III Year – II SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	IT3201	Data Warehousing and Data Mining	3	0	0	3
2	OE3201	**Open Elective- I (Inter Disciplinary)**	3	0	0	3
3	IT3202	Web Technologies	3	0	0	3
4	PE3201	**Professional Elective II** 1. Web Security 2. Software Project Management 3. Natural Language Processing 4. MOOCS (NPTEL/SWAYAM) **Duration: 12 Weeks Minimum** ***Course/subject title can't be repeated**	3	0	0	3
5	HS3201	Managerial Economics and Financial Accountancy	3	0	0	3
6	IT3203	Web Technologies Lab	0	0	3	1.5
7	IT3204	Data Mining Lab	0	0	3	1.5
8	PR3201	Industrial Training / Skill Development Programmes / Research Project in higher learning institutes	0	0	0	1
		Total	15	0	6	19

III Year – II Semester		L	T	P	C
		3	0	0	3

WEB SECURITY
(Professional Elective –II)

Course Objectives:
- Underlying security principles of the web
- Overview of concrete threats against web applications
- Insights into common attacks and countermeasures
- Current best practices for secure web applications

Course Outcomes: At the end of the course, student will be able to
- Demonstrate security concepts, security professional roles, and security resources in the context of systems and security development life cycle
- Justify applicable laws, legal issues and ethical issues regarding computer crime
- Explain the business need for security, threats, attacks, top ten security vulnerabilities, and secure software development
- Apply information security policies, standards and practices, the information security blueprint
- Analyze and describe security requirements for typical web application scenario

UNIT–I:
Introduction-A web security forensic lesson, Web languages, Introduction to different web attacks, Overview of N-tier web applications, Web Servers-Apache, IIS.

UNIT-II:
Securing the Communication Channel- Understanding the dangers of an insecure communication channel. Practical advice on deploying HTTPS, and dealing with the impact on your application, Insights into the latest evolutions for HTTPS deployments.

UNIT–III:
Web Hacking Basics- HTTP & HTTPS URL, Web under the Cover Overview of Java security Reading the HTML source, Applet Security Servlets Security Symmetric and Asymmetric Encryptions, Network security Basics, Firewalls & IDS.

UNIT–IV:
Securely Handling Untrusted Data-Investigation of injection attacks over time, Understanding the cause behind both server-side and client-side injection attacks, Execution of common injection attacks, and implementation of various defenses.

UNIT–V:
Preventing Unauthorized Access-Understanding the interplay between authentication, authorization and session management. Practical ways to secure the authentication process prevent authorization bypasses and harden session management mechanisms, Securing Large

Applications, Cyber Graffiti.

Text Books:

1. Web Hacking: Attacks and Defense, Latest Edition , McClure, Stuart, Saumil Shah, and Shreeraj Shah, Addison Wesley, 2003
2. Professional Java Security, 1.3 Edition, Garms, Jess and Daniel Somerfield, Wrox, 2001

III Year – II Semester		L	T	P	C
		3	0	0	3

SOFTWARE PROJECT MANAGEMENT
(Professional Elective –II)

Course Objectives:
At the end of the course, the student shall be able to:

- To describe and determine the purpose and importance of project management from the perspectives of planning, tracking and completion of project
- To compare and differentiate organization structures and project structures
- To implement a project to manage project schedule, expenses and resources with the application of suitable project management tools

Course Outcomes:
Upon the completion of the course students will be able to:-

- Apply the process to be followed in the software development life-cycle models.
- Apply the concepts of project management & planning.
- Implement the project plans through managing people, communications andchange
- Conduct activities necessary to successfully complete and close the Software projects
- Implement communication, modeling, and construction & deployment practices in software development.

UNIT I:
Conventional Software Management: The waterfall model, conventional software Management performance.
Evolution of Software Economics: Software Economics, pragmatic software cost estimation.
Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

UNIT II:
The Old Way and The New: The principles of conventional software Engineering,principles of modern software management, transitioning to an iterative process.
Life Cycle Phases: Engineering and production stages, inception, Elaboration, construction, transition phases.
Artifacts of The Process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

UNIT III:
Model Based Software Architectures: A Management perspective and technicalperspective.
Work Flows of the Process: Software process workflows, Iteration workflows. Checkpoints of the Process: Major mile stones, Minor Milestones, Periodic statusassessments.

UNIT IV:

Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

UNIT V

Process Automation: Automation Building blocks, The Project Environment.

Project Control and Process Instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations, pragmatic Software Metrics, Metrics automation.

Project Estimation and Management: COCOMO model, Critical Path Analysis, PERT technique, Monte Carlo approach (Text book 2)

Text Books:

1) Software Project Management, Walker Royce, Pearson Education, 2005.
2) Software Project Management, Bob Hughes, 4th edition, Mike Cotterell, TMH.

Reference Books:

1) Software Project Management, Joel Henry, Pearson Education.
2) Software Project Management in practice, Pankaj Jalote, Pearson Education, 2005.
3) Effective Software Project Management, Robert K.Wysocki, Wiley,2006.

III Year – II Semester		L	T	P	C
		3	0	0	3
NATURAL LANGUAGE PROCESSING (Professional Elective –II)					

Course Objectives:

- This course introduces the fundamental concepts and techniques of natural language processing (NLP).
- Students will gain an in-depth understanding of the computational properties of natural languages and the commonly used algorithms for processing linguistic information.
- The course examines NLP models and algorithms using both the traditional symbolic and the more recent statistical approaches.
- Enable students to be capable to describe the application based on natural language processing and to show the points of syntactic, semantic and pragmatic processing.

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

- Demonstrate a given text with basic Language features
- Explain a rule based system to tackle morphology/syntax of a language.
- To design an innovative application using NLP components.
- To design a tag set to be used for statistical processing for real- time applications.
- To compare and contrast the use of different statistical approaches for different types of NLP applications.

UNIT-I:

Introduction: Introduction to Natural Language Processing (NLP), Origins of NLP, Language and Knowledge, The challenges of NLP, Language and Grammar, Processing Indian Languages, NLP Applications, Some successful Early NLP Systems, Information Retrieval, Language Modelling: Introduction, Various Grammar-based Language Models, Statistical Language Model.

UNIT-II:

Word Level Analysis: Introduction, Regular Expressions, Finite State Automata, Morphological Parsing, Spelling Error Detection and Correction, Words and Word Classes, Part-of-Speech Tagging, Syntactic Analysis: Introduction, Context- Free Grammar, Constituency, Parsing, Probabilistic Parsing, Indian Languages.

UNIT-III:

Semantic Analysis and Pragmatics: Introduction, Meaning Representation, Lexical Semantics, Ambiguity, Word Sense Disambiguation, Discourse Processing: Introduction, Cohesion, Reference Resolution, Discourse Coherence and Structure.

UNIT-IV:

Natural Language Generation: Introduction, Architectures of NLG Systems, Generation task and Representations, Applications of NLG.

Machine Translation: Introduction, Problems in Machine Translation, Characteristics of Indian Languages, Machine Translation Approaches, Direct Machine Translation, Rule-

based Machine Translation, Corpus-based Machine Translation, Semantic or Knowledge-based MT Systems, Translation involving Indian Languages.

UNIT-V:

NLP Applications: Introduction, Information Extraction, Automatic Text Summarization, Question-Answering System, Lexical Resources: Introduction, Word Net, Frame Net, Stemmers, Part-of-Speech Tagger, Research Corpora, Journals and Conferences in the Area.

Text Books:

1. Tanveer Siddiqui, U.S. Tiwary, "Natural Language Processing and Information Retrieval", Oxford University Press, 2008.
2. Daniel Jurafsky, James H. Martin, "Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics and Speech", Pearson Publication, 2014

Reference Books:

1. Steven Bird, Ewan Klein and Edward Loper, " Natural Language Processing with Python", First Edition, OReilly Media, 2009.
2. Breck Baldwin, "Language processing with Java and Ling Pipe Cookbook", Atlantic Publisher, 2015.
3. Richard M Reese, "Natural Language Processing with Java", OReilly Media, 2015.