R.V.COLLEGE OF ENGINEERING
(Autonomous Institution Affiliated to VTU, Belagavi)
R.V. Vidyaniketan Post, Mysore Road
Bengaluru – 560 059

Scheme and Syllabus of III & IV Semesters
(Autonomous System of 2018 Scheme)

Master of Technology (M.Tech)
in
SOFWARE ENGINEERING

DEPARTMENT OF
INFORMATION SCIENCE & ENGINEERING

R V COLLEGE OF ENGINEERNG, BENGALURU-560 059
(Autonomous Institution Affiliated to VTU, Belagavi)

DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING
M.Tech in INFORMATION TECHNOLOGY

				THIRD SEMESTER CREDIT SCHEME
\multirow{2}{*}{Sl. No.}	\multirow{2}{*}{Course Code}	\multirow{2}{*}{Course Title}	\multirow{2}{*}{BoS}	Credit Allocation
				L	T	P	Total Credits
1	18MSE31	Social Network Analysis	IS	4	1	0	**5**
2	18 MSE 3EX	Elective 6	IS	4	0	0	**4**
3	18 MSE 33	Internship	IS	0	0	5	**5**
4	18 MSE 34	Dissertation Phase I	IS	0	0	5	**5**
\multicolumn{4}{c}{**Total number of Credits**}	**08**	**01**	**10**	**19**
**Total Number of Hours / Week**				

				FOURTH SEMESTER CREDIT SCHEME
\multirow{2}{*}{Sl. No.}	\multirow{2}{*}{Course Code}	\multirow{2}{*}{Course Title}	\multirow{2}{*}{BoS}	Credit Allocation
				L	T	P	Total Credits
1	18MSE41	Dissertation Phase II	IS	0	0	20	20
2	18MSE42	Technical Seminar	IS	0	0	2	2
\multicolumn{4}{c}{**Total number of Credits**}	**0**	**0**	**22**	**22**
**Total Number of Hours / Week**				

R.V. College of Engineering - Bengaluru-560059

Semester: III		
Social Network Analysis		
Course Code: 18MSE31		CIE Marks: 100
Credits: L:T:P:S: 4:1:0:0		SEE Marks: 100
Hours: 36L+12T		SEE Duration: 3Hrs
Course Learning Objectives:		
1	List basic principles behind network analysis algorithms	
2	Acquire essential knowledge of network analysis	
3	Apply real world data with examples from today's most popular social networks.	
4	Engage in critical thinking regarding the applicability of social network theory to various sociological phenomena.	

Unit-I	
Social Network Analysis: History, Concepts, and Research: Introduction, SNA Definition and features, The Development of Social Network Analysis: A Brief History, Basic Concepts and Research of SNA: Design, Theorization, and Data Processing. **Social Network Analysis**: What is network analysis? , Development of Social Network , Key concepts andmeasures in network analysis	07 Hrs
Unit – II	
Online Identities and Social Networking: Introduction , Background on Digital Identities, Putting Social Relations to Work, Social Digital Identity, Information and Threats in Social Networks **Discovering Sets of Key Players in Social Networks :** Information Theory in SNA, Methods for Discovering Sets of Key Players, Discovering Sets of Key Players Using Entropy Measures	07 Hrs
Unit -III	
Decentralized Online Social Networks: Introduction, Challenges for DOSN, The Case for Decentralizing OSNs, General Purpose DOSNs, Specialized Application Centric DOSNs, Delay-Tolerant DOSN **Understanding and Predicting Human Behavior for Social Communities:** Introduction, User Data Management, Inference and Distribution, Enabling New Human Experiences, The Social Enabler, Applications	07 Hrs
Unit –IV	
Security and Privacy in Online Social Networks: Introduction, Security Objectives: Privacy, Integrity, and Availability, Attack Spectrum and Countermeasures. **Optimizing Targeting of Intrusion Detection Systems in Social Networks:** Introduction, Background, Epidemic Propagation in Social Networks. **Security Requirements for Social Networks:** Introduction, Context, Threats, and Incidents, Two patterns	08 Hrs
Unit –V	
Visualization and applications of social networks : Graph theory , Centrality , Clustering ,Node-Edge Diagrams , Matrix representation , Visualizing online social networks, Visualizing social networks with matrix-based representations , Matrix and Node-Link Diagrams, Hybrid representations , Applications ,Cover networks , Community welfare ,Collaboration networks , Co-Citation networks.	07 Hrs

Information Science & Engineering

Course Outcomes: After completing the course, the students will be able to	
CO1:	Comprehend basic notation, concepts and terminology used in network science.
CO2:	Visualize, Analyze, summarize and compare different networks and its security.
CO3:	Use relevant tools to analyze real world networks
CO4:	Use advanced network analysis methods to perform empirical investigations of network data.

Reference Books	
1	"Social Networks and the Semantic Web", Peter Mika, First Edition, Springer. ISBN-13: 978-0-387-71000-6
2	"Handbook of Social Network Technologies and Applications", BorkoFurht, 1st Edition, , 2010, Springer, ISBN 978-1-4419-7141-8
3	"Computational Social Network Analysis- Trends, Tools and Research Advances", Ajith Abraham ,Aboul-Ella Hassanien, Springer, ISBN 978-1-84882-228-3
4	Social Network Data Analytics‖, Charu C. Aggarwal, 2014, Springer; ISBN 978-1-4419-8462-3

Scheme of Continuous Internal Evaluation (CIE); Theory (100 Marks):

CIE is executed by way of quizzes (Q), tests (T) and assignments. A minimum of two quizzes are conducted and each quiz is evaluated for 10 marks adding up to 20 marks. Faculty may adopt innovative methods for conducting quizzes effectively. The three tests are conducted for 50 marks each and the sum of the marks scored from three tests is reduced to 50 marks. A minimum of two assignments are given with a combination of two components among 1) Solving innovative problems 2) Seminar/new developments in the related course 3) Laboratory/ field work 4) mini project.

Total CIE is 20+50+30 = 100 marks.

Scheme of Semester End Examination (SEE) for 100 marks:

The question paper will have FIVE questions with internal choice from each unit. Each question will carry 20 marks. Student will have to answer one full question from each unit.

Semester: III		
Mobile Application Development **(Elective)**		
Course Code: 8MIT3E1/18MSE3E1		**CIE Marks: 100**
Credits: L:T:P:S: 4:0:0:0		**SEE Marks: 100**
Hours: 36L+12T		**SEE Duration: 3Hrs**
Course Learning Objectives:		
1	Comprehend the knowledge on essentials of mobile application development.	
2	Demonstrate the basic and advanced features of Android technology.	
3	Develop the skills in designing and building mobile applications using Android platform.	
4	Create debug and publish innovative mobile applications using Android platform	

Unit-I	
Essentials For Mobile Application Development Background about mobile technologies, Overview of Android, Android architecture, Android for mobile application development, Android development Framework – Android SDK, Emulators / Android AVD Android Project Framework , Setting up development environment, Running android app, Dalvik Virtual Machine & .apk file extension, android debug bridge. Fundamentals: Basic Building blocks - Activities, Services, Broadcast Receivers & Content providers, UI Components - Views & notifications, Components for communication -Intents & Intent Filters, Android API levels (versions & version names)	**10 Hrs**
Unit – II	
Android UI Architecture & UI Widgets Application context, Intents, Activity life cycle, Supporting different devices, multiple screen sizes, Fundamental Android UI design – Layouts, Drawable resources, UI widgets, Notification, Toasts, Menu, Dialogs, Lists & Adapters, Building dynamic UI with fragments.	**09 Hrs**
Unit -III	
Data Storage, Services & Content Providers Saving Data, Interacting with other Applicationss, Working with system permissions, Applications with content sharing, Shared Preferences, Preferences activity, Files access, SQLite database, Threads, Overview of services in Android, Implementing a Service, Service lifecycle, Inter Process Communication.	**10 Hrs**
Unit –IV	
Advanced Android Building apps with Multimedia, Building apps with Graphics & Animations, Building apps with Location Based Services and Google maps, Building apps with Connectivity & Cloud, Sensors, Bluetooth, Camera, Telephony Services.	**10Hrs**
Unit –V	
Testing, Debugging & Deployment of Android Application Role and use of Dalvik Debug Monitor Server (DDMS), adb tool, How to debug Android application, Use of Step Filters, Breakpoints, Suspend and Resume, How to use LogCat, Preparing for publishing – Signing & Versioning of apps, Using Google Play to distribute & Monetize, Best practices for security & privacy.	**09 Hrs**

Course Outcomes: After completing the course, the students will be able to	
CO1:	Comprehend the basic features of Android Platform and the Application Development Process. Acquire familiarity with basic building blocks of Android Application and its architecture.
CO2:	Apply and explore the basic framework, usage of SDK to build apps incorporating Android features in developing mobile applications.
CO3:	Demonstrate proficiency in coding on a mobile programming platform using advanced Android technologies like multimedia, involving the sensors and hardware features of the phone.
CO4:	Demonstrate proficiency in testing, debugging and deployment of Android applications.

Reference Books	
1	Android Programming, Phillips, Stewart, Hardy and Marsicano, 2nd edition, 2015; Big Nerd Ranch Guide; ISBN-13 978-0134171494
2	Professional Android 2 Application Development; Reto Meier; 1st Edition; 2012;Wiley India Pvt.ltd; ISBN-13: 9788126525898
3	Beginning Android 3; Mark Murphy; 1st Edition; 2011; A press Springer India Pvt Ltd. ; ISBN-13: 978-1-4302-3297-1
4	Android Programming – Pushing the limits by Hellman; Eric Hellman; Wiley; 2013; ISBN 13: 978-1118717370

Scheme of Continuous Internal Evaluation (CIE); Theory (100 Marks):

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Total CIE is 20+50+30 = 100 marks.

Scheme of Semester End Examination (SEE) for 100 marks:

The question paper will have FIVE questions with internal choice from each unit. Each question will carry 20 marks. Student will have to answer one full question from each unit.

Semester: III		
Web Intelligence (Theory)		
Course Code: 8MSE3E2		CIE Marks: 100
Credits: L:T:P:S: 4:0:0:0		SEE Marks: 100
Hours: 36L+12T		SEE Duration: 3Hrs
Course Learning Objectives:		
1	To understand different issues and approaches related to web Intelligence.	
2	To learn various web mining techniques with applications like Web Content Mining, Web Structure Mining and Web Usage Mining.	
3	To learn the application of web services in Ubiquitous Computing.	
4	To explore the fundamental concepts on knowledge representation and Ontological Engineering.	

Unit-I	
Introduction to Web Intelligence: What is Web Intelligence?, Benefits of Intelligent Web, Ingredients of Web Intelligence, Topics of Web Intelligence, Related Technologies. Information Retrieval: Document Representation, Retrieval Models, Evaluation of Retrieval Performance	08 Hrs
Unit – II	
Semantic Web: The Layered-Language Model, Metadata and Ontologies, Ontology Languages for the Web. Data Mining Techniques: Classification and Association, Clustering	08 Hrs
Unit -III	
Web Usage Mining: Web-Log Processing, Analyzing Web Logs, Applications of Web Usage Mining, Clustering of Web Users, Classification Modeling of Web Users, Association Mining of Web Usages, Sequence-Pattern Analysis of Web Logs	08 Hrs
Unit –IV	
Web Content Mining: Web Crawlers, Search Engines, Personalization of Web Content, Multimedia Information Retrieval	07 Hrs
Unit –V	
Web Structure Mining: Modeling Web Topology, PageRank Algorithm, Hyperlink-Induced Topic Search (HITS), Random Walks on the Web, Social Networks, Reference and Index Pages	08 Hrs

Course Outcomes: After completing the course, the students will be able to	
CO1:	Inspect the models of information retrieval, semantic webs, search engines, and web mining.
CO2:	Apply data mining tools to develop projects in web mining and information retrieval.
CO3:	Gain the knowledge of fundamental concepts on knowledge representation and Ontological Engineering.
CO4:	Apply of Web Intelligence on the Social Web

Reference Books	
1	Building an Intelligent Web: Theory and Practice. Akerkar, R. &Lingras, P. (2008). Jones and Bartlett Publishers, Sudbury, Massachusetts. ISBN-13: 978-0-7637-4137-2
2	Data Mining: Practical Machine Learning Tools and Techniques. Witten, Ian H. & Frank, E. 2nd Edition, 2005, Morgan Kaufman. ISBN 0120884070, 9780120884070
3	Advanced Techniques in Web Intelligence – 1, Juan D.Vel´asquez and Lakhmi C. Jain (Eds.): Sep-2010, Springer,.
4	Evolution of the Web in Artificial IntelligenceEnvironments, RichiNayak, NikhiIchalkaranje, Lakhmi C. Jain: 2008,Springer.

Scheme of Continuous Internal Evaluation (CIE); Theory (100 Marks):

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Total CIE is 20+50+30 = 100 marks.

Scheme of Semester End Examination (SEE) for 100 marks:

The question paper will have FIVE questions with internal choice from each unit. Each question will carry 20 marks. Student will have to answer one full question from each unit.

Semester: III		
Natural Language Processing		
Course Code: 8MSE3E3		**CIE Marks: 100**
Credits: L:T:P:S: 3:0:0:0		**SEE Marks: 100**
Hours: 36L+12T		**SEE Duration: 3Hrs**
Course Learning Objectives:		
1	Demonstrate sensitivity to linguistic phenomena and an ability to model them with formal grammars.	
2	Train and evaluate empirical NLP systems	
3	Manipulate probabilities, construct statistical models over strings and trees, and estimate parameters using supervised and unsupervised training methods	
4	Design, implement, and analyze NLP algorithms	

Unit-I	
Overview and Language Modeling: Overview: Origins and challenges of NLP-Language and Grammar-Processing Indian Languages- NLP Applications -Information Retrieval. Language Modeling: Various Grammar- based Language Models - Statistical Language Model **Accessing Text Corpora** Accessing Text Corpora, Conditional Frequency Distributions	10 Hrs
Unit – II	
Processing Raw Text : Accessing Text from the Web and from Disk, Strings: Text Processing at the Lowest Level Text Processing with Unicode, Regular Expressions for Detecting Word Patterns, Useful Applications of Regular Expressions, Normalizing Text ,Regular Expressions for Tokenizing Text, Segmentation, Formatting: From Lists to Strings	09 Hrs
Unit -III	
Categorizing and Tagging Words : Using a Tagger, Tagged Corpora, Mapping Words to Properties Using Python Dictionaries Automatic Tagging, N-Gram Tagging, Transformation-Based Tagging, How to Determine the Category of a Word **Learning to Classify Text :** Supervised Classification, Further Examples of Supervised Classification, Evaluation, Decision Trees, Naive Bayes Classifiers and other machine Learning models.	10 Hrs
Unit –IV	
Extracting Information from the text : Information Extraction, Chunking, Developing and Evaluating Chunkers, Recursion in Linguistic Structure, Named Entity Recognition, Term weighting, Inverse document frequency, Residual inverse document frequency **Analyzing Sentence Structure :** Some Grammatical Dilemmas, What's the Use of Syntax?, Context-Free Grammar, Parsing with Context-Free Grammar, Dependencies and Dependency Grammar, Grammar Development.	10 Hrs
Unit –V	
Analyzing the Meaning of words and Sentences : The semantics of English sentences, Representing Meaning, Semantic Analysis, Lexical semantics, Word-sense disambiguation, Supervised – Dictionary based and Unsupervised Approaches, Compositional semantics, Semantic Role Labelling and Semantic Parsing Applications of NLP- Spell-checking, Summarization Information Retrieval- Vector space model, term weighting, homonymy, polysemy, synonymy, improving user queries. Machine Translation– Overview.	09 Hrs

Course Outcomes: After completing the course, the students will be able to	
CO1:	Understand the approaches to syntax and semantics in Natural Language Processing, the various types of language processors, the elements of formal language theory, the types of grammar, and the computational morphology.
CO2:	Understand the basic parsing technique for context-free grammars, the data structures and algorithms for parsing, and the approaches to ambiguity resolution.
CO3:	Apply the fundamental algorithms and techniques in the area of Natural Language Processing.
CO4:	Comprehend and compare different natural language models.

Reference Books	
1	"Artificial Intelligence (SIE)", Kevin Night and Elaine Rich, Nair B., McGraw Hill- 2008.
2	"Introduction to AI and ES", Dan W. Patterson, 2007, Pearson Education.
3	"Introduction to Expert Systems", Peter Jackson, 3rd Edition, 2007,Pearson Education.
4	"Artificial Intelligence", Deepak Khemani ,Tata McGraw Hill Education 2013.

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