices generally required to investigate the cyber-crimes. It includes the study of various data acquisition process and tools, evidence analysis procedures and methodologies, taxonomy of digital forensics tools, analysis of network, file signature, malware analysis, malware classification, volatile memory forensics, mobile devices and cloud forensics which are the state-of-the-art requirement in the present and upcoming digital world followed by digital forensics examiner.

Course Outcomes:

After Completion of the course Students will be able to:

CO Number	Course Outcome
CO1	Understand the scope of digital forensic investigation and severity of crime scene.
CO2	Acquire forensic image of suspected digital device under investigation.
CO3	Examine the evidence using open source and freeware tools.
CO4	Apply different computer forensic tools for conducting malware analysis and reverse engineering.
CO5	Perform investigation practices using different operating systems on different class of malwares.

Syllabus:

Unit-I: Basics of Digital Forensics

Fundamentals of Computer forensics investigation, computer forensics versus other related disciplines, A brief History of computer Forensics, benefits of computer forensics, Modern day digital forensics, Introduction to IT Act 2000, Volatile and Non-Volatile Memory, challenges in digital forensics, Strategies for forensics investigations, importance of event reconstruction.

Unit-II: Memory Analysis

Memory organization concept, Data storage concepts, Disk partition, Data Acquisition and Authentication Process, Non-volatile memory analysis: overview of various File systems (FAT/NTFS/EXT/UFS etc.), data recovery concepts, file search and recovery, file carving approach, Volatile memory analysis: dumping RAM image, RAM analysis,

Volatility framework.

Unit-III: Network Forensics

Introduction to WireShark, Introduction to TCPDump, investigating netrowk traffic, investigating network intrusions, study and analysis of benchmark network traffic dumps, analysis of cyber-attacks, understanding attack signature and behavior, router forensics.

Unit-IV: Malware Analysis

Introduction to malware, Basic Static and Dynamic Analysis, Overview of Windows file format, PEView.exe, Patching Binaries, Disassembly (objdump, IDA Pro), Introduction to IDA, Introduction to Reverse Engineering, Extended Reverse Engineering using GDB and IDA, Advanced Dynamic Analysis – debugging tools and concepts, Malware Behavior – malicious activities and techniques, Analyzing Windows programs – WinAPI, Handles, Networking , COM, Data Encoding, Malware Countermeasures, Covert Launching and Execution

Unit-V: Forensic Tools and Case Studies

Evaluating Computer Forensics Tool Needs, Introduction to Kali Linux, Types of Computer Forensics Tools, Tasks Performed by Computer Forensics Tools, Tool Comparisons, Other Considerations for Tools, Computer Forensics Software Tools, Command-Line Forensics Tools, Other GUI Forensics Tools, Overview of Computer Forensics Hardware Tools, Forensic Workstations, Use Case of Write-Blocker Case Study: IoT device forensics, Drone Forensics, Smart TV Forensics, Gaming Console Forensics etc.

Text Books:

- Brian Carrier, "File System Forensic Analysis", Pearson Education.
- Michael Sikorski, Andrew Honig, "Practical Malware Analysis", No Starch Press,2012
- Eoghan Casey, "Handbook of Digital Forensics and Investigation", 1st edition, Academic Press.
- Jamie Butler, Greg Hoglund, "Rootkits: Subverting the Windows Kernel", Addison-Wesley, 2005
- Dang, Gazet, Bachaalany, "Practical Reverse Engineering", Wiley,2014

Reference Books:

- Mangesh M. Ghonge, Sabyasachi Pramanik, Ramchandra Mangrulkar, Dac-Nhuong Le, "Cyber Security and Digital Forensics: Challenges and Future Trends", Wiley-Scrivener
- Greg Gogolin, "Digital Forensics Explained", 2nd Edition, RC Press/Taylor & Francis Group
- Chuck Easttom, "Digital Forensics, Investigation, and Response", 4th Edition, Jones & Bartlett Learning

- Darren R. Hayes, "A Practical Guide to Digital Forensics Investigations", 2nd Edition, Pearson IT Certification

CO-PO & PSO Correlation

Course Name: Cyber Forensics and Malware												
	Program Outcomes								PSOs			
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**
CO1:	**3**	**2**	**2**			**2**	**3**		**3**	**1**	**1**	**1**
CO2:		**2**	**1**			**1**			**1**	**2**	**2**	**1**
CO3:	**3**	**2**				**2**	**1**		**2**	**3**	**1**	**1**
CO4:	**3**	**2**	**1**			**2**	**1**		**2**	**3**	**1**	**1**
CO5:	**3**	**2**	**2**			**2**	**2**		**3**	**2**	**2**	**2**

Note: 1.: Low 2.: Moderate 3.: High

Programme :	**B. Tech(01UG020)**	**Semester** :	**Final Year**
Name of the Course:	**Semantic Web and Social Networks**	**Course Code:**	**SOE-B-CSE-19-F04(3)**
		No of Hours :	**3 Hrs. / Week**
Credits :	**3**		
Max Marks :	**75**		

Course Description:

The Course explains the analysis of the social Web and the design of a new class of applications that combine human intelligence with machine processing. It will help in describe how the Semantic Web provides the key in aggregating information across heterogeneous sources and understand the benefits of Semantic Web by incorporating user-generated metadata and other clues left behind by users.

Course Outcomes:

After Completion of the course Students will be able to:

CO Number	Course Outcome
CO1	Understand Intelligent web application and logic to develop a semantic web
CO2	Understand and knowledge representation for the semantic web.
CO3	create ontology
CO4	Understand the basics of Semantic Web and Social Network.
CO5	Evaluate Web- based social network and Ontology.

Syllabus:

Unit-I: Web Intelligence

Thinking and Intelligent Web Applications, The Information Age, The World Wide Web, Limitations of Today's Web, The Next Generation Web, Machine Intelligence, Artificial Intelligence, Ontology, Inference engines, Software Agents, Berners-Lee www, Semantic Road Map, Logic on the semantic Web.

Unit-II: Knowledge Representation for the Semantic Web

Ontologies and their role in the semantic web, Ontologies Languages for the Semantic Web – Resource Description Framework (RDF) / RDF Schema, Ontology Web Language (OWL), UML, XML/XML Schema.

Unit-III: Ontology Engineering

Ontology Engineering, Constructing Ontology, Ontology Development Tools, Ontology Methods, Ontology Sharing and Merging, Ontology Libraries and Ontology Mapping, Logic, Rule and Inference Engines.

Unit-IV: Semantic Web Applications, Services and Technology

Semantic Web applications and services, Semantic Search, e-learning, Semantic Bioinformatics, Knowledge Base, XML Based Web Services, Creating an OWL-S Ontology for Web Services, Semantic Search Technology, Web Search Agents and Semantic Methods.

Unit-V: Social Network Analysis and semantic web

What is social Networks analysis, Development of the social networks analysis, Electronic Sources for Network Analysis – Electronic Discussion networks, Blogs and Online Communities, Web Based Networks, Building Semantic Web Applications with social network features.

Text Books:

- Godel and Turing, "Thinking on the Web - Berners Lee", Wiley inters science, 2008.
- Peter Mika, "Social Networks and the Semantic Web", Springer, 2007.

Reference Books:

- J.Davies, R. Studer, P. Warren, "Semantic Web Technologies, Trends and Research in Ontology Based Systems", John Wiley & Sons.
- Liyang Lu, "Semantic Web and Semantic Web Services", Chapman and Hall/CRC Publishers, (Taylor & Francis Group)
- Heiner Stuckenschmidt; Frank Van Harmelen, "Information Sharing on the semantic Web", Springer Publications.
- T.Segaran, C.Evans, J.Taylor, "Programming the Semantic Web", O'Reilly, SPD.

CO-PO & PSO Correlation

Course Name: Semantic Web and Social Networks												
	Program Outcomes								PSOs			
Course Outcomes	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	2		2			1			2		1	2
CO2:	1		3			1			1		1	2
CO3:	1		3			1			1		1	2
CO4:	1		3			1			2		1	2
CO5:	1		1			1			2		1	2

Note: 1.: Low 2.: Moderate 3.: High

Programme	**:**	**B. Tech**	**Semester**	**:**	**Final Year**
Name of the Course:		**Signal Processing and Data Analytics**	**Course Code:**		**SOE-B-CSE-19-F05(1)**
			No of Hours :		**3 Hrs. / Week**
Credits	**:**	**3**			
Max Marks	**:**	**75**			

Course Description:

The course will provide foundational knowledge of digital signal processing and data analytics and get practical experience in building projects in analyzing signals. It does not require an extensive math background to signals and data analytics. It introduces basic concepts of signal processing and data analytics.

Course Outcomes:

After Completion of the course Students will be able to:

CO Number	Course Outcome
CO1	Learn concept, process, and practice of the digital signal processing and data analytics.
CO2	Learn digital signal processing to analyze signals.
CO3	Learn data analytics techniques to deep understand of signals
CO4	Learn techniques to detect and classify digital signals.

Syllabus:

Unit-I: Introduction to Signal Processing

Signals, systems and signal processing, classification of signals, elements of digital signal processing system, concept of frequency in continuous and discrete time signals, Periodic Sampling, Frequency domain representation of sampling, Reconstructions of band limited signals from its samples

Unit-II: Introduction to Fourier Domain

Representation of Periodic sequences: The discrete Fourier Series and its Properties Fourier Transform of Periodic Signals, Sampling the Fourier Transform, The Discrete-Fourier Transform, Properties of DFT, Linear Convolution using DFT.

Unit-III: Introduction to data analytics

Need for data science – benefits and uses – facets of data – data science process – setting the research goal – retrieving data – cleansing, integrating, and transforming data – exploratory data analysis – build the models – presenting and building applications.

Unit-IV: Data analytics techniques

Frequency distributions – Outliers – relative frequency distributions – cumulative frequency distributions – frequency distributions for nominal data – interpreting distributions – graphs – averages – mode – median – mean – averages for qualitative and ranked data – describing variability – range – variance – standard deviation – degrees of freedom – interquartile range – variability for qualitative and ranked data

Unit-V: Data analytics tools to analyze data

Normal distributions – z scores – normal curve problems – finding proportions – finding scores – more about z scores – correlation – scatter plots – correlation coefficient for quantitative data – computational formula for correlation coefficient – regression – regression line – least squares regression line – standard error of estimate – interpretation of r2 – multiple regression equations – regression toward the mean

Text Books:

- David Cielen, Arno D. B. Meysman, Mohamed Ali, "Introducing Data Science", Manning Publications, 2016
- S. K. Mitra, "Digital Signal Processing: A Computer-Based Approach", 3rd edition, McGraw-Hill, 2006

Reference Books:

- Allen B. Downey, "Think Stats: Exploratory Data Analysis in Python", Green Tea Press, 2014.
- Li Tan , Jean Jiang, "Digital Signal Processing fundamentals and Applications", 2nd edition, Academic Press, 2013

CO-PO & PSO Correlation

Course Name: Signal Processing and Data Analytics												
	Program Outcomes								PSOs			
Course Outcomes	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	2		2			1			2		1	2
CO2:	1		3			1			1		1	2
CO3:	1		3			1			1		1	2
CO4:	1		3			1			2		1	2

Note: 1.: Low 2.: Moderate 3.: High

Programme	**:**	**B. Tech.**	**Semester**	**:**	**Final Year**
Name of the Course:		**Mobile Application Development**	**Course Code:**		**SOE-B-CSE-19-F05(2)**
			No of Hours	**:**	**3 Hrs. / Week**
Credits	**:**	**3**			
Max Marks	**:**	**75**			

Course Description:

This course is concerned with the development of applications on mobile and wireless computing platforms. Android will be used as a basis for teaching programming techniques and design patterns related to the development of standalone applications and mobile portals to enterprise and m-commerce systems. Emphasis is placed on the processes, tools and frameworks required to develop applications for current and emerging mobile computing devices. Students will work at all stages of the software development life-cycle from inception through to implementation and testing.

Course Outcomes:

After Completion of the course Students will be able to:

CO Number	Course Outcome
CO1	Identify various concepts of mobile programming that make it unique from programming for other platforms.
CO2	Critique mobile applications on their design pros and cons
CO3	Utilize rapid prototyping techniques to design and develop sophisticated mobile interfaces.
CO4	Program mobile applications for the Android operating system that use basic and advanced phone features.
CO5	Deploy applications to the Android marketplace for distribution.

Syllabus:

Unit-I: Introduction to Android:

Android Platform, Android SDK, Eclipse Installation, Android Installation, Building Android application, Understanding Anatomy of Android Application, Android Manifest file.

Unit-II: Android Application Design Essentials:

Anatomy of an Android applications, Terminologies, Application Context, Activities, Services, Intents, Receiving and Broadcasting Intents, Android Manifest File and its common settings, Using Intent Filter, Permissions.

Unit-III: Android User Interface Design Essentials:

User Interface Screen elements, Designing User Interfaces with Layouts, Drawing and Working with Animation.

Unit-IV: Testing and Publishing:
Testing Android applications, Publishing Android application, Using Android preferences, Managing Application resources in a hierarchy, working with different types of resources.

Unit-V: Common Android APIs:
Using Android Data and Storage APIs, managing data using Sqlite, Sharing Data between Applications with Content Providers, Using Android Networking APIs, Using Android Web APIs, Using Android Telephony APIs, Deploying Android Application to the World.

Text Books:

- T1. Lauren Darcey, Shane Conder, "Android Wireless Application Development", 2nd edition, Pearson Education, 2011

Reference Books:

- Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd
- Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd
- Barry Burd, "Android Application Development All in one for Dummies", Edition: I

CO-PO & PSO Correlation

Course Name: Mobile Application Development												
	Program Outcomes								PSOs			
Course Outcomes	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	1		1	2		2	2		1	2	1	
CO2:	2	1	2	2		1			1	2	2	
CO3:			1		1			1			2	
CO4:	1	2						3			2	1
CO5:				1		2	2	1		2		1

Note: 1.: Low 2.: Moderate 3.: High

Programme	**:**	**B. Tech (01UG020)**	**Semester**	**:**	**Final Year**
Name of the Course:		**Natural Language Processing**	**Course Code:**		**SOE-B-CSE-19-F05(3)**
			No of Hours	**:**	**3 Hrs. / Week**
Credits	**:**	**3**			
Max Marks	**:**	**75**			

Course Description:

The course will provide foundational knowledge of natural language processing. In the course, basic concepts of language designing, grammars, syntax and semantics and designing of NLP systems will be covered.

Course Outcomes:

After Completion of the course Students will be able to:

CO Number	Course Outcome
CO1	Tag a given text with basic Language features
CO2	Design an innovative application using NLP components
CO3	Implement a rule-based system to tackle morphology/syntax of a language
CO4	Design a tag set to be used for statistical processing for real-time applications
CO5	Compare and contrast the use of different statistical approaches for different types of NLP applications.

Syllabus:

Unit-I: Introduction

Origins and challenges of NLP – Language Modeling: Grammar-based LM, Statistical LM - Regular Expressions, Finite-State Automata – English Morphology, Transducers for lexicon and rules, Tokenization, Detecting and Correcting Spelling Errors, Minimum Edit Distance

Unit-II: Word level analysis

Unsmoothed N-grams, Evaluating N-grams, Smoothing, Interpolation and Backoff – Word Classes, Part-of-Speech Tagging, Rule-based, Stochastic and Transformation-based tagging, Issues in PoS tagging – Hidden Markov and Maximum Entropy models.

Unit-III: Syntactic Analysis

Context-Free Grammars, Grammar rules for English, Treebanks, Normal Forms for grammar – Dependency Grammar – Syntactic Parsing, Ambiguity, Dynamic Programming parsing – Shallow parsing – Probabilistic CFG, Probabilistic CYK, Probabilistic Lexicalized CFGs - Feature structures, Unification of feature structures.

Unit-IV: Semantics and pragmatics

Requirements for representation, First-Order Logic, Description Logics – Syntax-Driven Semantic analysis, Semantic attachments – Word Senses, Relations between Senses, Thematic Roles, selectional restrictions – Word Sense Disambiguation, WSD using Supervised, Dictionary & Thesaurus, Bootstrapping methods – Word Similarity using Thesaurus and Distributional methods.

Unit-V: Discourse analysis and lexical resources

Discourse segmentation, Coherence – Reference Phenomena, Anaphora Resolution using Hobbs and Centering Algorithm – Coreference Resolution – Resources: Porter Stemmer, Lemmatizer, Penn Treebank, Brill's Tagger, WordNet, PropBank, FrameNet, Brown Corpus, British National Corpus (BNC).

Text Books:

- Daniel Jurafsky, James H. Martin, "Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech", Pearson Publication, 2014.
- Steven Bird, Ewan Klein, Edward Loper, "Natural Language Processing with Python‖", 1st Edition, O_Reilly Media, 2009

Reference Books:

- Breck Baldwin, "Language Processing with Java and LingPipe Cookbook", Atlantic Publisher, 2015
- Richard M Reese, "Natural Language Processing with Java‖", O_Reilly Media, 2015
- Nitin Indurkhya, Fred J. Damerau, "Handbook of Natural Language Processing", 2nd Edition, Chapman and Hall/CRC Press, 2010.
- Tanveer Siddiqui, U.S. Tiwary, "Natural Language Processing and Information Retrieval‖", Oxford University Press, 2008

CO-PO & PSO Correlation

Course Name: Natural Language Processing												
	Program Outcomes								PSOs			
Course Outcomes	1	2	3	4	5	6	7	8	1	2	3	4
CO1:	2	2							1	2	1	
CO2:	2			1	1					1	1	
CO3:	2	2								2		
CO4:	2	1							1	1	1	
CO5:	1	2		1	1				1	2	1	

Note: 1.: Low 2.: Moderate 3.: High

Programme	**:**	**B. Tech**	**Semester**	**:**	**Final Year**
Name of the Course:		**Soft Computing Lab**	**Course Code:**		**SOE-B-CSE-19-F06(1)**
Credits	**:**	**1**	**No of Hours**	**:**	**1 Hrs. / Week**
Max Marks	**:**	**25**			

Course Descriptions:

This course will cover fundamental concepts used in Soft computing. The concepts of Fuzzy logic (FL) will be covered first, followed by Artificial Neural Networks (ANNs) and optimization techniques using Genetic Algorithm (GA). Applications of Soft Computing techniques to solve a number of real life problems will be covered to have hands on practices. In summary, this course will provide exposure to theory as well as practical systems and software used in soft computing.

Course Outcomes:

After Completion of the course Students will be able to:

CO Number	Course Outcome
CO1	Explore methods that implements neural network techniques.
CO2	Practice the fuzzy set relations using different operations.
CO3	Design Regression techniques for a set of data points.
CO4	Capture an appropriate classification model for analytical tasks.

The following concepts will be covered in the lab:

- Introduction to Soft Computing
  a. Concept of computing systems.
  b. "Soft" computing versus "Hard" computing
  c. Characteristics of Soft computing
  d. Some applications of Soft computing techniques
  e. Solving single-objective optimization problems using Gas
- Program to implement logic gates.
- Implement Union, Intersection, Complement and Difference operations on fuzzy sets. Also create fuzzy relation by Cartesian product of any two fuzzy sets and perform max-min composition on any two fuzzy relations.
- Implement svm classification by fuzzy concepts.
- Implementation of Genetic Application
- Implementation of Perceptron Learning Algorithm
- Implementation of Unsupervised Learning Algorithm
- Write a program to implement artificial neural network without back propagation.
- Implement travelling sales person problem (tsp) using genetic algorithms.
- Implement crisp partitions for real-life iris dataset

- Implement linear regression and multi-regression for a set of data points
- Perceptron net for an AND function with bipolar inputs and targets.
- Program for Pattern storage of 10 digits with Discrete Hopfield Network

Reference Books:

- G. A. Vijayalakshami, "Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications, S.Rajasekaran", PHI.
- E. Goldberg, "Genetic Algorithms: Search and Optimization".
- Chin Teng Lin, "Neuro-Fuzzy Systems", C. S. George Lee, PHI.
- Joe choong, "Build_Neural_Network_With_MS_Excel_sample".

CO-PO & PSO Correlation

Course Name: Soft Computing Lab												
	Program Outcomes								PSOs			
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**
CO1:	1	1	2	2					1	2	2	
CO2:	3	3	2	2					2	2	2	
CO3:			3								3	
CO4:	1										2	

Note: 1.: Low 2.: Moderate 3.: High

Programme	**:**	**B. Tech**	**Semester**	**:**	**Final Year**
Name of the Course:		**Cyber Forensics Lab**	**Course Code:**		**SOE-B-CSE-19-F06(2)**
Credits	**:**	**1**	**No of Hours**	**:**	**1 Hrs. / Week**
Max Marks	**:**	**25**			

Course Description:

This course is designed to introduce the principles and practices generally required to investigate the cyber-crimes. It includes the study and practical's related to data acquisition process and tools, evidence analysis procedures and methodologies, taxonomy of digital forensics tools, analysis of network, file signature, malware analysis, malware classification, volatile memory forensics, mobile devices and cloud forensics which are the state-of-the-art requirement in the present and upcoming digital world followed by digital forensics examiner.

Course Outcomes:

After Completion of the course Students will be able to:

CO Number	Course Outcome
CO1	Understand the scope of digital forensic investigation and severity of crime scene.
CO2	Acquire forensic image of suspected digital device under investigation.
CO3	Examine the evidence using open source and freeware tools.
CO4	Apply different computer forensic tools for conducting malware analysis and reverse engineering.
CO5	Perform investigation practices using different operating systems on different class of malwares.

The following concepts will be covered in the lab:

- Discuss the process of installing malware hunter toolset: Wireshark. Provide the scope of the installed tool.
- Discuss the process of installing malware hunter toolset: PeStudio. Provide the scope of the installed tool.
- Discuss the process of installing malware hunter toolset: RegShot. Provide the scope of the installed tool.
- Discuss the process of installing malware hunter toolset: Hexinator. Provide the scope of the installed tool.
- Discuss the process of installing FTK Imager tool for creating and analyzing forensic image. Provide the scope of the installed tool.
- Discuss the process of installing Autopsy tool for creating and analyzing forensic image. Provide the scope of the installed tool.
- Demonstrate the procedure to make the forensic image of the hard drive or USB using FTK Imager tool.

- Set up a safe virtual environment to analyze malware like sandbox.
- Quickly extract network signatures and host-based indicators.
- Discuss the use of Use key analysis tools like IDA Pro, OllyDbg, and WinDbg.
- Develop a methodology for unpacking malware and get practical experience with five of the most popular Packers
- Analyze special cases of malware with shellcode, C++, and 64-bit code
- Install Reanimator in your Windows machine and scan the system for Malware and prepare one report for the same.

Reference Books:

- Mangesh M. Ghonge, Sabyasachi Pramanik, Ramchandra Mangrulkar, Dac-Nhuong Le, "Cyber Security and Digital Forensics: Challenges and Future Trends", Wiley-Scrivener.
- Greg Gogolin, "Digital Forensics Explained", 2nd Edition, CRC Press/Taylor & Francis Group
- Chuck Easttom, "Digital Forensics, Investigation, and Response", 4th Edition, Jones & Bartlett Learning
- Darren R. Hayes, "A Practical Guide to Digital Forensics Investigations", 2nd Edition, Pearson IT Certification

CO-PO & PSO Correlation

Course Name: Cyber Forensics Lab												
	Program Outcomes								PSOs			
Course Outcomes	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**
CO1:	**3**	**2**	**2**			**2**	**3**		**3**	**1**	**1**	**1**
CO2:		**2**	**1**			**1**			**1**	**2**	**2**	**1**
CO3:	**3**	**2**				**2**	**1**		**2**	**3**	**1**	**1**
CO4:	**3**	**2**	**1**			**2**	**1**		**2**	**3**	**1**	**1**
CO5:	**3**	**2**	**2**			**2**	**2**		**3**	**2**	**2**	**2**

Note: 1.: Low 2.: Moderate 3.: High

Programme	**:**	**B. Tech**	**Semester**	**:**	**Final Year**
Name of the Course:		**N L P Lab**	**Course Code:**		**SOE-B-CSE-19-F07(1)**
Credits	**:**	**1**	**No of Hours**	**:**	**1 Hrs. / Week**
Max Marks	**:**	**25**			

Course Descriptions:

The laboratory augments the lecture course in Artificial Intelligence (AI) by providing experience with AI programming techniques. The laboratory introduces Common Lisp, reviews the fundamentals of symbolic programming, and considers such issues in AI programming such as pattern matching, search, problem solving, and reasoning tasks.

Course Outcomes:

After Completion of the course Students will be able to:

CO Number	Course Outcome
CO1	Creation of Bag of Words for text classification.
CO2	Implementing text Pre-processing techniques
CO3	Designing tools to remove stop words in dictionary
CO4	Creating training and testing data set for text classification
CO5	Designing machine learning based sentiment analysis.

The following concepts will be covered in the lab:

- Creation of Bag of Words for text classification.
- Implementing text Preprocessing techniques
- Designing tools to remove stop words in dictionary
- Creating training and testing data set for text classification
- Designing machine learning based sentiment analysis.

Reference Books:

- Daniel Jurafsky, James H. Martin, “Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech”, Pearson Publication, 2014
- Steven Bird, Ewan Klein and Edward Loper, “Natural Language Processing with Python”, 1st Edition, O_Reilly Media, 2009
- Breck Baldwin, “Language Processing with Java and LingPipe Cookbook”, Atlantic Publisher, 2015
- Richard M Reese, “Natural Language Processing with Java”, O_Reilly Media, 2015.
- Nitin Indurkhya, Fred J. Damerau, “Handbook of Natural Language Processing”, 2nd Edition, Chapman and Hall/CRC Press, 2010
- Tanveer Siddiqui, U.S. Tiwary, “Natural Language Processing and Information Retrieval”, Oxford University Press, 2008

CO-PO & PSO Correlation

Course Name: NLP Lab												
	Program Outcomes								PSOs			
Course	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**
CO1:	**2**	**2**				**1**			**1**	**2**	**1**	**1**
CO2:	**2**			**1**	**1**		**2**			**1**	**2**	**1**
CO3:	**2**	**2**						**1**		**2**	**1**	
CO4:	**2**	**1**					**1**		**1**	**1**	**2**	**1**
CO5:	**1**	**2**		**1**	**1**	**2**			**1**	**2**		**1**

Note: 1.: Low 2.: Moderate 3.: High

Programme	**:**	**B. Tech**	**Semester**	**:**	**Final Year**
Name of the Course:		**Signal Processing and Data Analytics lab**	**Course Code:**		**SOE-B-CSE-19-F07(2)**
			No of Hours	**:**	**1 Hrs. / Week**
Credits	**:**	**1**			
Max Marks	**:**	**25**			

Course Descriptions:

The laboratory augments the lecture course in Signal Processing and Data Analytics by programming signal processing and classification techniques. The laboratory introduces programming concepts of signal analysis and signal classification.

Course Outcomes:

After Completion of the course Students will be able to:

CO Number	Course Outcome
CO1	2D signal analysis using Fourier transform
CO2	2D signal analysis using Fourier transform
CO3	Analysis of signals using machine learning techniques
CO4	Signal classification using machine learning techniques
CO5	2D signal classification using CNN

The following concepts will be covered in the lab:

- Forward and Inverse Fourier transform of 1-Dimensional Signal.
- Forward and Inverse Fourier transform of 2-Dimensional Signal.
- Analysis 1D and 2D signal spectrum using machine learning techniques.
- Classification of different signals using SVM classifer.
- Classification of 2D signal using CNN.

Reference Books:

- David Cielen, Arno D. B. Meysman, and Mohamed Ali, “Introducing Data Science”, Manning Publications, 2016
- S. K. Mitra, “Digital Signal Processing: A Computer-Based Approach”, 3rd edition, McGraw-Hill, 2006
- Allen B. Downey, “Think Stats: Exploratory Data Analysis in Python”, Green Tea Press, 2014.
- , Li Tan , Jean Jiang, “Digital Signal Processing fundamentals and Applications”, 2nd edition, Academic Press,2013

CO-PO & PSO Correlation

Course Name: Signal Processing and Data Analytics Lab												
	Program Outcomes								PSOs			
Course	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**1**	**2**	**3**	**4**
CO1:	**2**	**2**							**1**	**2**	**1**	**1**
CO2:	**2**			**1**						**1**	**2**	**1**
CO3:	**2**	**2**								**2**	**1**	
CO4:	**2**	**1**							**1**	**1**	**2**	**1**
CO5:	**1**	**2**		**1**					**1**	**2**		**1**

Note: 1.: Low 2.: Moderate 3.: High