DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

III Year – II SEMESTER

S.No	Course Code	Courses	L	T	P	Credits
1	CS3201	Web Technologies	3	0	0	3
2	CS3202	Distributed Systems	3	0	0	3
3	CS3203	Design and Analysis of Algorithms	3	0	0	3
4	PE3201	**Professional Elective -II** 1.Mobile Application Development 2.Information Retrieval System 3.Social Network Analysis 4. MOOCS (NPTEL/SWAYAM) **Duration: 12 Weeks Minimum** ***Course/subject title can't be repeated**	3	0	0	3
5	OE3201	**Open Elective- I** (Inter Disciplinary)	3	0	0	3
6	HS3201	Managerial Economics and Financial Accountancy	3	0	0	3
7	CS3204	Web Technologies Lab	0	0	4	2
9	PR3201	Industrial Training / Skill Development Programmes / Research Project in higher learning institutes	0	0	0	1
		Total	18	0	4	21

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

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

MOBILE APPLICATION DEVELOPMENT
(Professional Elective –II)

Course Objectives:

- To demonstrate the introduction and characteristics of mobile applications
- Application models of mobile application frameworks. Managing application data and User-interface design for mobile applications
- Integrating networking, the OS and hardware into mobile-applications
- Addressing enterprise requirements in mobile applications – performance, scalability, modifiability, availability and security
- Testing methodologies for mobile applications– Publishing, deployment, maintenance and management. To demonstrate their skills of using Android software development tools
- To demonstrate their ability to deploy software to mobile devices

Course Outcomes:

Upon completion of the course students should be able to:

- Install and configure Android application development tools.
- Design and develop user Interfaces for the Android platform.
- Use state information across important operating system events.
- Apply Java programming concepts to Android application development.

UNIT I

Introduction to mobile devices: Introduction to Mobile Computing, Introduction to Android Development Environment, Mobile devices vs. desktop devices, ARM and Intel architectures, Screen resolution, Touch interfaces, Application deployment, App Store, Google Play, Windows Store.

Development environments: XCode, Eclipse, VS2012, PhoneGAP, etc.; Native vs. web applications.

Factors in Developing Mobile Applications: Mobile Software Engineering, Frameworks and Tools, Generic UI Development, Android User.

UNIT II

Android User Interface: Measurements – Device and pixel density independent measuring units User Interface (UI) Components – Editable and non editable Text Views, Buttons, Radio and Toggle Buttons, Checkboxes, Spinners, Dialog and pickers Fragments – Creating fragments, Lifecycle of fragments, Fragment states, Adding fragments to Activity, adding, removing and replacing fragments with fragment transactions, interfacing between fragments and Activities, Multi-screen Activities.

UNIT III

Back Ground Running Process, Networking And Telephony Services: Services: Introduction to services – local service, remote service and binding the service, the communication between service and activity, Intent Service.

MultiThreading: Handlers, AsyncTask.

Android network programming: Http Url Connection, Connecting to REST-based and SOAP

based Web services.
Broad cast receivers: Local Broadcast Manager, Dynamic broadcast receiver, System Broadcast. Pending Intent, Notifications.

UNIT IV

Android: Introduction, Establishing the development environment, Android architecture, Activities and views, Interacting with UI, Persisting data using SQLite, Packaging and deployment, Interaction with server side applications, Using Google Maps, GPS and Wifi – Integration with social media applications.

UNIT V

Advanced Topics: Power Management: Wake locks and assertions, Low-level OS support, Writing power-smart applications.
Augmented Reality via GPS and other sensors: GPS, Accelerometer, Camera.
Mobile device security in depth: Mobile malware, Device protections, iOS "Jailbreaking", Android "rooting" and Windows' "defenestration"; Security and Hacking: Active Transactions, More on Security, Hacking Android.

Text Books:

1) Bill Phillips, Chris Stewart, Brian Hardy, and Kristin Marsicano, "Android Programming: The Big Nerd"
2) Ranch Guide, "Big Nerd Ranch LLC", 2nd edition, 2015.
3) Valentino Lee, Heather Schneider, and Robbie Schell, "Mobile Applications: Architecture,Design and Development", Prentice Hall, 2004.
4) "Professional Android 4 Application Development", Reto Meier, Wiley India, (Wrox) ,2012
5) "Android Application Development for Java Programmers", James C Sheusi, Cengage Learning, 2013
6) Dawn Griffiths, David Griffiths, "Head First: Android Development" ,OReilly2015,ISBN: 9781449362188
7) http://developer.android.com/develop/index.html
8) Jeff McWherter and Scott Gowell, "Professional Mobile Application Development",Wrox, 2012

Reference Books:

1) Beginning Android 4 Application Development, Wei-Meng Lee, Wiley India (Wrox),2013
2) Tomasz Nurkiewicz and Ben Christensen, Reactive Programming with RxJava, O'ReillyMedia, 2016.
3) Brian Fling, Mobile Design and Development, O'Reilly Media, Inc., 2009.
4) Maximiliano Firtman, Programming the Mobile Web, O'Reilly Media, Inc., 2nd ed.,2013.
5) Cristian Crumlish and Erin Malone, Designing Social Interfaces, 2nd ed., O'ReillyMedia, Inc., 2014.
6) Suzanne Ginsburg, Designing the iPhone User Experience: A User-Centered Approach toSketching and Prototyping iPhone Apps, Addison-Wesley Professional, 2010.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

III Year – II Semester		L	T	P	C
		3	0	0	3
INFORMATION RETRIEVAL SYSTEM (Professional Elective –II)					

Course Objectives:

- To learn the important concepts and algorithms in IRS
- To understand the data/file structures that are necessary to design, and implement information retrieval (IR) systems.

Course Outcomes:

Upon completion of the course students should be able to:

- Apply IR principles to locate relevant information large collections of data
- Design different document clustering algorithms
- Implement retrieval systems for web search tasks.
- Design an Information Retrieval System for web search tasks.

UNIT – I

Introduction to Information Retrieval Systems: Definition of Information Retrieval System, Objectives of Information Retrieval Systems, Functional Overview, Relationship to Database Management Systems, Digital Libraries and Data Warehouses

Information Retrieval System Capabilities: Search Capabilities, Browse Capabilities, Miscellaneous Capabilities

UNIT – II

Cataloging and Indexing: History and Objectives of Indexing, Indexing Process, Automatic Indexing, Information Extraction

Data Structure: Introduction to Data Structure, Stemming Algorithms, Inverted File Structure, N-Gram Data Structures, PAT Data Structure, Signature File Structure, Hypertext and XML Data Structures, Hidden Markov Models

UNIT – III

Automatic Indexing: Classes of Automatic Indexing, Statistical Indexing, Natural Language, Concept Indexing, Hypertext Linkages

Document and Term Clustering: Introduction to Clustering, Thesaurus Generation, Item Clustering, Hierarchy of Clusters

UNIT – IV

User Search Techniques: Search Statements and Binding, Similarity Measures and Ranking, Relevance Feedback, Selective Dissemination of Information Search, Weighted Searches of

Boolean Systems, Searching the INTERNET and Hypertext
Information Visualization: Introduction to Information Visualization, Cognition and Perception, Information Visualization Technologies

UNIT – V

Text Search Algorithms: Introduction to Text Search Techniques, Software Text Search Algorithms, Hardware Text Search Systems
Multimedia Information Retrieval: Spoken Language Audio Retrieval, Non-Speech Audio Retrieval, Graph Retrieval, Imagery Retrieval, Video Retrieval

Text Books:

1. Gerald J. Kowalski, Mark T. Maybury, " Information Storage and Retrieval Systems – Theory and Implementation", Second Edition, , Springer
2. Frakes, W.B., Ricardo Baeza-Yates: Information Retrieval Data Structures and Algorithms, Prentice Hall, 1992.

Reference Books:

1. Robert Korfhage, "Information Storage & Retrieval" , John Wiley & Sons.
2. Yates and Neto, "Modern Information Retrieval" Pearson Education.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

III Year – II Semester		L	T	P	C
		3	0	0	3
SOCIAL NETWORK ANALYSIS (Professional Elective –II)					

Course Objectives:

- Formalize different types of entities and relationships as nodes and edges and represent thisinformation as relational data
- Plan and execute network analytical computations
- Use advanced network analysis software to generate visualizations and perform empiricalinvestigations of network data
- Interpret and synthesize the meaning of the results with respect to a question, goal, or task
- Collect network data in different ways and from different sources while adhering to legalstandards and ethics standards

Course Outcomes:

After completing the course student should:

- Know basic notation and terminology used in network science
- Be able to visualize, summarize and compare networks
- Illustrate basic principles behind network analysis algorithms
- Develop practical skills of network analysis in R programming language
- Be capable of analyzing real work networks

UNIT I

Social Network Analysis: Preliminaries and definitions, Erdos Number Project, Centrality measures, Balance and Homophily.

UNIT II

Random graph models**:** Random graphs and alternative models, Models of network growth, Navigation in social Networks, Cohesive subgroups, Multidimensional Scaling, Structural equivalence, roles and positions.

UNIT III

Network topology and diffusion, Contagion in Networks, Complex contagion, Percolation and information, Navigation in Networks Revisited.

UNIT IV

Small world experiments, small world models, origins of small world, Heavy tails, Small Diameter, Clustering of connectivity, The ErdosRenyi Model, Clustering Models.

UNIT V

Network structure -Important vertices and page rank algorithm, towards rational dynamics in networks, basics of game theory, Coloring and consensus, biased voting,

network formation games, network structure and equilibrium, behavioral experiments, Spatial and agent-based models.

Text Books:

1) S. Wasserman and K. Faust. “Social Network Analysis: Methods and Applications”, CambridgeUniversity Press.
2) D. Easley and J. Kleinberg, “Networks, Crowds and Markets: Reasoning about a highlyconnected world” , Cambridge University Press, 1st edition,2010

Reference Books:

1) Maarten van Steen. “Graph Theory and Complex Networks. An Introduction”, 2010.
2) Reza Zafarani, Mohammed Ali Abbasi, Huan Liu. “Social Media Mining: An Introduction”.Cambridge University Press 2014.
3) Maksim Tsvetovat and Alexander Kouznetsov. “Social Network Analysis for Startups”. O’ReillyMedia, 2011.

e-Resources:

https://www.classcentral.com/course/edx-social-network-analysis-sna-9134
https://www.coursera.org/learn/social-network-analysis