DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.Tech INFORMATION TECHNOLOGY
Regulations 2019

OPEN ELECTIVE

Sri Eshwar College of Engineering

(An Autonomous Institution)

(Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai)

Kondampatti (Post), Kinathukadavu,

Coimbatore – 641202

B.Tech INFORMATION TECHNOLOGY
OPEN ELECTIVE

Sl. No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	U19IT601	Basics of Software Engineering	OE	3	3	0	0	3
2.	U19IT602	Web Programming	OE	3	3	0	0	3
3.	U19IT603	Basics of Software Testing	OE	3	3	0	0	3
4.	U19IT606	Introduction to Blockchain Technology	OE	3	3	0	0	3
5.	U19IT607	Soft Computing Techniques	OE	3	3	0	0	3
6.	U19IT608	Fundamentals of IT Infrastructure Management	OE	3	3	0	0	3
7.	U19IT609	Mobile Application Development	OE	3	3	0	0	3
8.	U19IT610	Introduction to Computer Networks	OE	3	3	0	0	3

B.Tech INFORMATION TECHNOLOGY
OPEN ELECTIVE

U19IT601	Basics of Software Engineering	L	T	P	C
		3	0	0	3

Outcomes

After completion of this course, the students will be able to

CO1	**(Apply)** Apply appropriate software engineering model for a given development scenario.	K3
CO2	**(Apply)** Apply appropriate requirement engineering techniques for real time projects.	K3
CO3	**(Evaluate)** Compare and choose the suitable design models for the given application scenario.	K3
CO4	**(Apply)** Apply the testing principles to software project development.	K3
CO5	**(Apply)** Apply the estimation techniques for software project management.	K3

MODULE I SOFTWARE PRODUCT AND PROCESS **9**

Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models – System Engineering – Computer Based System – Business Process Engineering Overview – Product Engineering Overview.

MODULE II REQUIREMENTS ANALYSIS **9**

Software Requirements: Functional and Non-Functional, User requirements, System requirements – Software Requirements Document - IEEE Standards for SRS – Requirement Engineering Process: Feasibility Studies, Requirements elicitation – Requirements analysis modeling techniques – requirements validation.

MODULE III SOFTWARE DESIGN **9**

Design process: Design Concepts, Quality-Design Model, Heuristics - Architectural Design: Architectural styles-Architectural Mapping using Data Flow - Performing User interface design: Interface analysis and design models-Component level Design.

MODULE IV TESTING AND MAINTENANCE **9**

Software testing fundamentals – Testing Strategies: White box testing – control structure testing, black box testing – Unit Testing, Integration Testing, Acceptance Testing –Regression Testing, Validation Testing, System Testing and Debugging – Software Implementation Techniques: Coding practices – Refactoring – Reverse and Forward Engineering.

MODULE V PROJECT MANAGEMENT **9**

Software Project Management: Estimation – LOC, FP Based Estimation, Make/Buy Decision COCOMO Model – Project Scheduling – Scheduling, Earned Value Analysis Planning – Project Plan, Planning Process, RFP Risk Management – Identification, Projection - Risk Management-Risk Identification-RMMM Plan-CASE TOOLS

TOTAL : 45 Hours

TEXTBOOKS

1 R.S. Pressman, "Software Engineering – A Practitioner's Approach", Eighth Edition, McGraw Hill International Edition, 2015.

2 Ian Sommerville, —"Software Engineering", 10th Edition, Pearson Education, 2016.

REFERENCES

1 Ronald J. Leach, "Introduction to Software Engineering", CRC Press, 2016.

2 Rod Stephens "Beginning Software Engineering", John Wiley & Sons, 2015.

U19IT602	Web Programming	L	T	P	C
		3	0	0	3

Outcomes

After completion of this course, the students will be able to

CO1	**(Apply)** Understand and apply the features of object oriented programming paradigm and Java Semantics	K3

	CO2	**(Apply)** Understand and apply the concepts of Client side programming	K3
	CO3	**(Apply)** Understand and apply the concepts of Server Side Programming	K3
	CO4	**(Apply)** Understand and apply the features of PHP frameworks and project development using MVC Architecture	K3
	CO5	**(Apply)** Use relevant Web Frameworks along with web services for application building and deployment	K3

MODULE I WEB FUNDAMENTALS 10

Web Essentials: Clients, Servers and Communication – The Internet – Basic Internet protocols – World wide web – HTTP Request Message – HTTP Response Message – Web Clients – Web Servers – HTML5 – Tables – Lists – Image – HTML5 control elements – Semantic elements – Drag and Drop – Audio – Video controls - CSS3 – Inline, embedded and external style sheets – Rule cascading – Inheritance – Backgrounds – Border Images – Colors – Shadows – Text – Transformations – Transitions – Animations

MODULE II CLIENT SIDE SCRIPTING LANGUAGE 8

Java Script: An introduction to JavaScript–JavaScript DOM Model-Date and Objects,- Regular Expressions- Exception Handling-Validation-Built-in objects-Event HandlingDHTML with JavaScript

MODULE III SERVER SIDE PROGRAMMING 10

Servlets: Java Servlet Architecture- Servlet Life Cycle- Form GET and POST actionsSession Handling- Understanding Cookies- Installing and Configuring Apache Tomcat Web Server- DATABASE CONNECTIVITY: JDBC perspectives, JDBC program example - JSP: Understanding Java Server Pages- JSP Standard Tag Library (JSTL)-Creating HTML forms by embedding JSP code.

MODULE IV PHP and XML 9

Functions: Built-in Functions, User defined functions – Function Prototypes –Recursion – Command Line Argument -Arrays and Functions – Strings and Functions. Pointers: Declaration – Pointer operators – Pointer arithmetic -Passing Pointers to a Function – Pointers and one dimensional arrays - Dynamic Memory Allocation

MODULE V INTRODUCTION TO AJAX and WEB SERVICES 8

AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods; Web Services: Introduction- Java web services Basics – Creating, Publishing, Testing and Describing a Web services (WSDL)-Consuming a web service, Database Driven web service from an application –SOAP.

TOTAL : 45 Hours

TEXTBOOKS

1 Deitel and Deitel and Nieto, — Internet and World Wide Web - How to Program‖, Prentice Hall, 5th Edition, 2011.

REFERENCES

1 Stephen Wynkoop and John Burke —Running a Perfect Website‖, QUE, 2nd Edition,1999.
2 Chris Bates, Web Programming – Building Intranet Applications, 3rd Edition, Wiley Publications, 2009.
3 Jeffrey C and Jackson, —Web Technologies A Computer Science Perspective‖, Pearson Education, 2011.
4 Gopalan N.P. and Akilandeswari J., —Web Technology‖, Prentice Hall of India, 2011.
5 UttamK.Roy, —Web Technologies‖, Oxford University Press, 2011.

U19IT603	**Basics of Software Testing**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

	After completion of this course, the students will be able to		
Outcomes	**CO1**	**(Apply)** Define the test cases which are suitable for a software development for different domain.	K3
	CO2	**(Apply)** Explain fundamental concepts in software testing, strategies and methods for a software development for different domains.	K3
	CO3	**(Apply)** Determine the suitable tests to be carried out.	K3
	CO4	**(Apply)** Design test cases and prepare a test plan document.	K3
	CO5	**(Apply)** Describe the usage of the automatic testing tools.	K3

MODULE I FUNDAMENTALS OF TESTING 9

Testing as an Engineering Activity – Testing as a Process – Basic definitions – Software Testing Principles – The Tester's Role in a Software Development Organization – Origins of Defects – Cost of defects – Defect Classes – The Defect Repository and Test Design – Defect Examples – Developer/Tester Support of Developing a Defect Repository.

MODULE II TEST CASE DESIGN STRATEGIES 9

Test case Design Strategies – Using Black Box Approach to Test Case Design – Random Testing – Requirements based testing – Boundary Value Analysis – Equivalence Class Partitioning – State-based testing – Cause-effect graphing – Compatibility testing – user documentation testing – domain testing – Using White Box Approach to Test design – static testing vs. structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing – Evaluating Test Adequacy Criteria

MODULE III LEVELS OF TESTING 9

The need for Levers of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests –System Testing – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Usability and Accessibility testing – Configuration testing – Compatibility testing – Website testing.

MODULE IV TEST MANAGEMENT 9

People and organizational issues in testing – Organization structures for testing teams – testing services – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process – Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.

MODULE V TEST AUTOMATION 9

Software test automation – skill needed for automation – scope of automation – design and architecture for automation – requirements for a test tool – challenges in automation – Test metrics and measurements – project, progress and productivity metrics.

TOTAL : 45 Hours

TEXTBOOKS

1 Paul C. Jorgensen, "Software Testing: A Craftsman's Approach", Fourth Edition, CRC Press, 2013.

2 Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson Education, 2006.

3 Ilene Burnstein, "Practical Software Testing", Springer International Edition, 2003.

REFERENCES

1 Ali Mili, Fairouz Chier, "Software Testing: Concepts and Operations", Wiley, 2015.

2 Dorothy Graham, Mark Fewster, "Experiences of Test Automation: Case Studies of Software Test Automation", Pearson Education, 2012.

3 Aditya P. Mathur, "Foundations of Software Testing _ Fundamental Algorithms and Techniques", Dorling Kindersley (India) Pvt. Ltd., Pearson Education, 2008.

U19IT606	**INTRODUCTION TO BLOCKCHAIN TECHNOLOGY**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

Outcomes

After completion of this course, the students will be able to

CO1	**(Apply)** Describe and explain blockchain technology	K3
CO2	**(Apply)** Understand emerging abstract models for Blockchain Technology.	K3
CO3	**(Apply)** Understand the process of Cryptocurrencies issuance, proof-of-work and alternative consensus mechanisms and transaction	K3
CO4	**(Apply)** Familiarise the functional/operational aspects of Cryptocurrency ECOSYSTEM	K3

	CO5	**(Apply)** Integrate ideas from various domains and implement them using block chain technology in different perspectives.	K3

MODULE-I Basics of Blockchain 9

Distributed Database, Two General Problem, Byzantine General problem and Fault Tolerance, Hadoop Distributed File System, Distributed Hash Table, ASIC resistance, Turing Complete. • Cryptography: Hash function, Digital Signature - ECDSA, Memory Hard Algorithm, Zero Knowledge Proof.

MODULE-II Blockchain 9

Introduction, Advantage over conventional distributed database, Blockchain Network, Mining Mechanism, Distributed Consensus, Merkle Patricia Tree, Gas Limit, Transactions and Fee, Anonymity, Reward, Chain Policy, Life of Blockchain application, Soft & Hard Fork, Private and Public blockchain.

MODULE III Distributed Consensus 9

Nakamoto consensus, Proof of Work, Proof of Stake, Proof of Burn, Difficulty Level, Sybil Attack, Energy utilization and alternate.

MODULE IV Cryptocurrency 9

History, Distributed Ledger, Bitcoin protocols - Mining strategy and rewards, Ethereum - Construction, DAO, Smart Contract, GHOST, Vulnerability, Attacks, Sidechain, Namecoin

MODULE V Cryptocurrency Regulation 9

Stakeholders, Roots of Bit coin, Legal Aspects-Crypto currency Exchange, Black Market and Global Economy. **Applications:** Internet of Things, Medical Record Management System, Domain Name Service and future of Blockchain.

TOTAL : 45 Hours

TEXTBOOKS

1 Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).

2 Imran Bashir, "Mastering Blockchain - Distributed ledgers, decentralization and smart contracts explained", Packt Publishing Ltd., Second Edition, 2017.

REFERENCES

1 Andreas M. Antonopoulos ,Antonopoulos, Mastering Bitcoin: Unlocking Digital Cryptocurrencies , O'Reilly Media, Inc., December 2014

2 Bikramaditya Singhal, Gautama, Priyansu Sekhar Panda," Beginning Blockchain: A Beginner's Guide to Building Blockchain Solutions", Apress.

3 DR. Gavin Wood, "ETHEREUM: A Secure Decentralized Transaction Ledger", Yellow paper.2014.

U19IT607	**Soft Computing Techniques**	**L**	**T**	**P**	**C**
		3	**0**	**0**	**3**

After completion of this course, the students will be able to

Outcomes	**CO1**	**(Understand)** Understand human intelligence and AI	K2
	CO2	**(Understand)** Generalize basics of Fuzzy logic and neural networks	K2
	CO3	**(Understand)** Discuss the ideas of fuzzy sets, fuzzy logic and use of heuristics based on human experience	K2
	CO4	**(Apply)** Examine with genetic algorithms and other random search procedures useful while seeking global optimum in self-learning situations	K3
	CO5	**(Apply)** Experiment some familiarity with current research problems and research methods in Soft Computing Techniques.	K3

MODULE I INTRODUCTION TO SOFT COMPUTING 9

Introduction of soft computing, soft computing vs. hard computing, various types of soft computing techniques, Fuzzy Computing, Neural Computing, Genetic Algorithms, Associative Memory, Adaptive Resonance Theory, Classification, Clustering, Bayesian Networks

MODULE II ARTIFICIAL NEURAL NETWORKS 9

Neural Network: Biological and Artificial Neuron, Neural Networks, Supervised and Unsupervised Learning. Single Layer Perceptron - Multilayer Perceptron – Back propagation Learning.

MODULE III FUZZY SYSTEMS 9

Introduction to Fuzzy Logic, Classical Sets and Fuzzy Sets – Classical Relations and Fuzzy Relations - Membership Functions -Defuzzification – Fuzzy Arithmetic and Fuzzy Measures -Fuzzy Rule Base and Approximate Reasoning

MODULE IV GENETIC ALGORITHMS 9

Basic Concepts- Working Principles -Encoding- Fitness Function – Reproduction -Inheritance Operators – Cross Over – Inversion and Deletion -Mutation Operator

MODULE V HYBRID SYSTEMS 9

Hybrid Systems -Neural Networks, Fuzzy Logic and Genetic -GA Based Weight Determination – LR-Type Fuzzy Numbers – Fuzzy Neuron – Fuzzy BP Architecture – Learning in Fuzzy BP

TOTAL : 45 Hours

TEXTBOOKS

1. Herbert Schildt, "C – The Complete Reference", Tata McGraw Hill Publishing Company, New Delhi, 2017.
2. N.P.Padhy, S.P.Simon, "Soft Computing with MATLAB Programming", Oxford University Press, 2015.
3. J.S.R.Jang, C.T.Sun and E.Mizutani, "Neuro-Fuzzy and Soft Computing", PHI, 2004, Pearson Education 2004

REFERENCES

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun, Eiji Mizutani, —Neuro-Fuzzy and Soft Computing, Prentice-Hall of India, 2002.
2. Kwang H.Lee, —First course on Fuzzy Theory and Applications, Springer, 2005.
3. George J. Klir and Bo Yuan, —Fuzzy Sets and Fuzzy Logic-Theory and Applications, Prentice Hall, 1996.
4. S.N.Sivanandam , S.N.Deepa, "Principles of Soft Computing", Wiley India Pvt. Ltd., 2nd Edition, 2011.

U19IT608	Fundamentals of IT Infrastructure Management	L	T	P	C
		3	0	0	3

After completion of this course, the students will be able to

Outcomes	**CO1**	**(Understand)** Understand the basics of IT infrastructure design and ITIL.	K2
	CO2	**(Understand)** Distinguish between various IT Infrastructure Management Operations.	K2
	CO3	**(Understand)** Understand the strategic methods of storage management in Information Technology.	K2
	CO4	**(Understand)** Able to know the Security Management in Information Technology.	K2
	CO5	**(Understand)** Able to Know about the Detailed Knowledge of IT Recent Trends in Globally.	K2

MODULE-I IT INFRASTRUCTURE: OVERVIEW 9

Introduction-Challenges in IT Infrastructure Management, Design Issues-Determining Customer's Requirements, IT Systems and Service Management Process, IT Infrastructure Library.

MODULE-II IT INFRASTRUCTURE MANAGEMENT 9

Service Delivery Process: Service Level Agreements, Financial Managements, ITService Continuity Management, Capacity Management, Availability Management.

MODULE III STORAGE MANAGEMENT 9

Introduction, Backup and Storage, Archive and Retrieve, Disaster Recovery, Space Management, Database and Application Protection, BMR, Data Retention.

MODULE IV SECURITY MANAGEMENT 9

Security Management: Introduction, Computer Security, Internet Security, Physical Security, Identity Management, Access Control, Intrusion Detection.

MODULE V EMERGING TRENDS IN IT **9**

E-Commerce, Electronic Data Interchange, Global System for Mobile Communication(GSM),Bluetooth, Infrared Technology.

TOTAL : 45 Hours

TEXTBOOKS

1 Phalguni Gupta, "IT Infrastructure and Its Management", Tata McGraw Hill Publishing Company, New Delhi, 2010.

2 Rich Schiesser, "IT Systems Management: Designing, Implementing, and Managing World-Class Infrastructures", Pearson, 2001.

REFERENCES

1 S.C.Mourya," IT Infrastructure and Its Management- A conceptual Approach", Technical Publications, 2014.

2 Anita Sengar"IT Infrastructure Management", S K Kataria publications, 2012.

3 Mani Subrahmanian,"Network Management, Principles and Practice", Pearson Education,2010.

U19IT609	MOBILE APPLICATION DEVELOPMENT	L	T	P	C
		3	0	0	3

After completion of this course, the students will be able to

Outcomes	**CO1**	Describe the challenges in mobile application design and development	K3
	CO2	Use Practical Knowledge of the design for mobile applications for specific requirements	K3
	CO3	Implement the design using Android SDK	K3
	CO4	Develop applications using components of android framework	K3
	CO5	Develop android applications including files and databases	K3

MODULE-I FUNDAMENTALS OF ANDROID **9**

Introduction to Android, Android versions and its feature ,Android Development Environment - System Requirements, Android SDK, Installing Java, and ADT bundle - Eclipse Integrated Development Environment (IDE), Creating Android Virtual Devices (AVDs)- Market and business drivers for mobile applications – Requirements gathering and validation for mobile applications.

MODULE-II DESIGN ASPECTS **9**

Introduction – Basics of embedded systems design – Embedded OS - Design constraints for mobile applications, both hardware and software related – Architecting mobile applications – Android Libraries, Application Framework, Creating a New Android Project ,Defining the Project Name and SDK Settings, Project Configuration Settings, Configuring the Launcher Icon, Creating an Activity, Running the Application in the AVD, Stopping a Running Application, Modifying the Example Application, Reviewing the Layout and Resource Files

MODULE III ANDROID DEVELOPMENT PLATFORM **8**

Understanding Java SE and Virtual Machine , The Directory Structure of an Android Project , Common Default Resources Folders , The Values Folder , Leveraging Android XML, Screen Sizes , Launching Your Application: The AndroidManifest.xml File ,Creating Your First Android Application

MODULE IV ANDROID FRAMEWORK OVERVIEW **9**

Android Application Components, Android Activities: Defining the UI, Android Services: Processing in the Background, Broadcast Receivers: Announcements and Notifications Content Providers: Data Management, Android Intent Objects: Messaging for Components, Android Manifest XML: Declaring Your Components, Views and View Groups, Android Layout Managers, The View Hierarchy, Designing an Android User Interface using the Graphical Layout Tool

MODULE V FILES, CONTENT PROVIDERS,AND DATABASES **9**

Saving and Loading Files, SQLite Databases, Android Database Design, Exposing Access to a Data Source through a Content Provider, Content Provider Registration, Native Content Providers, Packaging and deployment – Interaction with server side applications – Using Google Maps, GPS and Wifi – Integration with social media applications

TOTAL : 45 Hours

TEXTBOOKS:

1 Code Complete: A Practical Handbook of Software Construction, 2016, 2nd Edition by Steve McConnell.

2 Mobile Apps Made Simple: The Ultimate Guide to Quickly Creating, Designing and Utilizing Mobile Apps for Your Business, 2016,2nd Edition by Jonathan McCallister

3 Android Application Development Cookbook- 2016,Second Edition by Rick Boyer and Kyle Mew

REFERENCES:

1 http://developer.android.com/develop/index.html

2 Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012

3 Charlie Collins, Michael Galpin and Matthias Kappler, "Android in Practice", DreamTech, 2012

4 James Dovey and Ash Furrow, "Beginning Objective C", Apress, 2012.

5 David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, "Beginning iOS 6 Development: Exploring the iOS SDK", Apress, 2013.

U19IT610	INTRODUCTION TO COMPUTER NETWORKS	L	T	P	C
		3	0	0	3

After completion of this course, the students will be able to

Outcomes	**CO1**	**(Understand)** Understand the division of network functionalities into layers and transmission media.	K2
	CO2	**(Understand)** Learn the various protocols in data link layer and introduce IEEE standards	K2
	CO3	**(Understand)** Trace the flow of information from one node to another node in the network	K2
	CO4	**(Understand)** Understand the different routing protocols	K2
	CO5	**(Understand)** Be familiar with the applications and its functionality	K2

MODULE-I NETWORKING FUNDAMENTALS 9

Computer Networks Applications-Network Types: PAN, LAN, MAN and WAN Network-Internet-Reference Models: OSI Reference Model-TCP/IP Reference Model-Comparison of OSI and TCP/IP-Critique of Reference Models.

MODULE-II DATA LINK LAYER 9

Framing; Error control including Bit-parity, CRC and Hamming Codes; Reliable transmission and Automatic Repeat Request (ARQ) protocols including Stop-and-Wait, Go-back-N, Selective Repeat. Performance analysis of ARQ protocols. Example protocols such as HDLC and PPP.

MODULE III TRANSPORT LAYER 8

Elements of Transport Layer Protocols, The Internet Transport Protocols: Details of TCP header and operation, Performance problems in Computer Networks, UDP Header.

MODULE IV NETWORK LAYER 10

Network Design issues, Routing protocols including distance-vector and link-state approaches Routing Algorithms including Dijkstra's algorithm and distributed Bellman-Ford algorithm; Example protocols: OSPF, RIP, BGP. Approaches to Congestion Control, Packet scheduling, Ipv4 and Ipv6 addressing and headers. Gateway protocol concepts.

MODULE V APPLICATION LAYER 9

DNS – The Domain Name System, Electronic mail, The World wide web: Architectural overview, FTP, HTTP and Mobile web.

TOTAL : 45 Hours

TEXTBOOKS

1 James F. Kurose, Keith W. Ross, "Computer Networking: A Top-Down Approach", Seventh Edition, Pearson Education, 2017.

2 S.Tanenbaum, David J, Wetherall, "Computer Networks Andrew S". Pearson Education India 5th Edition, 2013

REFERENCES

1 Larry L. Peterson, Bruce S. Davie, "Computer Networks: A Systems Approach", Fifth Edition, Morgan Kaufmann Publishers, 2011.

2 Behrouz A. Forouzan, "Data communication and Networking", Fourth Edition, Tata McGraw – Hill, 2011