



St. JOHN'S COLLEGE OF ARTS & SCIENCE

(Accredited with B++ by NAAC & Approved by UGC under section 2(f) & 12(B) status)

(Affiliated to Manonmaniam Sundaranar University, Tirunelveli)

(A Christian Minority Institution)

**St. John's College Road, Ammandivilai, Kanyakumari District - 629 204,
Tamil Nadu, South India. Visit us at : www.stjohnskk.ac.in**



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ELECTIVE COURSE – MSC COMPUTER SCIENCE

M.Sc., Computer Science

Course Code	Title of the Course	Credits	Hours		Maximum Marks		
			Theory	Practical	CIA	ESE	Total
FIRST SEMESTER							
Core - I	Analysis & Design of Algorithms	4	5		25	75	100
Core – II	Object Oriented Analysis and Design & C++	4	5		25	75	100
Core – III	Python Programming	4	4		25	75	100
Elective - I	Advanced Software Engineering / Web Services /Multimedia and its Applications	3	4		25	75	100
Elective – II	Advanced Operating System/Advanced Computer Network/ Mobile Computing	3	4		25	75	100
Core Practical1	Algorithm Lab	3		4	50	50	100
Core Practical 2	Python Lab	3		4	50	50	100
Total		24	22	8			
SECOND SEMESTER							
Core - IV	Data Mining and Warehousing	4	5		25	75	100
Core – V	Advanced Java Programming	4	5		25	75	100
Elective – III	Artificial Intelligence &Machine Learning/ Robotics Process Automation for Business/Cloud Computing	3	4		25	75	100
Elective – IV	IoT/Embedded System/Block Chain Technology	3	4		25	75	100
Core Practical 3	Data Mining Lab using R	3		4	50	50	100
Core Practical 4	Advanced Java Lab	3		4	50	50	100
SEC 1	Statistical Tools	2	4		25	75	100
Total		22	22	8			

LIST OF ELECTIVES

Course code		ADVANCED SOFTWARE ENGINEERING	I	T	P	C
Core/Elective/Supportive		Elective 1-1	4			3
Pre-requisite		Basics of Software Engineering & SPM				
Course Objectives:						
The main objectives of this course are to:						
1. Introduce Software Engineering, Design, Testing and Maintenance.						
2. Enable the students to learn the concepts of Software Engineering.						
3. Learn about Software Project Management, Software Design & Testing.						
Expected Course Outcomes:						
On the successful completion of the course, students will be able to:						
1	Understand about Software Engineering process					K1,K2
2	Understand about Software project management skills, design and quality management					K2,K3
3	Analyze Software Requirements and Specification					K3,K4
4	Analyze Software Testing, Maintenance and Software Re-Engineering					K4,K5
5	Design and conduct various types and levels of software quality for software project					K5,K6
K1-Remember;K2-Understand;K3-Apply;K4-Analyze;K5-Evaluate; K6-Create						
Unit:1		INTRODUCTION			15hours	
Introduction: The Problem Domain – Software Engineering Challenges - Software Engineering Approach – Software Processes: Software Process – Characteristics of a Software Process – Software Development Process Models – Other software processes.						
Unit:2		SOFTWARE REQUIREMENTS			15hours	
Software Requirements Analysis and Specification: Requirement engineering – Type of Requirements – Feasibility Studies – Requirements Elicitation – Requirement Analysis – Requirement Documentation – Requirement Validation – Requirement Management – SRS - Formal System Specification – Axiomatic Specification – Algebraic Specification - Case study: Student Result management system. Software Quality Management –Software Quality, Software Quality Management System, ISO 9000, SEI CMM.						

Unit:3	PROJECT MANAGEMENT	15hours
Software Project Management: Responsibilities of a software project manager – Project planning – Metrics for Project size estimation – Project Estimation Techniques – Empirical Estimation Techniques – COCOMO – Halstead’s software science – Staffing level estimation – Scheduling– Organization and Team Structures – Staffing – Risk management – Software Configuration Management – Miscellaneous Plan.		
Unit:4	SOFTWARE DESIGN	15hours
Software Design: Outcome of a Design process – Characteristics of a good software design – Cohesion and coupling - Strategy of Design – Function Oriented Design – Object Oriented Design - Detailed Design - IEEE Recommended Practice for Software Design Descriptions.		
Unit:5	SOFTWARE TESTING	13hours
Software Testing: A Strategic approach to software testing – Terminologies – Functional testing– Structural testing – Levels of testing – Validation testing - Regression testing – Art of Debugging– Testing Tools- Metrics-Reliability Estimation. Software Maintenance -Maintenance Process - Reverse Engineering – Software Re-engineering - Configuration Management Activities.		
Unit:6	Contemporary Issues	2 hours
Expert lectures, online seminars –webinars		
	Total Lecture hours	75 hours
Text Books		
1	An Integrated Approach to Software Engineering – Pankaj Jalote, Narosa Publishing House, Delhi, 3rd Edition.	
2	Fundamentals of Software Engineering –Rajib Mall, PHI Publication,3rdEdition.	
Reference Books		
1	Software Engineering– K.K. Aggarwal and Yogesh Singh, New Age International Publishers, 3rd edition.	
2	A Practitioner Approach-Software Engineering, - R.S. Pressman, McGraw Hill.	
3	Fundamentals of Software Engineering Carlo Ghezzi, M Jarayeri, D. Manodrioli, PHI Publication.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://www.javatpoint.com/software-engineering-tutorial	
2	https://onlinecourses.swayam2.ac.in/cec20_cs07/preview	
3	https://onlinecourses.nptel.ac.in/noc19_cs69/preview	

Mapping with Programming Outcomes										
Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
1	S	S	M	S	S	S	M	M	M	M
CO2	S	S	S	S	S	S	S	M	S	S
CO3	S	S	S	S	S	S	S	M	S	S
CO4	S	S	S	S	S	S	S	M	S	S
CO5	S	S	S	S	S	S	S	M	S	S

*S-Strong; M-Medium; L-Low

course code		INTERNET OF THINGS	L	T	P	C
Core/Elective/Supportive		Elective 4-1	4			3
Pre-requisite		Basics of Sensors & their Applications				
Course Objectives:						
The main objectives of this course are to: ● To get familiar with the evolution of IOT with its design principles. ● To outline the functionalities and protocols of Internet communication. ● To analyze the hardware and software components needed to construct IOT applications. ● To identify the appropriate protocol for API construction and writing embedded code. ● To realize various business models and ethics in the Internet of Things.						
Expected Course Outcomes:						
On the successful completion of the course, students will be able to:						
1	Understand about IoT, its Architecture and its Applications					K1,K2
2	Comprehend the IoT evolution with its architecture and sensors					K2,K3
3	Assess the embedded technologies and develop prototypes for the IoT products					K4
4	Evaluate the use of Application Programming Interface and design an API for IoT in real-time					K5,K6
5	Design IoT in real-time applications using today's internet & wireless Technologies					K6
K1-Remember;K2-Understand;K3-Apply;K4-Analyze;K5-Evaluate; K6-Create						
Unit:1						
INTRODUCTION			12hours			
Internet of Things: An Overview: IoT Conceptual Framework - IoT Architectural View - Technology Behind IoT - Sources of IoT - M2M Communication - Examples of IoT - Design Principles for Connected Devices: IoT/M2M Systems Layers and Designs Standardization - Communication Technologies - Data Enrichment, Data Consolidation and Device Management at Gateway						
Unit:2						
Design Principles for Web Connectivity:			12hours			
Communication Protocols for Connected Devices – Message Communication Protocols for Connected Devices – Web Connectivity for Connected Devices – Network Using Gateway, SOAP, REST, HTTP, RESTful and Web Sockets - Internet Connectivity Principles: Internet Connectivity - Internet Based Communication – IP Addressing in the IoT – Media Access Control – Application Layer Protocols: HTTP, HTTPS, FTP, Telnet and Others						
Unit:3			Data Acquiring, Organizing, Processing and Analytics :			12hours
Data Acquiring and Storage – Organizing the Data – Transactions, Business Processes, Integration and Enterprise Systems – Analytics – Knowledge Acquiring, Managing and Storing Processes - Data Collection, Storage and Computing Using a Cloud Platform: Cloud Computing Paradigm for Data Collection, Storage and Computing – Everything as a Service and Cloud Service Models.						

Unit:4	SENSORS AND ACTUATORS	10hours
Sensors, Participatory Sensing, RFIDs, and Wireless Sensor Networks: Sensor Technology – Wireless Sensor Networks Technology - Prototyping the Embedded Devices for IoT and M2M : Embedded Computing Basics – Embedded Platforms for Prototyping.		
Unit:5	Prototyping and Designing the Software for IoT Applications	12hours
Prototyping Embedded Device Software - Devices, Gateways, Internet and Web/Cloud Services Software Development – Prototyping online Component APIs and Web APIs – Security for IoT: Vulnerabilities, Security Requirements and Threat Analysis – IoT Security Tomography and Layered Attacker Model – Security Models, Profiles and Protocols for IoT – IoT Application Case Study: Design Layers, Design Complexity and Designing using Cloud PaaS – IoT / IoT Applications in the premises, Supply – Chain and Customer Monitoring – Connected Car and its Applications and Services.		
Unit:6	Contemporary Issues	2 hours
Expert lectures, online seminars –webinars		
	Total Lecture hours	60 hours
Text Book		
1	Raj Kamal, “ Internet of Things Architecture and Design Principles”, McGraw Hill, 2017	
Reference Books		
1	Ovidiu Vermesan and Peter Friess, “Internet of Things – From Research and Innovation to Mark Deployment”, River Publishers, 2014.	
2	Peter Waher, “Learning Internet of Things” , Packt Publishing, 2015.	
3	Donald Norris, “The Internet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi and Beagle Bone Black”, Mc Graw Hill, 2015	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
1	https://onlinecourses.nptel.ac.in/noc20_cs66/preview	
2	https://www.javatpoint.com/iot-internet-of-things	
3	https://www.tutorialspoint.com/internet_of_things/index.htm	

Mapping with Programming Outcomes										
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	M	M	M	S	M	S	M	M	S	M
CO2	M	S	M	S	M	S	M	S	S	S
CO3	S	S	S	S	M	S	M	S	S	S
CO4	S	S	S	S	S	S	S	S	S	S
CO5	S	S	S	S	S	S	S	S	S	S

*S-Strong; M- Medium; L- Low



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Declaration

I hereby declare that the details and information given above are complete and true to the best of my knowledge and belief.

Dr. V.Y. DASAPPAN M.A., M.Phil., Ph.D.
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