


SOFTWARE ENGINEERING			
[As per Choice Based Credit System (CBCS) scheme]			
(Effective from the academic year 2016 -2017)			
SEMESTER – IV			
Subject Code	15CS42	IA Marks	20
Number of Lecture Hours/Week	04	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS – 04			
Course objectives: This course will enable students to			
<ul style="list-style-type: none"> • Outline software engineering principles and activities involved in building large software programs. • Identify ethical and professional issues and explain why they are of concern to software engineers. • Describe the process of requirements gathering, requirements classification, requirements specification and requirements validation. • Differentiate system models, use UML diagrams and apply design patterns. • Discuss the distinctions between validation testing and defect testing. • Recognize the importance of software maintenance and describe the intricacies involved in software evolution. • Apply estimation techniques, schedule project activities and compute pricing. • Identify software quality parameters and quantify software using measurements and metrics. • List software quality standards and outline the practices involved. • Recognize the need for agile software development, describe agile methods, apply agile practices and plan for agility. 			
Module 1			Teaching Hours
Introduction: Software Crisis, Need for Software Engineering. Professional Software Development, Software Engineering Ethics. Case Studies. Software Processes: Models: Waterfall Model (Sec 2.1.1), Incremental Model (Sec 2.1.2) and Spiral Model (Sec 2.1.3). Process activities. Requirements Engineering: Requirements Engineering Processes (Chap 4). Requirements Elicitation and Analysis (Sec 4.5). Functional and non-functional requirements (Sec 4.1). The software Requirements Document (Sec 4.2). Requirements Specification (Sec 4.3). Requirements validation (Sec 4.6). Requirements Management (Sec 4.7).			12 Hours
Module 2			Teaching Hours
System Models: Context models (Sec 5.1). Interaction models (Sec 5.2). Structural models (Sec 5.3). Behavioral models (Sec 5.4). Model-driven engineering (Sec 5.5). Design and Implementation: Introduction to RUP (Sec 2.4), Design Principles (Chap 17). Object-oriented design using the UML (Sec 7.1). Design patterns (Sec 7.2). Implementation issues (Sec 7.3). Open source development (Sec 7.4).			11 Hours
Module 3			Teaching Hours
Software Testing: Development testing (Sec 8.1), Test-driven development (Sec 8.2), Release testing (Sec 8.3), User testing (Sec 8.4). Test Automation (Page no 42, 70,212, 231,444,695). Software Evolution: Evolution processes (Sec 9.1). Program evolution dynamics (Sec			9 Hours

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9.2). Software maintenance (Sec 9.3). Legacy system management (Sec 9.4).	
Module 4	
Project Planning: Software pricing (Sec 23.1). Plan-driven development (Sec 23.2). Project scheduling (Sec 23.3): Estimation techniques (Sec 23.5). Quality management: Software quality (Sec 24.1). Reviews and inspections (Sec 24.3). Software measurement and metrics (Sec 24.4). Software standards (Sec 24.2)	10 Hours
Module 5	
Agile Software Development: Coping with Change (Sec 2.3), The Agile Manifesto: Values and Principles. Agile methods: SCRUM (Ref "The SCRUM Primer, Ver 2.0") and Extreme Programming (Sec 3.3). Plan-driven and agile development (Sec 3.2). Agile project management (Sec 3.4), Scaling agile methods (Sec 3.5):	8 Hours
Course Outcomes: After studying this course, students will be able to:	
<ul style="list-style-type: none"> • Design a software system, component, or process to meet desired needs within realistic constraints. • Assess professional and ethical responsibility • Function on multi-disciplinary teams • Use the techniques, skills, and modern engineering tools necessary for engineering practice • Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems. 	
Graduate Attributes	
<ul style="list-style-type: none"> • Project Management and Finance • Conduct Investigations of Complex Problems • Modern Tool Usage • Ethics 	
Question paper pattern:	
<p>The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.</p>	
Text Books:	
<ol style="list-style-type: none"> 1. Ian Sommerville: Software Engineering, 9th Edition, Pearson Education, 2012. (Listed topics only from Chapters 1,2,3,4, 5, 7, 8, 9, 23, and 24) 2. The SCRUM Primer, Ver 2.0, http://www.goodagile.com/scrumprimer/scrumprimer20.pdf 	
Reference Books:	
<ol style="list-style-type: none"> 1. Roger S. Pressman: Software Engineering-A Practitioners approach, 7th Edition, Tata McGraw Hill. 2. Pankaj Jalote: An Integrated Approach to Software Engineering, Wiley India 	
Web Reference for eBooks on Agile:	
<ol style="list-style-type: none"> 1. http://agilemanifesto.org/ 2. http://www.lamesshore.com/Agile-Book/ 	


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MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2016 -2017) SEMESTER – V			
Subject Code	15CSS1	IA Marks	20
Number of Lecture Hours/Week	4	Exam Marks	80
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS – 04			
Course objectives: This course will enable students to			
<ul style="list-style-type: none"> • Explain the principles of management, organization and entrepreneur. • Discuss on planning, staffing, ERP and their importance • Infer the importance of intellectual property rights and relate the institutional support 			
Module – 1			Teaching Hours
Introduction - Meaning, nature and characteristics of management, scope and Functional areas of management, goals of management, levels of management, brief overview of evolution of management theories,. Planning- Nature, importance, types of plans, steps in planning, Organizing- nature and purpose, types of Organization, Staffing- meaning, process of recruitment and selection			10 Hours
Module – 2			
Directing and controlling- meaning and nature of directing, leadership styles, motivation Theories, Communication- Meaning and importance, Coordination- meaning and importance, Controlling- meaning, steps in controlling, methods of establishing control.			10 Hours
Module – 3			
Entrepreneur – meaning of entrepreneur, characteristics of entrepreneurs, classification and types of entrepreneurs, various stages in entrepreneurial process, role of entrepreneurs in economic development, entrepreneurship in India and barriers to entrepreneurship. Identification of business opportunities, market feasibility study, technical feasibility study, financial feasibility study and social feasibility study.			10 Hours
Module – 4			
Preparation of project and ERP - meaning of project, project identification, project selection, project report, need and significance of project report, contents, formulation, guidelines by planning commission for project report, Enterprise Resource Planning: Meaning and Importance- ERP and Functional areas of Management – Marketing / Sales- Supply Chain Management – Finance and Accounting – Human Resources – Types of reports and methods of report generation			10 Hours
Module – 5			
Micro and Small Enterprises: Definition of micro and small enterprises, characteristics and advantages of micro and small enterprises, steps in establishing micro and small enterprises, Government of India industrial policy 2007 on micro and small enterprises, case study (Microsoft), Case study(Captain G R Gopinath),case study (N R Narayana Murthy & Infosys), Institutional support: MSME-DI, NSIC, SIDBI, KIADB, KSSIDC, TECSOK, KSFC, DIC and District level single window agency, Introduction to IPR.			10 Hours
Course outcomes: The students should be able to:			
<ul style="list-style-type: none"> • Define management, organization, entrepreneur, planning, staffing, ERP and outline 			

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their importance in entrepreneurship

- Utilize the resources available effectively through ERP
- Make use of IPRs and institutional support in entrepreneurship

Question paper pattern:

The question paper will have TEN questions.

There will be TWO questions from each module.

Each question will have questions covering all the topics under a module.

The students will have to answer FIVE full questions, selecting ONE full question from each module.

Text Books:

1. Principles of Management -P. C. Tripathi, P. N. Reddy; Tata McGraw Hill, 4th / 6th Edition, 2010.
2. Dynamics of Entrepreneurial Development & Management -Vasant Desai Himalaya Publishing House.
3. Entrepreneurship Development -Small Business Enterprises -Poornima M Charantimath Pearson Education – 2006.
4. Management and Entrepreneurship - Kanishka Bedi- Oxford University Press-2017

Reference Books:

1. Management Fundamentals -Concepts, Application, Skill Development Robert Lusier – Thomson.
2. Entrepreneurship Development -S S Khanka -S Chand & Co.
3. Management -Stephen Robbins -Pearson Education /PHI -17th Edition, 2003

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SOFTWARE ENGINEERING			
[As per Choice Based Credit System (CBCS) scheme]			
(Effective from the academic year 2017 -2018)			
SEMESTER – IV			
Subject Code	17CS45	IA Marks	40
Number of Lecture Hours/Week	04	Exam Marks	60
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS – 04			
Module 1			Teaching Hours
Introduction: Software Crisis, Need for Software Engineering. Professional Software Development, Software Engineering Ethics. Case Studies. Software Processes: Models: Waterfall Model (Sec 2.1.1), Incremental Model (Sec 2.1.2) and Spiral Model (Sec 2.1.3). Process activities. Requirements Engineering: Requirements Engineering Processes (Chap 4). Requirements Elicitation and Analysis (Sec 4.5). Functional and non-functional requirements (Sec 4.1). The software Requirements Document (Sec 4.2). Requirements Specification (Sec 4.3). Requirements validation (Sec 4.6). Requirements Management (Sec 4.7).			12 Hours
Module 2			Teaching Hours
System Models: Context models (Sec 5.1). Interaction models (Sec 5.2). Structural models (Sec 5.3). Behavioral models (Sec 5.4). Model-driven engineering (Sec 5.5). Design and Implementation: Introduction to RUP (Sec 2.4), Design Principles (Chap 17). Object-oriented design using the UML (Sec 7.1). Design patterns (Sec 7.2). Implementation issues (Sec 7.3). Open source development (Sec 7.4).			11 Hours
Module 3			Teaching Hours
Software Testing: Development testing (Sec 8.1), Test-driven development (Sec 8.2), Release testing (Sec 8.3), User testing (Sec 8.4). Test Automation (Page no 42, 70,212, 231,444,695). Software Evolution: Evolution processes (Sec 9.1). Program evolution dynamics (Sec 9.2). Software maintenance (Sec 9.3). Legacy system management (Sec 9.4).			9 Hours
Module 4			Teaching Hours
Project Planning: Software pricing (Sec 23.1). Plan-driven development (Sec 23.2). Project scheduling (Sec 23.3): Estimation techniques (Sec 23.5). Quality management: Software quality (Sec 24.1). Reviews and inspections (Sec 24.3). Software measurement and metrics (Sec 24.4). Software standards (Sec 24.2)			10 Hours
Module 5			Teaching Hours
Agile Software Development: Coping with Change (Sec 2.3), The Agile Manifesto: Values and Principles. Agile methods: SCRUM (Ref "The SCRUM Primer, Ver 2.0") and Extreme Programming (Sec 3.3). Plan-driven and agile development (Sec 3.2). Agile project management (Sec 3.4), Scaling agile methods (Sec 3.5):			8 Hours
Course Outcomes: After studying this course, students will be able to:			
<ul style="list-style-type: none"> • Design a software system, component, or process to meet desired needs within realistic constraints. • Assess professional and ethical responsibility • Function on multi-disciplinary teams • Make use of techniques, skills, and modern engineering tools necessary for engineering 			

<p>practice</p> <ul style="list-style-type: none"> • Comprehend software systems or parts of software systems.
<p>Question paper pattern:</p> <p>The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.</p>
<p>Text Books:</p> <ol style="list-style-type: none"> 1. Ian Sommerville: Software Engineering, 9th Edition, Pearson Education, 2012. (Listed topics only from Chapters 1,2,3,4, 5, 7, 8, 9, 23, and 24) 2. The SCRUM Primer, Ver 2.0, http://www.goodagile.com/scrumpriemer/scrumpriemer20.pdf
<p>Reference Books:</p> <ol style="list-style-type: none"> 1. Roger S. Pressman: Software Engineering-A Practitioners approach, 7th Edition, Tata McGraw Hill. 2. Pankaj Jalote: An Integrated Approach to Software Engineering, Wiley India
<p>Web Reference for eBooks on Agile:</p> <ol style="list-style-type: none"> 1. http://agilemanifesto.org/ 2. http://www.jamesshore.com/Agile-Book/


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MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY [As per Choice Based Credit System (CBCS) scheme] (Effective from the academic year 2017 - 2018) SEMESTER – V			
Subject Code	17CS51	IA Marks	40
Number of Lecture Hours/Week	4	Exam Marks	60
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS – 04			
Module – 1			Teaching Hours
Introduction – Meaning, nature and characteristics of management, scope and functional areas of management, goals of management, levels of management, brief overview of evolution of management. Planning- Nature, importance, types of plans, steps in planning, Organizing- nature and purpose, types of organization.			10 Hours
Module – 2			
Staffing- meaning, process of recruitment and selection. Directing and controlling- meaning and nature of directing, leadership styles, motivation theories. Controlling- meaning, steps in controlling, methods of establishing control, Communication- Meaning and importance, Coordination- meaning and importance			10 Hours
Module – 3			
Entrepreneur – meaning of entrepreneur, types of entrepreneurship, stages of entrepreneurial process, role of entrepreneurs in economic development, entrepreneurship in India, barriers to entrepreneurship. Identification of business opportunities- market feasibility study, technical feasibility study, financial feasibility study and social feasibility study.			10 Hours
Module – 4			
Preparation of project and ERP - meaning of project, project identification, project selection, project report, need and significance of report, contents, formulation, guidelines by planning commission for project report Enterprise Resource Planning: Meaning and Importance- ERP and Functional areas of Management – Marketing / Sales- Supply Chain Management – Finance and Accounting – Human Resources – Types of reports and methods of report generation			10 Hours
Module – 5			
Micro and Small Enterprises: Definition of micro and small enterprises, characteristics and advantages of micro and small enterprises, steps in establishing micro and small enterprises, Government of India industrial policy 2007 on micro and small enterprises, case study (Microsoft), Case study(Captain G R Gopinath),case study (N R Narayana Murthy & Infosys), Institutional support: MSME-DI, NSIC, SIDBI, KIADB, KSSIDC, TECSOK, KSFC, DIC and District level single window agency, Introduction to IPR.			10 Hours
Course outcomes: The students should be able to:			
<ul style="list-style-type: none"> • Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship • Utilize the resources available effectively through ERP • Make use of IPRs and institutional support in entrepreneurship 			
Question paper pattern:			

The question paper will have TEN questions.
There will be TWO questions from each module.
Each question will have questions covering all the topics under a module.
The students will have to answer FIVE full questions, selecting ONE full question from each module.

Text Books:

1. Principles of Management -P. C. Tripathi, P. N. Reddy; Tata McGraw Hill, 4th / 6th Edition, 2010.
2. Dynamics of Entrepreneurial Development & Management -Vasant Desai Himalaya Publishing House.
3. Entrepreneurship Development -Small Business Enterprises -Poornima M Charantimath Pearson Education – 2006.
4. Management and Entrepreneurship- Kanishka Bedi- Oxford University Press-2017

Reference Books:

1. Management Fundamentals -Concepts, Application, Skill Development Robert Lusier – Thomson.
2. Entrepreneurship Development -S S Khanka -S Chand & Co.
3. Management -Stephen Robbins -Pearson Education /PHI -17th Edition, 2003



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CRYPTOGRAPHY, NETWORK SECURITY AND CYBER LAW
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2017 - 2018)
SEMESTER – VI

Subject Code	17CS61	IA Marks	40
Number of Lecture Hours/Week	4	Exam Marks	60
Total Number of Lecture Hours	50	Exam Hours	03

CREDITS – 04

Module – 1	Teaching Hours
Introduction - Cyber Attacks, Defence Strategies and Techniques, Guiding Principles, Mathematical Background for Cryptography - Modulo Arithmetic's, The Greatest Comma Divisor, Useful Algebraic Structures, Chinese Remainder Theorem, Basics of Cryptography - Preliminaries, Elementary Substitution Ciphers, Elementary Transport Ciphers, Other Cipher Properties, Secret Key Cryptography – Product Ciphers, DES Construction.	10 Hours
Module – 2	
Public Key Cryptography and RSA – RSA Operations, Why Does RSA Work?, Performance, Applications, Practical Issues, Public Key Cryptography Standard (PKCS), Cryptographic Hash - Introduction, Properties, Construction, Applications and Performance, The Birthday Attack, Discrete Logarithm and its Applications - Introduction, Diffie-Hellman Key Exchange, Other Applications.	10 Hours
Module – 3	
Key Management - Introduction, Digital Certificates, Public Key Infrastructure, Identity-based Encryption, Authentication-I - One way Authentication, Mutual Authentication, Dictionary Attacks, Authentication – II – Centralised Authentication, The Needham-Schroeder Protocol, Kerberos, Biometrics, IPsec-Security at the Network Layer – Security at Different layers: Pros and Cons, IPsec in Action, Internet Key Exchange (IKE) Protocol, Security Policy and IPSEC, Virtual Private Networks, Security at the Transport Layer - Introduction, SSL Handshake Protocol, SSL Record Layer Protocol, OpenSSL.	10 Hours
Module – 4	
IEEE 802.11 Wireless LAN Security - Background, Authentication, Confidentiality and Integrity, Viruses, Worms, and Other Malware, Firewalls – Basics, Practical Issues, Intrusion Prevention and Detection - Introduction, Prevention Versus Detection, Types of Intrusion Detection Systems, DDoS Attacks Prevention/Detection, Web Service Security – Motivation, Technologies for Web Services, WS- Security, SAML, Other Standards.	10 Hours
Module – 5	
IT act aim and objectives, Scope of the act, Major Concepts, Important provisions, Attribution, acknowledgement, and dispatch of electronic records, Secure electronic records and secure digital signatures, Regulation of certifying authorities: Appointment of Controller and Other officers, Digital Signature certificates, Duties of Subscribers, Penalties and adjudication, The cyber regulations appellate tribunal, Offences, Network service providers not to be liable in certain cases, Miscellaneous Provisions.	10 Hours
Course outcomes: The students should be able to:	
<ul style="list-style-type: none"> • Discuss cryptography and its need to various applications • Design and develop simple cryptography algorithms 	

- Understand cyber security and need cyber Law

Question paper pattern:

The question paper will have TEN questions.

There will be TWO questions from each module.

Each question will have questions covering all the topics under a module.

The students will have to answer FIVE full questions, selecting ONE full question from each module.

Text Books:

1. Cryptography, Network Security and Cyber Laws – Bernard Menezes, Cengage Learning, 2010 edition (Chapters-1,3,4,5,6,7,8,9,10,11,12,13,14,15,19(19.1-19.5),21(21.1-21.2),22(22.1-22.4),25

Reference Books:

1. Cryptography and Network Security- Behrouz A Forouzan, DebdeepMukhopadhyay, Mc-GrawHill, 3rd Edition, 2015
2. Cryptography and Network Security- William Stallings, Pearson Education, 7th Edition
3. Cyber Law simplified- VivekSood, Mc-GrawHill, 11th reprint , 2013
4. Cyber security and Cyber Laws, Alfred Basta, Nadine Basta, Mary brown, ravindrakumar, Cengage learning


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INFORMATION AND NETWORK SECURITY
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2017 - 2018)
SEMESTER – VII

Subject Code	17CS743	IA Marks	40
Number of Lecture Hours/Week	3	Exam Marks	60
Total Number of Lecture Hours	40	Exam Hours	03
CREDITS – 03			
Module – 1			Teaching Hours
Introduction. How to Speak Crypto. Classic Crypto. Simple Substitution Cipher. Cryptanalysis of a Simple Substitution. Definition of Secure. Double Transposition Cipher. One-time Pad. Project VENONA. Codebook Cipher. Ciphers of the Election of 1876. Modern Crypto History. Taxonomy of Cryptography. Taxonomy of Cryptanalysis.			8 Hours
Module – 2.			
What is a Hash Function? The Birthday Problem. Non-cryptographic Hashes. Tiger Hash. HMAC. Uses of Hash Functions. Online Bids. Spam Reduction. Other Crypto-Related Topics. Secret Sharing. Key Escrow. Random Numbers. Texas Hold 'em Poker. Generating Random Bits. Information Hiding.			8 Hours
Module – 3			
Random number generation Providing freshness Fundamentals of entity authentication Passwords Dynamic password schemes Zero-knowledge mechanisms Further reading Cryptographic Protocols Protocol basics From objectives to a protocol Analysing a simple protocol Authentication and key establishment protocols			8 Hours
Module – 4			
Key management fundamentals Key lengths and lifetimes Key generation Key establishment Key storage Key usage Governing key management Public-Key Management Certification of public keys The certificate lifecycle Public-key management models Alternative approaches			8 Hours
Module – 5			
Cryptographic Applications Cryptography on the Internet Cryptography for wireless local area networks Cryptography for mobile telecommunications Cryptography for secure payment card transactions Cryptography for video broadcasting Cryptography for identity cards Cryptography for home users			8 Hours
Course outcomes: The students should be able to:			
<ul style="list-style-type: none"> • Analyze the Digital security lapses • Illustrate the need of key management 			
Question paper pattern:			
The question paper will have ten questions. There will be 2 questions from each module. Each question will have questions covering all the topics under a module. The students will have to answer 5 full questions, selecting one full question from each module.			
Text Books:			
<ol style="list-style-type: none"> 1. Information Security: Principles and Practice, 2nd Edition by Mark Stamp Wiley 2. Everyday Cryptography: Fundamental Principles and Applications Keith M. Martin Oxford Scholarship Online: December 2013 			

Reference Books:

1. Applied Cryptography Protocols, Algorithms, and Source Code in C by Bruce Schneier

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INTERNET OF THINGS TECHNOLOGY
[As per Choice Based Credit System (CBCS) scheme]
(Effective from the academic year 2017 - 2018)

SEMESTER – VIII

Subject Code	17CS81	IA Marks	40
Number of Lecture Hours/Week	04	Exam Marks	60
Total Number of Lecture Hours	50	Exam Hours	03
CREDITS – 04			
Module – 1			Teaching Hours
What is IoT, Genesis of IoT, IoT and Digitization, IoT Impact, Convergence of IT and IoT, IoT Challenges, IoT Network Architecture and Design, Drivers Behind New Network Architectures, Comparing IoT Architectures, A Simplified IoT Architecture, The Core IoT Functional Stack, IoT Data Management and Compute Stack.			10 Hours
Module – 2			
Smart Objects: The “Things” in IoT, Sensors, Actuators, and Smart Objects, Sensor Networks, Connecting Smart Objects, Communications Criteria, IoT Access Technologies.			10 Hours
Module – 3			
IP as the IoT Network Layer, The Business Case for IP, The need for Optimization, Optimizing IP for IoT, Profiles and Compliances, Application Protocols for IoT, The Transport Layer, IoT Application Transport Methods.			10 Hours
Module – 4			
Data and Analytics for IoT, An Introduction to Data Analytics for IoT, Machine Learning, Big Data Analytics Tools and Technology, Edge Streaming Analytics, Network Analytics, Securing IoT, A Brief History of OT Security, Common Challenges in OT Security, How IT and OT Security Practices and Systems Vary, Formal Risk Analysis Structures: OCTAVE and FAIR, The Phased Application of Security in an Operational Environment			10 Hours
Module – 5			
IoT Physical Devices and Endpoints - Arduino UNO: Introduction to Arduino, Arduino UNO, Installing the Software, Fundamentals of Arduino Programming. IoT Physical Devices and Endpoints - RaspberryPi: Introduction to RaspberryPi, About the RaspberryPi Board: Hardware Layout, Operating Systems on RaspberryPi, Configuring RaspberryPi, Programming RaspberryPi with Python, Wireless Temperature Monitoring System Using Pi, DS18B20 Temperature Sensor, Connecting Raspberry Pi via SSH, Accessing Temperature from DS18B20 sensors, Remote access to RaspberryPi, Smart and Connected Cities, An IoT Strategy for Smarter Cities, Smart City IoT Architecture, Smart City Security Architecture, Smart City Use-Case Examples.			10 Hours
Course Outcomes: After studying this course, students will be able to			
<ul style="list-style-type: none"> • Interpret the impact and challenges posed by IoT networks leading to new architectural models. • Compare and contrast the deployment of smart objects and the technologies to connect them to network. 			

- Appraise the role of IoT protocols for efficient network communication.
- Elaborate the need for Data Analytics and Security in IoT.
- Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry.

Question paper pattern:

The question paper will have ten questions.
There will be 2 questions from each module.
Each question will have questions covering all the topics under a module.
The students will have to answer 5 full questions, selecting one full question from each module.

Text Books:

1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1st Edition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978-9386873743)
2. Srinivasa K G, "Internet of Things", CENGAGE Learning India, 2017


Reference Books:

1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014. (ISBN: 978-8173719547)
2. Raj Kamal, "Internet of Things: Architecture and Design Principles", 1st Edition, McGraw Hill Education, 2017. (ISBN: 978-9352605224)


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SOFTWARE ENGINEERING (Effective from the academic year 2018 -2019) SEMESTER – III			
Course Code	18CS35	CIE Marks	40
Number of Contact Hours/Week	3:0:0	SEE Marks	60
Total Number of Contact Hours	40	Exam Hours	03
CREDITS –3			
Course Learning Objectives: This course (18CS35) will enable students to:			
<ul style="list-style-type: none"> Outline software engineering principles and activities involved in building large software programs. Identify ethical and professional issues and explain why they are of concern to software engineers. Explain the fundamentals of object oriented concepts Describe the process of requirements gathering, requirements classification, requirements specification and requirements validation. Differentiate system models, use UML diagrams and apply design patterns. Discuss the distinctions between validation testing and defect testing. Recognize the importance of software maintenance and describe the intricacies involved in software evolution. Apply estimation techniques, schedule project activities and compute pricing. Identify software quality parameters and quantify software using measurements and metrics. List software quality standards and outline the practices involved. 			
Module 1			Contact Hours
Introduction: Software Crisis, Need for Software Engineering. Professional Software Development, Software Engineering Ethics. Case Studies. Software Processes: Models: Waterfall Model (Sec 2.1.1), Incremental Model (Sec 2.1.2) and Spiral Model (Sec 2.1.3). Process activities. Requirements Engineering: Requirements Engineering Processes (Chap 4). Requirements Elicitation and Analysis (Sec 4.5). Functional and non-functional requirements (Sec 4.1). The software Requirements Document (Sec 4.2). Requirements Specification (Sec 4.3). Requirements validation (Sec 4.6). Requirements Management (Sec 4.7). RBT: L1, L2, L3			08
Module 2			
What is Object orientation? What is OO development? OO Themes; Evidence for usefulness of OO development; OO modelling history. Modelling as Design technique: Modelling; abstraction; The Three models. Introduction, Modelling Concepts and Class Modelling: What is Object orientation? What is OO development? OO Themes; Evidence for usefulness of OO development; OO modelling history. Modelling as Design technique: Modelling; abstraction; The Three models. Class Modelling: Object and Class Concept; Link and associations concepts; Generalization and Inheritance; A sample class model; Navigation of class models; Textbook 2: Ch 1,2,3. RBT: L1, L2 L3			08
Module 3			
System Models: Context models (Sec 5.1). Interaction models (Sec 5.2). Structural models (Sec 5.3). Behavioral models (Sec 5.4). Model-driven engineering (Sec 5.5). Design and Implementation: Introduction to RUP (Sec 2.4), Design Principles (Chap 7). Object-oriented design using the UML (Sec 7.1). Design patterns (Sec 7.2). Implementation issues (Sec 7.3). Open source development (Sec 7.4). RBT: L1, L2, L3			08
Module 4			

<p>Software Testing: Development testing (Sec 8.1), Test-driven development (Sec 8.2), Release testing (Sec 8.3), User testing (Sec 8.4). Test Automation (Page no 212).</p> <p>Software Evolution: Evolution processes (Sec 9.1). Program evolution dynamics (Sec 9.2). Software maintenance (Sec 9.3). Legacy system management (Sec 9.4).</p> <p>RBT: L1, L2, L3</p>	08
<p>Module 5</p>	
<p>Project Planning: Software pricing (Sec 23.1). Plan-driven development (Sec 23.2). Project scheduling (Sec 23.3): Estimation techniques (Sec 23.5). Quality management: Software quality (Sec 24.1). Reviews and inspections (Sec 24.3). Software measurement and metrics (Sec 24.4). Software standards (Sec 24.2)</p> <p>RBT: L1, L2, L3</p>	08
<p>Course Outcomes: The student will be able to :</p>	
<ul style="list-style-type: none"> • Design a software system, component, or process to meet desired needs within realistic constraints. • Assess professional and ethical responsibility • Function on multi-disciplinary teams • Use the techniques, skills, and modern engineering tools necessary for engineering practice • Analyze, design, implement, verify, validate, implement, apply, and maintain software systems or parts of software systems 	
<p>Question Paper Pattern:</p>	
<ul style="list-style-type: none"> • The question paper will have ten questions. • Each full Question consisting of 20 marks • There will be 2 full questions (with a maximum of four sub questions) from each module. • Each full question will have sub questions covering all the topics under a module. • The students will have to answer 5 full questions, selecting one full question from each module. 	
<p>Textbooks:</p>	
<ol style="list-style-type: none"> 1. Ian Sommerville: Software Engineering, 9th Edition, Pearson Education, 2012. (Listed topics only from Chapters 1,2,3,4, 5, 7, 8, 9, 23, and 24) 2. Michael Blaha, James Rumbaugh: Object Oriented Modelling and Design with UML, 2nd Edition, Pearson Education, 2005. 	
<p>Reference Books:</p>	
<ol style="list-style-type: none"> 1. Roger S. Pressman: Software Engineering-A Practitioners approach, 7th Edition, Tata McGraw Hill. 2. Pankaj Jalote: An Integrated Approach to Software Engineering, Wiley India 	


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MANAGEMENT AND ENTREPRENEURSHIP FOR IT INDUSTRY (Effective from the academic year 2018 -2019) SEMESTER – V			
Course Code	18CS51	CIE Marks	40
Number of Contact Hours/Week	2:2:0	SEE Marks	60
Total Number of Contact Hours	40	Exam Hours	03
CREDITS – 03			
Course Learning Objectives: This course (18CS51) will enable students to:			
<ul style="list-style-type: none"> • Explain the principles of management, organization and entrepreneur. • Discuss on planning, staffing, ERP and their importance • Infer the importance of intellectual property rights and relate the institutional support 			
Module – 1			Contact Hours
Introduction - Meaning, nature and characteristics of management, scope and Functional areas of management, goals of management, levels of management, brief overview of evolution of management theories,. Planning- Nature, importance, types of plans, steps in planning, Organizing- nature and purpose, types of Organization, Staffing- meaning, process of recruitment and selection RBT: L1, L2			08
Module – 2			
Directing and controlling- meaning and nature of directing, leadership styles, motivation Theories, Communication- Meaning and importance, Coordination- meaning and importance, Controlling- meaning, steps in controlling, methods of establishing control. RBT: L1, L2			08
Module – 3			
Entrepreneur – meaning of entrepreneur, characteristics of entrepreneurs, classification and types of entrepreneurs, various stages in entrepreneurial process, role of entrepreneurs in economic development, entrepreneurship in India and barriers to entrepreneurship. Identification of business opportunities, market feasibility study, technical feasibility study, financial feasibility study and social feasibility study. RBT: L1, L2			08
Module – 4			
Preparation of project and ERP - meaning of project, project identification, project selection, project report, need and significance of project report, contents, formulation, guidelines by planning commission for project report, Enterprise Resource Planning: Meaning and Importance- ERP and Functional areas of Management – Marketing / Sales- Supply Chain Management – Finance and Accounting – Human Resources – Types of reports and methods of report generation RBT: L1, L2			08
Module – 5			
Micro and Small Enterprises: Definition of micro and small enterprises, characteristics and advantages of micro and small enterprises, steps in establishing micro and small enterprises, Government of India industrial policy 2007 on micro and small enterprises, case study (Microsoft), Case study(Captain G R Gopinath),case study (N R Narayana Murthy & Infosys), Institutional support: MSME-DI, NSIC, SIDBI, KIADB, KSSIDC, TECSOK, KSFC, DIC and District level single window agency, Introduction to IPR. RBT: L1, L2			08

Course outcomes: The students should be able to:

- Define management, organization, entrepreneur, planning, staffing, ERP and outline their importance in entrepreneurship
- Utilize the resources available effectively through ERP
- Make use of IPRs and institutional support in entrepreneurship

Question Paper Pattern:

- The question paper will have ten questions.
- Each full Question consisting of 20 marks
- There will be 2 full questions (with a maximum of four sub questions) from each module.
- Each full question will have sub questions covering all the topics under a module.
- The students will have to answer 5 full questions, selecting one full question from each module.


Textbooks:

1. Principles of Management -P. C. Tripathi, P. N. Reddy; Tata McGraw Hill, 4th / 6th Edition, 2010.
2. Dynamics of Entrepreneurial Development & Management -Vasant Desai Himalaya Publishing House.
3. Entrepreneurship Development -Small Business Enterprises -Poomima M Charantimath Pearson Education – 2006.
4. Management and Entrepreneurship - Kanishka Bedi- Oxford University Press-2017

Reference Books:

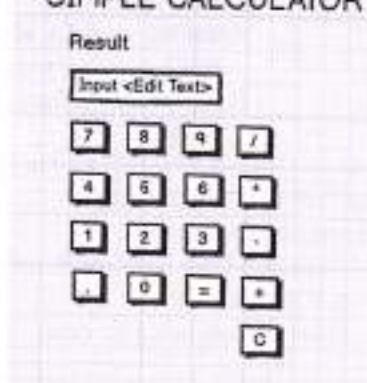
1. Management Fundamentals -Concepts, Application, Skill Development Robert Lusier – Thomson.
2. Entrepreneurship Development -S S Khanka -S Chand & Co.
3. Management -Stephen Robbins -Pearson Education /PHI -17th Edition, 2003


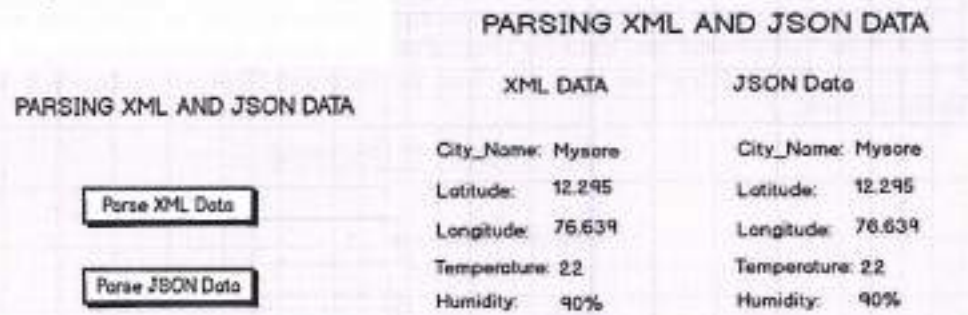
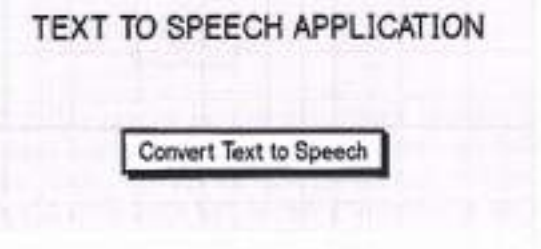

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MOBILE APPLICATION DEVELOPMENT (Effective from the academic year 2018 -2019) SEMESTER – VI			
Course Code	18ISMP68	IA Marks	40
Number of Contact Hours/Week	0:0:2	Exam Marks	60
Total Number of Contact Hours	3 Hours/Week	Exam Hours	03
CREDITS – 02			
Laboratory Objectives: This laboratory (18CSMP68) will enable students to			
<ul style="list-style-type: none"> • Learn and acquire the art of Android Programming. • Configure Android studio to run the applications. • Understand and implement Android's User interface functions. • Create, modify and query on SQLite database. • Inspect different methods of sharing data using services. 			
Descriptions (if any):			
<ol style="list-style-type: none"> 1. The installation procedure of the Android Studio/Java software must be demonstrated and carried out in groups. 2. Students should use the latest version of Android Studio/Java/ Kotlin to execute these programs. Diagrams given are for representational purposes only, students are expected to improvise on them. 3. Part B programs should be developed as an application and are to be demonstrated as a mini project in a group by adding extra features or the students can also develop their application and demonstrate it as a mini-project. (Projects/programs are not limited to the list given in Part B). 			
Programs List:			
PART – A			
1	<p>Create an application to design a Visiting Card. The Visiting card should have a company logo at the top right corner. The company name should be displayed in Capital letters, aligned to the center. Information like the name of the employee, job title, phone number, address, email, fax and the website address is to be displayed. Insert a horizontal line between the job title and the phone number.</p> <div style="text-align: center;">  </div>		
2	<p>Develop an Android application using controls like Button, TextView, EditText for designing a calculator having basic functionality like Addition, Subtraction, Multiplication, and Division.</p>		

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	<p style="text-align: center;">SIMPLE CALCULATOR</p> 
<p>3</p>	<p>Create a SIGN Up activity with Username and Password. Validation of password should happen based on the following rules:</p> <ul style="list-style-type: none"> • Password should contain uppercase and lowercase letters. • Password should contain letters and numbers. • Password should contain special characters. • Minimum length of the password (the default value is 8). <p>On successful SIGN UP proceed to the next Login activity. Here the user should SIGN IN using the Username and Password created during signup activity. If the Username and Password are matched then navigate to the next activity which displays a message saying "Successful Login" or else display a toast message saying "Login Failed". The user is given only two attempts and after that display a toast message saying "Failed Login Attempts" and disable the SIGN IN button. Use Bundle to transfer information from one activity to another.</p> <div style="display: flex; justify-content: space-around;"> <div data-bbox="279 1198 774 1523"> <p style="text-align: center;">SIGNUP ACTIVITY</p> <p>Username: <input type="text"/></p> <p>Password: <input type="password"/></p> <p style="text-align: center;">SIGN UP</p> </div> <div data-bbox="790 1198 1308 1523"> <p style="text-align: center;">LOGIN ACTIVITY</p> <p>Username: <input type="text"/></p> <p>Password: <input type="password"/></p> <p style="text-align: center;">SIGN IN</p> </div> </div>
<p>4</p>	<p>Develop an application to set an image as wallpaper. On click of a button, the wallpaper image should start to change randomly every 30 seconds.</p> <p style="text-align: center;">CHANGING WALLPAPER APPLICATION</p> <p style="text-align: center;">CLICK HERE TO CHANGE WALLPAPER</p>
<p>5</p>	<p>Write a program to create an activity with two buttons START and STOP. On pressing of the START button, the activity must start the counter by displaying the numbers from One and the counter must keep on counting until the STOP button is pressed. Display the counter</p>

	<p>value in a TextViewcontrol.</p> <div style="text-align: center;">  </div>
<p>6</p>	<p>Create two files of XML and JSON type with values for City_Name, Latitude, Longitude, Temperature, and Humidity. Develop an application to create an activity with two buttons to parse the XML and JSON files which when clicked should display the data in their respective layouts side by side.</p> <div style="text-align: center;">  </div>
<p>7</p>	<p>Develop a simple application with one EditText so that the user can write some text in it. Create a button called "Convert Text to Speech" that converts the user input text into voice.</p> <div style="text-align: center;">  </div>
<p>8</p>	<p>Create an activity like a phone dialer with CALL and SAVE buttons. On pressing the CALL button, it must call the phone number and on pressing the SAVE button it must save the number to the phone contacts.</p>

CALL AND SAVE APPLICATION	
<input type="text" value="1234567890"/>	<input type="button" value="DEL"/>
<input type="button" value="1"/>	<input type="button" value="2"/>
<input type="button" value="3"/>	<input type="button" value="4"/>
<input type="button" value="5"/>	<input type="button" value="6"/>
<input type="button" value="7"/>	<input type="button" value="8"/>
<input type="button" value="9"/>	<input type="button" value="0"/>
<input type="button" value="CALL"/>	<input type="button" value="SAVE"/>

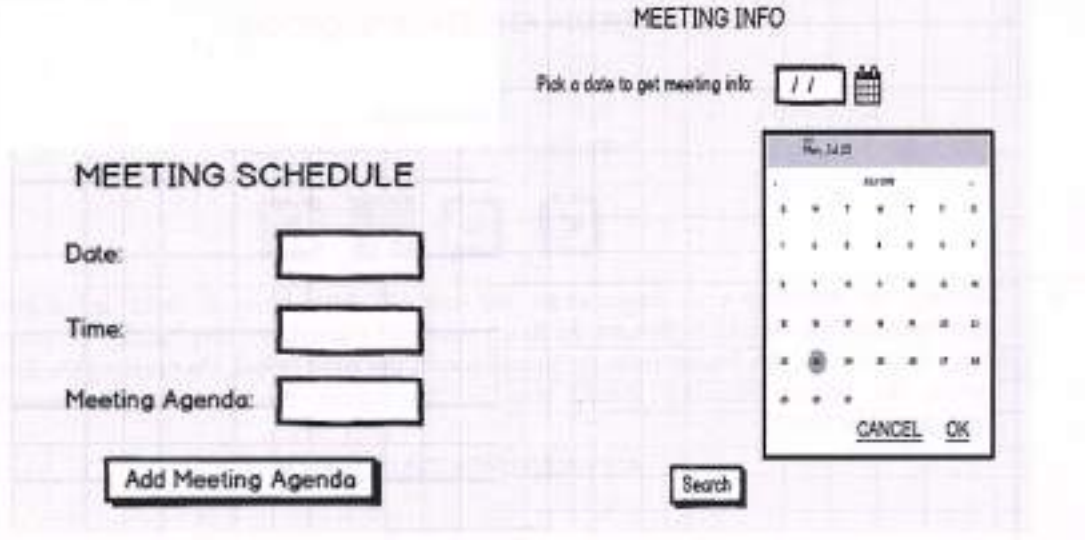
PART - B

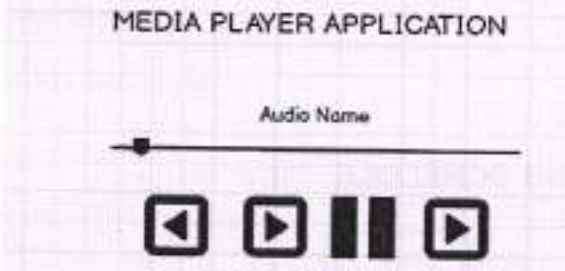
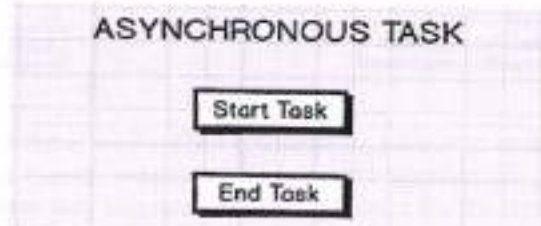
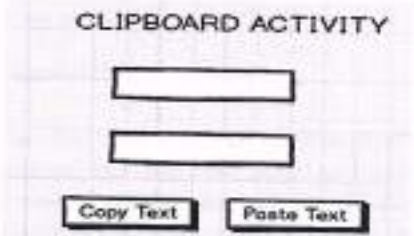
- 1 Write a program to enter Medicine Name, Date and Time of the Day as input from the user and store it in the SQLite database. Input for Time of the Day should be either Morning or Afternoon or Evening or Night. Trigger an alarm based on the Date and Time of the Day and display the Medicine Name.

MEDICINE DATABASE	
Medicine Name:	<input type="text"/>
Date:	<input type="text"/>
Time of the Day:	<input type="text"/>
<input type="button" value="Insert"/>	

- 2 Develop a content provider application with an activity called "Meeting Schedule" which takes Date, Time and Meeting Agenda as input from the user and store this information into the SQLite database. Create another application with an activity called "Meeting Info" having DatePicker control, which on the selection of a date should display the Meeting Agenda information for that particular date, else it should display a toast message saying "No Meeting on this Date".


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<p>3</p>	<p>Create an application to receive an incoming SMS which is notified to the user. On clicking this SMS notification, the message content and the number should be displayed on the screen. Use appropriate emulator control to send the SMS message to your application.</p> <p style="text-align: center;">SMS APPLICATION</p> <p style="text-align: center;">Display SMS Number</p> <p style="text-align: center;">Display SMS Message</p>
<p>4</p>	<p>Write a program to create an activity having a Text box, and also Save, Open and Create buttons. The user has to write some text in the Text box. On pressing the Create button the text should be saved as a text file in MksDcard. On subsequent changes to the text, the Save button should be pressed to store the latest content to the same file. On pressing the Open button, it should display the contents from the previously stored files in the Text box. If the user tries to save the contents in the Textbox to a file without creating it, then a toast message has to be displayed saying "First Create a File".</p> <p style="text-align: center;">FILE APPLICATION</p> <p style="text-align: center;">Create Open</p> <p style="text-align: center;">[Text Box]</p> <p style="text-align: center;">Save</p>
<p>5</p>	<p>Create an application to demonstrate a basic media player that allows the user to Forward, Backward, Play and Pause an audio. Also, make use of the indicator in the seek bar to move the audio forward or backward as required.</p>

	
6	<p>Develop an application to demonstrate the use of Asynchronous tasks in android. The asynchronous task should implement the functionality of a simple moving banner. On pressing the Start Task button, the banner message should scroll from right to left. On pressing the Stop Task button, the banner message should stop. Let the banner message be "Demonstration of Asynchronous Task".</p> 
7	<p>Develop an application that makes use of the clipboard framework for copying and pasting of the text. The activity consists of two EditText controls and two Buttons to trigger the copy and paste functionality.</p> 
8	<p>Create an AIDL service that calculates Car Loan EMI. The formula to calculate EMI is</p> $E = P * (r(1+r)^n)/((1+r)^n - 1)$ <p>where</p> <ul style="list-style-type: none"> E = The EMI payable on the car loan amount P = The Car loan Principal Amount r = The interest rate value computed on a monthly basis n = The loan tenure in the form of months <p>The down payment amount has to be deducted from the principal amount paid towards buying the Car. Develop an application that makes use of this AIDL service to calculate the EMI. This application should have four EditText to read the PrincipalAmount, Down Payment, Interest Rate, Loan Term (in months) and a button named as "Calculate Monthly EMP". On click of this button, the result should be shown in a TextView. Also, calculate the EMI by varying the Loan Term and Interest Rate values.</p>

CAR EMI CALCULATOR	
Principal Amount:	<input type="text"/>
Down Payment:	<input type="text"/>
Interest Rate:	<input type="text"/>
Loan Term (in months):	<input type="text"/>
<input type="button" value="Calculate Monthly EMI"/>	

EMI: Result

Laboratory Outcomes: After studying these laboratory programs, students will be able to

- Create, test and debug Android application by setting up Android development environment.
- Implement adaptive, responsive user interfaces that work across a wide range of devices.
- Infer long running tasks and background work in Android applications.
- Demonstrate methods in storing, sharing and retrieving data in Android applications.
- Infer the role of permissions and security for Android applications.

Procedure to Conduct Practical Examination

- Experiment distribution
 - For laboratories having only one part: Students are allowed to pick one experiment from the lot with equal opportunity.
 - For laboratories having PART A and PART B: Students are allowed to pick one experiment from PART A and one experiment from PART B, with equal opportunity.
- Change of experiment is allowed only once and marks allotted for procedure to be made zero of the changed part only.
- Marks Distribution (Coursee to change in accordance with university regulations)
 - For laboratories having only one part – Procedure + Execution + Viva-Voce: 15+70+15= 100 Marks
 - For laboratories having PART A and PART B
 - i. Part A – Procedure + Execution + Viva = 6 + 28 + 6 = 40 Marks
 - ii. Part B – Procedure + Execution + Viva = 9 + 42 + 9 = 60 Marks

Text Books:


1. Google Developer Training, "Android Developer Fundamentals Course – Concept Reference", Google Developer Training Team, 2017. <https://www.gitbook.com/book/google-developer-training/android-developer-fundamentals-course-concepts/details>
(Download pdf file from the above link)

Reference Books:

1. Erik Hellman, "Android Programming – Pushing the Limits", 1st Edition, Wiley India Pvt Ltd, 2014. ISBN-13: 978-8126547197
2. Dawn Griffiths and David Griffiths, "Head First Android Development", 1st Edition, O'Reilly SPD Publishers, 2015. ISBN-13: 978-9352131341
3. Bill Phillips, Chris Stewart and Kristin Marsicano, "Android Programming: The Big Nerd Ranch Guide", 3rd Edition, Big Nerd Ranch Guides, 2017. ISBN-13: 978-0134706054

CRYPTOGRAPHY (Effective from the academic year 2018 -2019) SEMESTER – VII			
Course Code	18CS744	CIE Marks	40
Number of Contact Hours/Week	3:0:0	SEE Marks	60
Total Number of Contact Hours	40	Exam Hours	03
CREDITS –3			
Course Learning Objectives: This course (18CS744) will enable students to:			
<ul style="list-style-type: none"> • Define cryptography and its principles • Explain Cryptography algorithms • Illustrate Public and Private key cryptography • Explain Key management, distribution and certification • Explain authentication protocols • Tell about IPSec 			
Module – 1			Contact Hours
Classical Encryption Techniques Symmetric Cipher Model, Cryptography, Cryptanalysis and Brute-Force Attack, Substitution Techniques, Caesar Cipher, Monoalphabetic Cipher, Playfair Cipher, Hill Cipher, Polyalphabetic Cipher, One Time Pad. Block Ciphers and the data encryption standard: Traditional block Cipher structure, stream Ciphers and block Ciphers, Motivation for the feistel Cipher structure, the feistel Cipher, The data encryption standard, DES encryption, DES decryption, A DES example, results, the avalanche effect, the strength of DES, the use of 56-Bit Keys, the nature of the DES algorithm, timing attacks, Block cipher design principles, number of rounds, design of function F, key schedule algorithm Textbook 1: Ch. 2.1,2.2, Ch. 3 RBT: L1, L2			08
Module – 2			
Public-Key Cryptography and RSA: Principles of public-key cryptosystems. Public-key cryptosystems. Applications for public-key cryptosystems, requirements for public-key cryptosystems. public-key cryptanalysis. The RSA algorithm, description of the algorithm, computational aspects, the security of RSA. Other Public-Key Cryptosystems: Diffie-hellman key exchange, The algorithm, key exchange protocols, man in the middle attack, Elgamal Cryptographic systems Textbook 1: Ch. 9, Ch. 10.1,10.2 RBT: L1, L2			08
Module – 3			
Elliptic curve arithmetic, abelian groups, elliptic curves over real numbers, elliptic curves over Z_p , elliptic curves over $GF(2^m)$, Elliptic curve cryptography, Analog of Diffie-hellman key exchange, Elliptic curve encryption/ decryption, security of Elliptic curve cryptography, Pseudorandom number generation based on an asymmetric cipher, PRNG based on RSA. Key Management and Distribution: Symmetric key distribution using Symmetric encryption, A key distribution scenario, Hierarchical key control, session key lifetime, a transparent key control scheme, Decentralized key control, controlling key usage, Symmetric key distribution using asymmetric encryption, simple secret key distribution, secret key distribution with confidentiality and authentication, A hybrid scheme, distribution of public keys, public announcement of public keys, publicly available directory, public key authority, public keys certificates.			08


Textbook 1: Ch. 10.3-10.5, Ch.14.1 to 14.3	
RBT: L1, L2	
Module – 4	
X-509 certificates. Certificates, X-509 version 3, public key infrastructure . User Authentication: Remote user Authentication principles, Mutual Authentication, one way Authentication, remote user Authentication using Symmetric encryption, Mutual Authentication, one way Authentication, Kerberos, Motivation , Kerberos version 4, Kerberos version 5, Remote user Authentication using Asymmetric encryption, Mutual Authentication, one way Authentication. Electronic Mail Security: Pretty good privacy, notation, operational; description, S/MIME, RFC5322, Multipurpose internet mail extensions, S/MIME functionality, S/MIME messages, S/MIME certificate processing, enhanced security services, Domain keys identified mail, internet mail architecture, E-Mail threats, DKIM strategy, DKIM functional flow. Textbook 1: Ch. 14.4, Ch. 15.1 to 15.4, Ch.19	08
RBT: L1, L2	
Module – 5	
IP Security: IP Security overview, applications of IPsec, benefits of IPsec, Routing applications, IPsec documents, IPsec services, transport and tunnel modes, IP Security policy, Security associations, Security associations database, Security policy database, IP traffic processing, Encapsulating Security payload, ESP format, encryption and authentication algorithms, Padding, Anti replay service Transport and tunnel modes, combining security associations, authentication plus confidentiality, basic combinations of security associations, internet key exchange, key determinations protocol, header and payload formats, cryptographic suits. Textbook 1: Ch. 20.1 to 20.3	08
RBT: L1, L2	
Course outcomes: The students should be able to:	
<ul style="list-style-type: none"> • Define cryptography and its principles • Explain Cryptography algorithms • Illustrate Public and Private key cryptography • Explain Key management, distribution and certification • Explain authentication protocols • Tell about IPSec 	
Question paper pattern:	
<ul style="list-style-type: none"> • The question paper will have ten questions. • There will be 2 questions from each module. • Each question will have questions covering all the topics under a module. • The students will have to answer 5 full questions, selecting one full question from each module. 	
Text Books:	
1. William Stallings: Cryptography and Network Security, Pearson 6 th edition.	
Reference Books:	
1. V K Pachghare: Cryptography and Information Security, PHI 2 nd Edition.	


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INTERNET OF THINGS (Effective from the academic year 2018 -2019) SEMESTER – VIII			
Course Code	18CS81	CIE Marks	40
Number of Contact Hours/Week	3:0:0	SEE Marks	60
Total Number of Contact Hours	40	Exam Hours	03
CREDITS –3			
Course Learning Objectives: This course (18CS81) will enable students to:			
<ul style="list-style-type: none"> • Assess the genesis and impact of IoT applications, architectures in real world. • Illustrate diverse methods of deploying smart objects and connect them to network. • Compare different Application protocols for IoT. • Infer the role of Data Analytics and Security in IoT. • Identifysensor technologies for sensing real world entities and understand the role of IoT in various domains of Industry. 			
Module 1			Contact Hours
What is IoT, Genesis of IoT, IoT and Digitization, IoT Impact, Convergence of IT and IoT, IoT Challenges, IoT Network Architecture and Design, Drivers Behind New Network Architectures, Comparing IoT Architectures, A Simplified IoT Architecture, The Core IoT Functional Stack, IoT Data Management and Compute Stack. Textbook 1: Ch.1, 2 RBT: L1, L2, L3			08
Module 2			
Smart Objects: The “Things” in IoT, Sensors, Actuators, and Smart Objects, Sensor Networks, Connecting Smart Objects, Communications Criteria, IoT Access Technologies. Textbook 1: Ch.3, 4 RBT: L1, L2, L3			08
Module 3			
IP as the IoT Network Layer, The Business Case for IP, The need for Optimization, Optimizing IP for IoT, Profiles and Compliances, Application Protocols for IoT, The Transport Layer, IoT Application Transport Methods. Textbook 1: Ch.5, 6 RBT: L1, L2, L3			08
Module 4			
Data and Analytics for IoT, An Introduction to Data Analytics for IoT, Machine Learning, Big Data Analytics Tools and Technology, Edge Streaming Analytics, Network Analytics, Securing IoT, A Brief History of OT Security, Common Challenges in OT Security, How IT and OT Security Practices and Systems Vary, Formal Risk Analysis Structures: OCTAVE and FAIR, The Phased Application of Security in an Operational Environment Textbook 1: Ch.7, 8 RBT: L1, L2, L3			08
Module 5			
IoT Physical Devices and Endpoints - Arduino UNO: Introduction to Arduino, Arduino UNO, Installing the Software, Fundamentals of Arduino Programming. IoT Physical Devices and Endpoints - RaspberryPi: Introduction to RaspberryPi, About the RaspberryPi Board: Hardware Layout, Operating Systems on RaspberryPi, Configuring RaspberryPi, Programming RaspberryPi with Python, Wireless Temperature Monitoring System Using Pi, DS18B20 Temperature Sensor, Connecting Raspberry Pi via SSH, Accessing Temperature from DS18B20 sensors, Remote access to RaspberryPi, Smart and Connected Cities, An IoT			08

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<p>Strategy for Smarter Cities, Smart City IoT Architecture, Smart City Security Architecture, Smart City Use-Case Examples.</p> <p>Textbook 1: Ch.12</p> <p>Textbook 2: Ch.7.1 to 7.4, Ch.8.1 to 8.4, 8.6</p> <p>RBT: L1, L2, L3</p>	
<p>Course Outcomes: The student will be able to :</p> <ul style="list-style-type: none"> • Interpret the impact and challenges posed by IoT networks leading to new architectural models. • Compare and contrast the deployment of smart objects and the technologies to connect them to network. • Appraise the role of IoT protocols for efficient network communication. • Elaborate the need for Data Analytics and Security in IoT. • Illustrate different sensor technologies for sensing real world entities and identify the applications of IoT in Industry. 	
<p>Question Paper Pattern:</p> <ul style="list-style-type: none"> • The question paper will have ten questions. • Each full Question consisting of 20 marks • There will be 2 full questions (with a maximum of four sub questions) from each module. • Each full question will have sub questions covering all the topics under a module. • The students will have to answer 5 full questions, selecting one full question from each module. 	
<p>Textbooks:</p> <ol style="list-style-type: none"> 1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry, "IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1st Edition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978-9386873743) 2. Srinivasa K.G, "Internet of Things", CENGAGE Learning India, 2017 	
<p>Reference Books:</p> <ol style="list-style-type: none"> 1. Vijay Madisetti and Arshdeep Bahga, "Internet of Things (A Hands-on-Approach)", 1st Edition, VPT, 2014. (ISBN: 978-8173719547) 2. Raj Kamal, "Internet of Things: Architecture and Design Principles", 1st Edition, McGraw Hill Education, 2017. (ISBN: 978-9352605224) 	
<p>Mandatory Note: Distribution of CIE Marks is as follows (Total 40 Marks):</p> <ul style="list-style-type: none"> • 20 Marks through IA Tests • 20 Marks through practical assessment <p>Maintain a copy of the report for verification during LIC visit.</p>	
<p>Possible list of practicals:</p> <ol style="list-style-type: none"> 1. Transmit a string using UART 2. Point-to-Point communication of two Motes over the radio frequency. 3. Multi-point to single point communication of Motes over the radio frequency. LAN (Sub-netting). 4. I2C protocol study 5. Reading Temperature and Relative Humidity value from the sensor 	


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VI Semester

SOFTWARE ENGINEERING & PROJECT MANAGEMENT			
Course Code	21CS61	CIE Marks	50
Teaching Hours/Week (L:T:P: S)	2:2:0:0	SEE Marks	50
Total Hours of Pedagogy	40	Total Marks	100
Credits	03	Exam Hours	03

Course Learning Objectives

- CLO 1. Outline software engineering principles and activities involved in building large software programs. Identify ethical and professional issues and explain why they are of concern to Software Engineers.
- CLO 2. Describe the process of requirement gathering, requirement classification, requirement specification and requirements validation.
- CLO 3. Infer the fundamentals of object oriented concepts, differentiate system models, use UML diagrams and apply design patterns.
- CLO 4. Explain the role of DevOps in Agile Implementation.
- CLO 5. Discuss various types of software testing practices and software evolution processes.
- CLO 6. Recognize the importance Project Management with its methods and methodologies.
- CLO 7. Identify software quality parameters and quantify software using measurements and metrics. List software quality standards and outline the practices involved

Teaching-Learning Process (General Instructions)

These are sample Strategies, which teachers can use to accelerate the attainment of the various course outcomes.

1. Lecturer method (L) need not to be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes.
2. Use of Video/Animation to explain functioning of various concepts.
3. Encourage collaborative (Group Learning) Learning in the class.
4. Ask at least three HOT (Higher order Thinking) questions in the class, which promotes critical thinking.
5. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it.
6. Introduce Topics in manifold representations.
7. Show the different ways to solve the same problem with different circuits/logic and encourage the students to come up with their own creative ways to solve them.
8. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.

Module-1

Introduction: The evolving role of software, Software, The changing nature of software, Software engineering, A Process Framework, Process Patterns, Process Assessment, Personal and Team Process Models, Process Technology, Product and Process.

Textbook 1: Chapter 1: 1.1 to 1.3

Process Models: Prescriptive models, Waterfall model, Incremental process models, Evolutionary process models, Specialized process models.

Textbook 1: Chapter 2: 2.1, 2.2, 2.4 to 2.7

Requirements Engineering: Requirements Engineering Task, Initiating the Requirements Engineering process, Eliciting Requirements, Developing use cases, Building the analysis model, Negotiating Requirements, Validating Requirements, Software Requirement Document (**Sec 4.2**)

Textbook 1: Chapter 3: 3.1 to 3.6, Textbook 5: Chapter 4: 4.2

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Teaching-Learning Process	Chalk and board, Active Learning, Problem based learning
Module-2	
<p>Introduction, Modelling Concepts and Class Modelling: What is Object orientation? What is OO development? OO Themes; Evidence for usefulness of OO development; OO modelling history. Modelling as Design technique: Modelling, abstraction, The Three models. Class Modelling: Object and Class Concept, Link and associations concepts, Generalization and Inheritance, A sample class model, Navigation of class models, Introduction to RUP(Textbook: 5 Sec 2.4) and UML diagrams</p> <p>Textbook 2: Chapter 1,2,3</p> <p>Building the Analysis Models: Requirement Analysis, Analysis Model Approaches, Data modeling Concepts, Object Oriented Analysis, Scenario-Based Modeling, Flow-Oriented Modeling, class Based Modeling, Creating a Behavioral Model.</p> <p>Textbook 1: Chapter 8: 8.1 to 8.8</p>	
Teaching-Learning Process	Chalk and board, Active Learning, Demonstration
Module-3	
<p>Software Testing: A Strategic Approach to Software Testing, Strategic Issues, Test Strategies for Conventional Software, Test Strategies for Object -Oriented Software, Validation Testing, System Testing, The Art of Debugging.</p> <p>Textbook 1: Chapter 13: 13.1 to 13.7</p> <p>Agile Methodology & DevOps: Before Agile – Waterfall, Agile Development,</p> <p>Self-Learning Section: What is DevOps?, DevOps Importance and Benefits, DevOps Principles and Practices, 7 C's of DevOps Lifecycle for Business Agility, DevOps and Continuous Testing, How to Choose Right DevOps Tools?, Challenges with DevOps Implementation.</p> <p>Textbook 4: Chapter 2: 2.1 to 2.9</p>	
Teaching-Learning Process	Chalk and board, Active Learning, Demonstration
Module-4	
<p>Introduction to Project Management: Introduction, Project and Importance of Project Management, Contract Management, Activities Covered by Software Project Management, Plans, Methods and Methodologies, Some ways of categorizing Software Projects, Stakeholders, Setting Objectives, Business Case, Project Success and Failure, Management and Management Control, Project Management life cycle, Traditional versus Modern Project Management Practices.</p> <p>Textbook 3: Chapter 1: 1.1 to 1.17</p>	
Teaching-Learning Process	Chalk and board, Active Learning, Demonstration
Module-5	
<p>Activity Planning: Objectives of Activity Planning, When to Plan, Project Schedules, Sequencing and Scheduling Activities, Network Planning Models, Forward Pass- Backward Pass, Identifying critical path, Activity Float, Shortening Project Duration, Activity on Arrow Networks.</p> <p>Textbook 3: Chapter 6: 6.1 to 6.16</p> <p>Software Quality: Introduction, The place of software quality in project planning, Importance of software quality, software quality models, ISO 9126, quality management systems, process capability models, techniques to enhance software quality, quality plans.</p> <p>Textbook 3: Chapter 13: (13.1 to 13.6 , 13.9, 13.11, 13.14),</p>	

Teaching-Learning Process	Chalk and board, Active Learning, Demonstration
Course Outcomes At the end of the course the student will be able to: <ul style="list-style-type: none"> CO 1. Understand the activities involved in software engineering and analyze the role of various process models CO 2. Explain the basics of object-oriented concepts and build a suitable class model using modelling techniques CO 3. Describe various software testing methods and to understand the importance of agile methodology and DevOps CO 4. Illustrate the role of project planning and quality management in software development CO 5. Understand the importance of activity planning and different planning models 	
Assessment Details (both CIE and SEE) The weightage of Continuous Internal Evaluation (CIE) is 50% and for Semester End Exam (SEE) is 50%. The minimum passing mark for the CIE is 40% of the maximum marks (20 marks). A student shall be deemed to have satisfied the academic requirements and earned the credits allotted to each subject/course if the student secures not less than 35% (18 Marks out of 50) in the semester-end examination (SEE), and a minimum of 40% (40 marks out of 100) in the sum total of the CIE (Continuous Internal Evaluation) and SEE (Semester End Examination) taken together Continuous Internal Evaluation: Three Unit Tests each of 20 Marks (duration 01 hour) <ol style="list-style-type: none"> 1. First test at the end of 5th week of the semester 2. Second test at the end of the 10th week of the semester 3. Third test at the end of the 15th week of the semester Two assignments each of 10 Marks <ol style="list-style-type: none"> 4. First assignment at the end of 4th week of the semester 5. Second assignment at the end of 9th week of the semester Group discussion/Seminar/quiz any one of three suitably planned to attain the COs and POs for 20 Marks (duration 01 hours) <ol style="list-style-type: none"> 6. At the end of the 13th week of the semester The sum of three tests, two assignments, and quiz/seminar/group discussion will be out of 100 marks and will be scaled down to 50 marks (to have less stressed CIE, the portion of the syllabus should not be common /repeated for any of the methods of the CIE. Each method of CIE should have a different syllabus portion of the course). CIE methods /question paper has to be designed to attain the different levels of Bloom's taxonomy as per the outcome defined for the course. Semester End Examination: Theory SEE will be conducted by University as per the scheduled timetable, with common question papers for the subject (duration 03 hours) <ol style="list-style-type: none"> 1. The question paper will have ten questions. Each question is set for 20 marks. Marks scored shall be proportionally reduced to 50 marks 2. There will be 2 questions from each module. Each of the two questions under a module (with a maximum of 3 sub-questions), should have a mix of topics under that module. The students have to answer 5 full questions, selecting one full question from each module	
Suggested Learning Resources: Textbooks <ol style="list-style-type: none"> 1. Roger S. Pressman: Software Engineering-A Practitioners approach, 7th Edition, Tata McGraw Hill. 2. Michael Blaha, James Rumbaugh: Object Oriented Modelling and Design with UML, 2nd Edition, Pearson Education, 2005. 3. Bob Hughes, Mike Cotterell, Rajib Mall: Software Project Management, 6th Edition, McGraw Hill 	

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Education, 2018. 4. Deepak Gaikwad, Viral Thakkar, DevOps Tools From Practitioner's Viewpoint, Wiley. 5. Ian Sommerville: Software Engineering, 9th Edition, Pearson Education, 2012.
Reference: 1. Pankaj Jalote: An Integrated Approach to Software Engineering, Wiley India.
Weblinks and Video Lectures (e-Resources): 1. https://onlinecourses.nptel.ac.in/noc20_cs68/preview 2. https://www.youtube.com/watch?v=WxkP5KR_Emk&list=PLrjkTqI3jnm9b5nr-ggx7Pt1G4UAHeFl 3. http://elearning.vtu.ac.in/econtent/CSE.php 4. http://elearning.vtu.ac.in/econtent/courses/video/CSE/15CS42.html 5. https://nptel.ac.in/courses/128/106/128106012/ (DevOps)
Activity Based Learning (Suggested Activities in Class)/ Practical Based learning Case study, Field visit


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