MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI
PG - COURSES – AFFILIATED COLLEGES
Course Structure for M.Sc Software Engineering (2 year)
(Choice Based Credit System)
(with effect from the academic year 2016- 2017 onwards)
(44th SCAA meeting held on 30.05.2016)

Sem	Sub 'Pr. No.	Subject status	Subject Title	Hrs/ week	Cre-dits	Marks				
						Maximum			Passing minimum	
						Int.	Ext	Tot.	Ext.	Tot
III	13	Core – 7	Reach Methodology	5	4	25	75	100	38	50
	14	Core – 8	Web Programming	5	4	25	75	100	38	50
	15	Core - 9	Digital Image Processing	5	4	25	75	100	38	50
	16	Elective – III (Choose any one)	a. Cloud Computing b. Mobile Computing c. Security in Computing	5	5	25	75	100	38	50
	17	Practical – V	Web Programming Lab	5	4	50	50	100	25	50
	18	Mini Project	Mini Project	5	4	50	50	100	25	50
IV	19	Project	Major Project	--	15	50	50	100	25	50

Research Methodology

Unit – I

Research Methodology : Introduction - Meaning of Research – Objectives of Research – Types of Research – Motivation of Research – Research approaches – Significance of Research – Research Methods versus Methodology – Research and Scientific method – Research process – Criteria of good Research – Problems encountered by Researchers in India. Defining the Research problem : What is a Research problem - Selecting the Problem – Technique involved Defining a problem. Research design : Meaning – Need for Research Design – Features of Good Design – Important concept relating to Research design – Different Research designs – Basic Principles of Experimental Designs.

Unit – II

Sampling Design : Census and sample survey – Implications of a sample design – Steps in sample design - Criteria of selecting a sampling procedure – Characteristics of a good sample design – Different types of sample design – How to select a random sample – Random sample from an infinite Universe – Complex random sampling designs. Measurements and scaling techniques : Measurement in Research – Measurement scales – Sources of error in Measurement – Test and sound Measurements – Technique of developing measurement tools – Scaling, Meaning of scaling – Scale classification bases – Important scaling techniques – Scale Construction techniques.

Unit – III

Chi-Square Test for large samples – Definition of Chi-Square – Limitations of Chi-Square test - Chi-Square test as a test of goodness of fit and as a test of independence – Yate's correction and its applications – Analysis of variance(ANOVA) : Concept – One way ANOVA – ANOVA in test in Latin Square Design

Unit – IV

Data Collection : Methods of Data collection – Collection of Primary Data – Observation Method – Interview method – Collection of data through Questionnaires – Collection of data through Schedules – Some other methods of data collection – Collection of secondary data – Selection of appropriate method for data collection.

Interpretation and Report Writing : Meaning of interpretation – Why interpretation – Technique of interpretation – Precaution in Interpretation – Significance of Report Writing – Different Steps in Writing Report – Layout of the Research Report – Types of Reports – Mechanics of Writing a Research Report – Precautions for Writing Research Reports.

Unit – V

Algorithmic Research : Introduction – Algorithmic Research Problems – Types of Solution Procedure/ Algorithm – Steps of Development of Algorithm – Steps of Algorithmic research – Design of Experiments and Comparison of Algorithms – Meta Heuristics for Combinational Problems. The computer – Its role in Research – The Computer and Computer Technology – The Computer System – Important Characteristics - Computer Applications – Computer and Researchers.

Text Books
1. C.R.Kothari, "Research Methodology Methods and Techniques", Second edition, New Age International Publishers, 2010.
2. R.Panneerselvam, "Research Methodology", PHI, 2009.

References
1. S.P.Gupta, Introduction to Mathematical Statics"
2. D.K.Bhattacharyya, "Research Methodology", First Edition, EBP, 2003.
3. Sancheti and Kapoor, "Business Statics".

Web Programming

Unit - I

ASP.NET Introduction :.NET Programming Framework, , The Common language runtime and .NET Class Library, Features of ASP.NET and Visual studio .NET.

.NET language : Data types - declaring variables - Scope and accessibility - Variable Operators & Operations - Type conversions - Object based manipulations - Conditional and Loop structures - Functions and subroutines.

Types, Objects and Namespaces : Class – object - constructor - Value types and Reference types.

Advanced class programming : Inheritance – polymorphism – Interfaces - Exception handling - Multithreading. Understanding namespaces.

Unit - II

ASP.NET Applications – File types, Simple Application from start to finish. Code behind compilation - Global .asax application files, ASP.Net configuration.

Web Form fundamentals : Simple page applet- server controls - Deeper look in HTML controls - page classes

Web control classes : Auto postback and web control event- Generating Automatic greeting card.

Unit - III

Validation and Rich Controls : Calendar and Ad Rotator control - Validation Controls – Simple validation example – Regular expression concepts- Customer form validation.

State management : view state - custom cookies - Session state - Session state configuration - Application state.

Unit - IV

ASP.NET Intrinsic Objects **:** HTTP Request Object, HTTP Response Object, HTTP ServerUtility Object, ObjectContext Object

Data Access with ADO.NET **:** Overview of ADO.NET Objects - Characteristics of ADO.NET - ADO.NET object model.

ADO.NET data access : SQL basics – select, update, insert, delete statements. Accessing data - Creating a connection – Defining select statement - Using command with data reader -Updating data. Accessing disconnected data.

Unit - V

Comparing the template control : The Data list - The Data grid - The Repeater - Selecting Items - Editing Items - Paging with Data Grid - Sorting with Data grid.

Web Server and IIS manager, Web services Architecture : The Open Standards Plumbing - WSDL- SOAP- UDDI. Communicating with web service.

Text Book

1 Mathew Mac Donald, "ASP.NET Complete Reference", TMH 2005.

References

1. Crouch Matt J, "ASP.NET and VB.NET Web Programming", Addison Wesley 2002.

2. J.Liberty, D.Hurwitz, "Programming ASP.NET", Third Edition, O'REILLY, 2006.

Digital Image Processing
Unit - I

Introduction : Fundamentals - The MATLAB Desktop - Using Mat lab Editor /Debugger- getting help-saving and Retrieving work session data - Digital Image Representation - Image I/O and Display – Classes and Image Types - M-Function Programming.

Intensity Transformation and Spatial Filtering : Background - Intensity transformation - histogram Processing and function Plotting - Spatial filtering - Image processing toolbox standard spatial filters.

Unit - II

Filtering in Frequency Domain : The 2-D Discrete Fourier transform - Computing and Visualizing the 2-D DFT in MATLAB – Filtering in the Frequency domain - Obtaining frequency domain filters from spatial filters - High pass (sharpening) frequency domain filters.

Image Restoration and Reconstruction : A model of the image degradation / restoration process - Noise models - Restoration in the presence of Noise only – Periodic Noise reduction using Frequency Domain Filtering – Modeling the Degradation Function - Direct Inverse Filtering - Wiener filtering.

Unit - III

Color image processing : Colour image representation in MATLAB - converting to other color spaces - The basics of color image processing - Color transformation - Spatial Filtering of colour images.

Working directly in a RGB vector space Wavelets : Background - The fast wavelet transform - Working with wavelet decomposition structures - The inverse wavelet transform - Wavelets in image processing.

Unit - IV

Image compression : Background - Coding Redundancy - Spatial Redundancy - Irrelevant information- JPEG Compression.

Morphological image Processor : Preliminaries - Dialation and Erosion - Combining Dialation and erosion - Labelling connected components – Morphological reconstruction - Gray scale morphology.

Unit - V

Image segmentation : Image segmentation - Point, line and edge detection - Line detection using the Hough transform – Thresholding – Region - Based segmentation using the Watershed transform.

Representation and description : Background – Representation - Boundary Descriptors.

Text Book

1. Rafael C.Gonzalez, Richard E.Woods and Steven L.Eddins , "Image Processing Using MATLAB" ,Second edition, Tata McGraw Hill Education Private Limited, 2011.

References

1.Anil.K.Jain, "Fundamentals of Digital Image Processing", Prentice-Hall, 1989.
2.Chanda & Majumdar, "Digital Image Processing and Analysis", Prentice Hall ,3rd Edition
3.S.Sridhar, "Digital Image Processing",Oxford University Press, 2011

Cloud Computing

Unit – I

Cloud computing – An Overview : Introduction – History of cloud computing – Characteristics of cloud – Cloud computing model – Issues and challenges for cloud computing – Advantages and disadvantages of cloud computing – Security, Privacy and trust – Virtualization – Threats to cloud computing – Next generation of cloud computing.

Cloud computing Architecture : Introduction - Cloud Architecture – Cloud computing models – Comparisons of Service models - Deployment models – Identity as a service.

Unit – II

Virtualization in Cloud : Virtualization – Implementation of Virtualization - Virtualization support at the OS level – Middleware support for Virtualization – Advantages of Virtualization – Application Virtualization - Virtualization implementation techniques – Hardware virtualization – Types of Virtualization – Load balancing in cloud computing – Logical cloud computing model – Virtualization for Data-centre.

Security Issues and challenges in Cloud computing : Introduction - Security challenges in Cloud computing – Information Security in Cloud computing – Security, Privacy and Trust.

Security Management : Introduction – Security in reference architecture – Security Issues in cloud computing – Classification of security issues – Types of attackers – Security risk in cloud computing – Security Threats against cloud computing – Novel security approaches – Emerging trends in security and privacy.

Unit - III

Virtualization System specific Attacks : Attacks in cloud computing environment – Attacks in Hypervisor – Security challenges – Virtualization security solutions – Desktop virtualization Security – Planning and deployment for secure virtualization.

Web Services : Amazon web services – Microsoft Azure – Google App Engine

Unit – IV

Service Oriented Architecture : SOA components – Design principles of SOA – SOA requirements – Benefits of SOA – Significance of SOA in cloud computing – Challenges associated with SOA – Enterprise Service Bus – Web Services – Recurring Architectural Capabilities.

Migrating Applications to the Cloud computing : Motivations for migration – Issues in migrating the applications to the cloud – Challenges in migrating the applications to the cloud – Solutions – Types of migration – Planning for migrating the application to the cloud – Migration Roadmap – Cloud bursting.

Cloud Computing Applications : Business applications – Finance and banking applications – Cloud computing in education.

Unit – V

Standards in Cloud Computing : Standardization activities – Challenges – Fields of standardization – Role of Standards in cloud computing environment – Standardization organizations in Cloud Computing.

Mobile Cloud Computing : Needs of mobile Cloud Computing – Mobile Cloud Computing Architecture – Technologies for MCC – MCC Applications – Issues in MCC – Challenges in building applications – Platforms.

Microservices : Need of microservices – Microservice architecture – Benefits of Microservices – Drawbacks of microservices – Communication mechanisms – Decentralized data management - Essential ckeck-lists for migration from monolithic to microservices - Comparison of Microservices with SOA.

Text book

1. V.K.Pachghare, "Cloud Computing", PHI, 2016.

References

1. Michael Miller, "Cloud Computing", Pearson Education, New Delhi, 2009

2.Anthony T.Velte,Toby J.Velte,Pobert Elsenpeter,"Cloud Computing",TMH,2010

3. Kumar Saurbh , "Cloud Computing – Insights into New-Era Infrastructure", Wiley India, 2011.

4. John W.Rittinghouse and James F. Ransome, "Cloud computing : Implementation, Management and Security", CRC press, 2010.

Mobile Computing

Unit - I

Introduction: Advantages of Digital Information **-** Introduction to Telephone Systems
Mobile communication : Need for Mobile Communication – Requirements of Mobile Communication – History of Mobile Communication- Introduction to Cellular Mobile Communication

Unit - II

Mobile Communication Standards – Mobility Management – Frequency Management – Cordless Mobile Communication Systems- Mobile Computing: History of data networks –Classification of Mobile data networks - CDPD System

Unit - III

Satellites in Mobile Communication: Satellite classification – Global Satellite Communication – Changeover from one satellite to other – Global Mobile Communication – Interferences in Cellular Mobile Communication- Important Parameters of Mobile Communication System

Unit - IV

Mobile Internet: Working of Mobile IP – Wireless Network Security – Wireless Local Loop Architecture: Components in WLL – Problems in WLL – Modern Wireless Local Loop – Local Multipoint Distribution Service – Wireless Application Protocol-WCDMA Technology
and Fibre Optic Microcellular Mobile Communication – Ad hoc Network and Bluetooth technology – Intelligent Mobile Communication system – Fourth Generation Mobile Communication systems.

Unit - V

Mobile Application Languages XML and JAVA : Mobile Application Development - XML - JAVA - Java 2 Micro Editions - Java Card.
 Mobile Application Development Platforms : OSWindows
Mobile and CE-Windows Phone 7-Android-Symbian

Text Book
1.T.G. Palanivelu, R. Nakkeeran, Wireless and Mobile Communication, PHI Learning
Private Limited.2009
2.Raj Kamal, Mobile Computing,Second Edition,Oxford University Press-2012

References
1.Jochen Schiller, Mobile Communications, Second Edition, Pearson Education. 2007
2. William Stallings ,Wireless Communication and Networks -Pearson Education Asia-2002

Security in Computing

Unit – I
Cryptography : Terminology and Background – Substitution ciphers - The Caesar cipher, The Vernam cipher, Book cipher; Transposition ciphers.
DES – AES - Public key encryption - RSA encryption - Possible attacks on RSA-Uses of Encryption

Unit – II
Program Security : Secure programs – Fixing faults, Unexpected behavior, Types of flaws; Nonmalicious Program errors
Virus and other malicious code – Kinds of malicious code, How Viruses attach, Document viruses, How viruses gain control, Homes for viruses, Virus Signatures, The source of Viruses, Prevention of Virus Infection.
Targeted malicious code – Trojans, Trapdoors, Salami Attack.
Controls against Program Threats – Development controls, Program controls in general.

Unit – III
Security in Databases : Security Requirements - Integrity of the database, Element Integrity, Audibility, Access control, User authentication, Availability, SQL injection; Reliability and Integrity – Protection features from the operating system, Two-phase update, Redundancy/Internal consistency, Recovery, Concurrency/Consistency, Monitors; Sensitive data - Access decisions, Types of disclosures, Security versus Precision; Inference – Direct Attack , Indirect Attack; Multilevel databases – Granularity , Security Issues.
Proposes for multilevel security – Separation, Designs of multilevel secure databases, Trusted Front End.

Unit – IV
Security in Networks : Threats in Networks – What makes a network vulnerable? Categories of attack, Who attacks Networks?
 Network Security Controls – Security Threat analysis, Effect of security in architecture of network, Encryption, Content integrity, Strong authentication, Access controls, Wireless security, Alarms and alerts, Honeypots, Traffic flow security.
Firewalls – Design of firewalls, Types of Firewalls, Personal Firewalls, Comparison of Firewall Types; Intrusion Detection Systems – Types of IDSs, Goals for Intrusion Detection Systems, IDSs Strengths and Limitations, Snort; Secure E-Mail – Security for Email, Requirements and solutions, Designs.

Unit – V

Legal and Ethical Issues in Computer Security : Protecting Programs and data – Information and the law - Redress for software failures – Selling correct software, Reporting software flaws.

Computer crime : Why a separate category for computer crime is needed, Why computer crime is hard to define, Why computer crime is hard to prosecute, Indian Cyber law offences, Cyber Pornography, Accessing Protected System, Tampering with Computer Source code.

Ethical Issues in Computer Security - Differences between the Law and the Ethics, Studying Ethics, Ethical Reasoning.

Text Book

1. Charles P. Pfleeger, Shari Lawrence Pfleeger, "Security in Computing", Fourth Edition, Pearson Education, 2007.

References

1. Michael Whitman, Herbert J. Mattord, "Management of Information Security", Third Edition, Course Technology, 2010.
2. William Stallings, "Cryptography and Network Security:Principles and Practices", Fifth Edition. PHI, 2010.
3. V.K.Pachghare, "Cryptography and Information Security", PHI, 2013.

Web Programming Lab

Programs should include but not limited to:

1. Change the background color using RGB()
2. Implement Currency Converter
3. Demonstrate Event Tracker
4. Write a program using file uploading control
5. Write a program to create a registration page using validation controls
6. Write a program using Session State and Application State variables
7. Write a program to demonstrate the use of Session.TimeOut
8. Write a program using QueryString.
9 Write a program to create Cookies
10. Write a program using DataGrid and DataList controls
11. Write a program to search and store student data in MSAccess
12. Write a program to save customer information and generate electricity bill using MS Access

Mini Project

It is mandatory that the student should submit a report based on the software developed on any one of the below mentioned topics:

- Android Applications
- Image Processing Applications
- Web based Applications

The internal mark shall be distributed as given below:

Internal Assessment Component	Marks
System Study	10
Execution	10
Report	5
Total	25

The external mark shall be distributed as given below:

External Assessment Component	Marks
Execution	30
Report	25
Vivi-voce	20
Total	75

MSU / 2016-17 / PG –Colleges / M.Sc.(Software Engineering) / Semester - IV / Ppr.no.19 / Project

Major Project