SACRED HEART COLLEGE (AUTONOMOUS)

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Ready for
Every Good Work

A Don Bosco Institution of Higher Education, Founded in 1951 * Affiliated to Thiruvalluvar University, Vellore * Autonomous since 1987
Accredited by NAAC (4th Cycle – under RAF) with CGPA of 3.31 / 4 at 'A+' Grade

Sacred Heart College (Autonomous), Tirupattur District

1.2.1 List of New Courses

M.Sc. Computer Science

Sem	Code	Subject	L	T	P	C	CA	Sem	Total
I		Mathematical Foundation for Computer Science (**IDC**)	5	0	0	3	40	60	100
		Advanced Java Programming	4	1	0	3	40	60	100
		Python Programming	3	1	0	3	40	60	100
		Open Source Technologies	3	1	0	3	40	60	100
		Elective-I: a. Web Services b. Database Administration c. Decision Support System	4	0	0	3	40	60	100
		Practical – I: Advanced Java Programming	0	0	2	2	40	60	100
		Practical – II: Python Programming	0	0	2	2	40	60	100
		Practical – III: Open Source Technologies	0	0	2	2	40	60	100
		Business Communication	2	0	0	0	100	-	100
		IDCC – I	30 Hrs	0	0	2#	100	-	100
		Total	21	3	6	21 +2#	-	-	30
II		Principles of Compiler Design	5	0	0	3	40	60	100
		Enterprise Java Programming	4	1	0	3	40	60	100
		Desktop Application Using C#.NET	3	1	0	3	40	60	100
		Cryptography and Network Security	3	1	0	3	40	60	100

		Elective-II:
		a. Object Oriented Analysis and
		   Design
		b. Data Communication and
		   Networks
			4	0	0	3	40	60	100

		c. Software Project Management							
		Practical - IV: Enterprise Java Programming	0	0	2	2	40	60	100
		Practical - V: Desktop Application Using C#.NET	0	0	2	2	40	60	100
		Practical – VI : Cryptography and Network Security	0	0	2	2	40	60	100
		Quantitative Aptitude	2	0	0	-	100	-	100
		Technology Trends – I	0	0	0	1	100	-	100
		Department Domain – I	**20 Hrs**	**10 Hrs**	**0**	**2***	**100**	**-**	**100**
		Department Domain – II	**20 Hrs**	**10 Hrs**	**0**	**2***	**100**	**-**	**100**
		Total	**21**	**3**	**6**	**22 +4 ***	**-**	**-**	**30**
III		Internet Of Things	4	0	0	3	40	60	100
		Distributed Operating System	4	0	0	3	40	60	100
		Web Application Using ASP.NET	4	1	0	3	40	60	100
		Mobile Applications	4	1	0	3	40	60	100
		Elective - III: a. Cloud Computing b. Semantic Web c. Data Science	4	0	0	3	40	60	100
		Practical-VII: Web Application Using ASP.NET	0	0	2	2	40	60	100
		Practical -VIII: Mobile Applications	0	0	2	2	40	60	100
		Software Project – I	0	0	2	2	40	60	100
		Soft Skills	2	0	0	-	100	-	100
		Industrial Plant Training	0	0	0	2	100		100
		Technology Trends – II	0	0	0	1	100	-	100
		Department Domain – III	**20 Hrs**	**10 Hrs**	**0**	**2***	**100**	**-**	**100**
		Department Domain – IV	**20 Hrs**	**10 Hrs**	**0**	**2***	**100**	**-**	**100**
		Total	**22**	**2**	**6**	**24 +4 ***	**-**	**-**	**30**
IV		Design and Analysis of Algorithms	4	1	0	3	40	60	100

		Software Testing and Quality Assurance	4	1	0	3	40	60	100
		Elective-IV: a. Big Data Analytics b. Machine Learning c. Security Systems	4	0	0	3	40	60	100
		Research Paper	2	0	0	2	100	-	100
		Practical - IX: Design and Analysis of Algorithms	0	0	4	2	40	60	100
		Practical - X: Software Testing	0	0	2	2	40	60	100
		Software Project – II	0	0	6	5	40	60	100
		Human Rights	2	0	0	2	40	60	100
		Technology Trends – III	0	0	0	1	100	-	100
		IDCC – II	**30 Hrs**	**0**	**0**	**2$^{\#}$**	**100**	**-**	**100**
		Total	**16**	**2**	**12**	**23 +2$^{\#}$**	**-**	**-**	**30**
		Grand Total	**80**	**10**	**30**	**90+ 4$^{\#}$+ 8***	**-**	**-**	**120**

Sacred Heart College (Autonomous), Tirupattur District

1.2.1 List of New Courses

Department: M. SC. COMPUTER SCIENCE

S. NO	COURSE CODE	COURSE NAME
1.	MCS356P	Practical: Mobile Applications
2.	MCS451T	Software Testing and Quality Assurance
3.	MCS454P	Practical: Software Testing
4.	MCS359S	Technology Trends-II
5.	MCS354C	Data Science
6.	MCS452B	Machine Learning
7.	MCS452C	Security Systems

Semester - III   **0-0-2:2:40:60**

PRACTICAL - VIII: MOBILE APPLICATIONS - MCS356P

1. Using Text Controls and Button, Check Box & Radio button, Toast & Toggle Button.
2. Using Alert Dialogue, Dropdown list, Image view and Web view
3. Using Notification, Widget, Intents and Filters, Fragments, Hiding Title Bar and Screen Orientation.
4. Layouts, Menus
5. Connectivity
6. Telephony
7. Multimedia
8. Storage Preferences
9. SQLite DB
10. Sensors

BLUE PRINT OF THE SEMESTER QUESTION PAPER

Section	Type and Choice	Marks	Questions in Section
A (Exercise 1 – 5)	**EITHER OR TYPE**	25	1 Pair
B (Exercise 6 – 10)	**EITHER OR TYPE**	25	1 Pair
TOTAL NUMBER OF QUESTIONS			2

Semester - IV   **4-1-0:3:40:60**

SOFTWARE TESTING AND QUALITY ASSURANCE - MCS451T

OBJECTIVES

- To introduce various approaches, techniques, technologies, and methodologies used in software testing and quality assurance.
- To understand the role of testing in applications
- To learn to design the test cases
- To know the different levels of testing
- To study the state-of-the-art of software testing and quality assurance.

UNIT I: TESTING BASICS
Testing as an engineering activity – Deming's Quality Principles- Testing as a process – introduction to SQA And SQC - Software testing principles – Life cycle of Testing - The tester's role – Origins of defects – Defect classes – The defect repository and test design – Developer / tester support for developing a defect repository – Life cycle of Defects – Introduction to Jira tool

UNIT II: TEST CASE DESIGN
Introduction to testing design strategies – Test case design strategies – Using black box approach to test case design – Random testing – Equivalence class partitioning – Boundary value analysis – Other black box test design approaches – Black box Testing and COTS – Using white box approach to test design – Test adequacy criteria –v&v test model - flow graphs –Case Study: Test case preparation.

UNIT III: LEVELS OF TESTING
Static Code Reviews –Unit test – Unit test planning – Designing the unit tests – The class as a testable unit – Running the unit tests and recording results - code coverage – Function coverage- code coverage tool for C++ Covtool – Introduction to EMMA – Dead code - Integration tests – Designing integration tests – Integration test planning – System test – The different types – Regression testing – Alpha, and beta tests.

UNIT IV: EXPLORATORY AND RISK BASED TESTING

Performance Testing – Memory leak – creation of memory leak programs - process leak – system crashes - exploratory testing – Risk based testing – Adhoc testing – User acceptance testing – Stress testing – Drivers and Stubs - Practical: Web stress tool -

UNIT V: FUNDAMENTALS OF SOFTWARE QUALITY & ASSURANCE

Software quality per Juran and Deming - Hierarchical models of Boehm and McCall - Measuring Software Quality - Gilb's approach - GQM Model-Quality tasks - SQA plan - Characteristics - Implementation - Documentation - Reviews and audits. Case Study: SQA Plan. CASE STUDY: Tools for quality - Ishikawa's basic tools - CASE tools

TEXT BOOKS

1. Roger S. Pressman, "Software Engineering: A Practitioner's Approach", Seventh Edition. McGrawHill, 2010.
2. Ilene Burnstein, "Practical Software Testing", Springer International Edition, 2003
3. Allan C. Gillies, "Software Quality: Theory and Management", Thomson Learning, 2003.

REFERENCES

1. Elfriede Dustin, "Effective Software Testing", Pearson Education, 2003.
2. RenuRajani and Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, 2003.
3. Mordechai Ben, Menachem and Garry S.Marliss, "Software Quality", Thomson Asia Pvt. Ltd., 2003.
4. Kamna Malik and Praveen Choudry, "Software Quality: A Practitioner Approach", PHI, 2000.

WEB REFERENCES

http://en.wikibooks.org/wiki/Software_Quality_Assurance

BLUE PRINT OF THE SEMESTER QUESTION PAPER

Section	Type and Choice	Marks	Number of Questions from					Total Questions in each Section
			Unit I	Unit II	Unit III	Unit IV	Unit V	
A	**ANY EIGHT**	2	2	2	2	2	2	10
B	**EITHER OR TYPE**	4	1 Pair	1 Pair	1 Pair	1 Pair	1 Pair	5 Pairs
C	**ANY THREE**	8	1	1	1	1	1	5

TOTAL NUMBER OF QUESTIONS	4	4	4	4	4	20

SEMESTER - IV   **0-0-2:2:40:60**

<mark>**PRACTICAL – IX: SOFTWARE TESTING - MCS454P**</mark>

1. Understand The Automation Testing Approach

2. Using Selenium IDE, Write a test suite containing minimum 4 test case

3. Conduct a test suite for nay two web sites

4. Install Selenium server and demonstrate it using a script in Java/PHP.

5. Write and test a program to login a specific web page

6. Write and test a program to update 10 student records into table into Excel file

7. Write and test a program to select the number of students who have scored more than 60 in any one subject.

8. Write and test a program to provide total number of objects present / available on the page.

9. Write and test a program to get the number of list items in a list / combo box.

10. Write and test a program to count number of check boxes on the page checked and unchecked count.

BLUE PRINT OF THE SEMESTER QUESTION PAPER

Section	Type and Choice	Marks	Questions in Section
A (Exercise 1 – 5)	**EITHER OR TYPE**	25	1 Pair
B (Exercise 6 – 10)	**EITHER OR TYPE**	25	1 Pair
TOTAL NUMBER OF QUESTIONS			2

Semester II/III/IV   **0-0-0:1:100:0**

TECHNOLOGY TRENDS - MCS359S

Objectives

- To expose the students to various information technologies through magazines, journals and the Web.

Methodology

1. No formal classes will be conducted.
2. Students will be divided into groups for all activities with regard to this Course. Utmost THREE students will be allowed to form a group.
3. Each group has to prepare two papers based on the recent technology during semester. This will be presented as a group activity. A staff committee who will monitor the activities of this course will decide the topics for study.The group needs to study the topic collectively, gather information for the concerned subtopics, write down the paper and submit jointly as a word processed document. The paper must be prepared in A4 size paper, not less than 40 pages and with bibliography, following the directives given.
4. Students must have access to recent magazines to gather information.
   The source for the paper is
   I M.Sc - PC Quest, Voice & Data, Express Computer and Data Quest.
   II M.Sc – Open Source for You, Digit, Apps unveiled and My Mobile.
   Magazines of the academic year for January to December. (For example for the year 2017-2018, magazines of 2017 will be used.)
5. Students will present their papers as part of the Association activities of the Department. Students will be assessed based on his/her involvement in the team and effectiveness of his/her preparation.

Evaluation

The Technology Trends paper will be evaluated based on the following components.

CA Evaluation   **50 Marks**

Presentation of papers	: 20 marks
(2 x 10 and Question & Answers)	
Online Test	: 10 marks
CA Test	: 20 marks

1. Students will be asked to collect questions from the submitted papers. About 300 questions will be gathered and made into a Question Bank. A Quiz will be conducted in Moodle using this Question Bank.

2. CA test is for two hours. Course material for the test includes the papers submitted during the semester.

3. The CA test mark is converted to 20 marks.

Question Paper Pattern for CA

The CA test will be conducted for 60 marks and it will be converted to 20 marks.

Time: 2 hrs   **Max: 60 Marks**

Section - A (10 x 2 = 20)
Short Answer Question. TEN Question to be answered. No choice will be given.

Section - B (4 x 5 = 20)
FOUR Questions to be answered out of SIX Questions. Each question may or may not have subdivisions.

Section - C (1 x 20 = 20)
ONE Question to be answered out of TWO Questions. Each question may or may not have subdivisions.

Semester Evaluation   **50 Marks**

Online Objective Type Test	: 30 Marks
Viva Voce	: 20 Marks

1. Semester Examination will be conducted at the end of the semester for 2 hours.

2. Online Objective Type Test is conducted for 60 questions and marks are converted to 30 marks. The resource for the test is the Question Bank.

3. Viva Voce is conducted individually based on the papers submitted by the group by a committee of two internal faculty members.

4. A student shall be declared as passed in the course if he/she has secured 50% or above in the Semester examination and 50% or above in the aggregate of CA and Semester Examination.

5. If a student fails in the examination, he/she must appear in the next semester as per the syllabus of the current students.

Semester - III   **4-0-0:3:40:60**

OBJECTIVES
- To know the fundamental algorithmic ideas to process data.
- To learn to apply hypotheses and data into actionable predictions.
- To document and transfer the results and effectively communicate the findings using visualization techniques.
- To handle data with R
- To employ the Map reduce technique

UNIT – I: INTRODUCTION TO DATA SCIENCE
Data science process – roles, stages in data science project – working with data from files – working with relational databases – exploring data – managing data – cleaning and sampling for modeling and validation – introduction to NoSQL.

UNIT - II: MODELING METHODS
Resampling Methods: Cross-Validation, the Bootstrap. Linear Model Selection and Regularization: Subset Selection, Shrinkage Methods, Dimension Reduction Methods, Considerations in High Dimensions.

UNIT - III: INTRODUCTION TO R
Reading and getting data into R – ordered and unordered factors – arrays and matrices – lists and data frames – reading data from files – probability distributions – statistical models in R - manipulating objects – data distribution.

UNIT - IV: MAP REDUCE
Introduction – distributed file system – algorithms using map reduce, Matrix-Vector Multiplication by Map Reduce – Hadoop - Understanding the Map Reduce architecture - Writing Hadoop MapReduce Programs - Loading data into HDFS - Executing the Map phase - Shuffling and sorting - Reducing phase execution.

UNIT - V: DELIVERING RESULTS
Documentation and deployment – producing effective presentations – Introduction to graphical analysis – plot () function – displaying multivariate data – matrix plots – multiple plots in one window - exporting graph - using graphics parameters. Case studies.

TEXT BOOKS
1. Nina Zumel, John Mount, "Practical Data Science with R", Manning Publications, 2014.
2. Jure Leskovec, Anand Rajaraman, Jeffrey D. Ullman, "Mining of Massive Datasets", Cambridge University Press, 2014.
3. Mark Gardener, "Beginning R - The Statistical Pr ogramming Language", John Wiley & Sons, Inc., 2012.

REFERENCES

1. W. N. Venables, D. M. Smith and the R Core Team, "An Introduction to R", 2013.
2. Tony Ojeda, Sean Patrick Murphy, Benjamin Bengfort, Abhijit Dasgupta, "Practical Data Science Cookbook", Packt Publishing Ltd., 2014.
3. Nathan Yau, "Visualize This: The Flowing Data Guide to Design, Visualization, and Statistics", Wiley, 2011.
4. Boris lublinsky, Kevin t. Smith, Alexey Yakubovich, "Professional Hadoop Solutions", Wiley, ISBN: 9788126551071, 2015.

WEB REFERENCES

http://www.johndcook.com/R_language_for_programmers.html
http://bigdatauniversity.com/
http://home.ubalt.edu/ntsbarsh/stat-data/topics.htm#rintroduction
https://www.datacamp.com/
https://www.dataquest.io/

BLUE PRINT OF THE SEMESTER QUESTION PAPER

Section	Type and Choice	Marks	Number of Questions from					Total Questions in each Section
			Unit I	Unit II	Unit III	Unit IV	Unit V	
A	**ANY EIGHT**	2	2	2	2	2	2	10
B	**EITHER OR TYPE**	4	1 Pair	1 Pair	1 Pair	1 Pair	1 Pair	5 Pairs
C	**ANY THREE**	8	1	1	1	1	1	5
TOTAL NUMBER OF QUESTIONS			4	4	4	4	4	20

Semester - IV   **4-0-0:3:40:60**

==ELECTIVE – IV: B. MACHINE LEARNING - MCS452B==

OBJECTIVES
- To introduce several fundamental concepts and methods for machine learning
- To familiarize the basic learning algorithms and techniques and their applications
- To learn to analyze and handle large data sets.
- To emphasis the basic concepts of probability and statistics.
- To know the types of learning methods

UNIT – I: LEARNING-STANDARD LINEAR METHODS

Statistical Learning: What Is Statistical Learning, Assessing Model Accuracy- Linear Regression: Simple Linear Regression, Multiple Linear Regressions, and Other Considerations in the Regression Model, The Marketing Plan, and Comparison of Linear Regression with K-Nearest Neighbors- Classification: An Overview of Classification, Why Not Linear Regression- Logistic Regression, Linear Discriminant Analysis, A Comparison of Classification Methods.

UNIT - II: SELECTION & IMPROVEMENTS OF LINEAR LEARNING METHODS
Resampling Methods: Cross-Validation, the Bootstrap. Linear Model Selection and Regularization: Subset Selection, Shrinkage Methods, Dimension Reduction Methods, Considerations in High Dimensions.

UNIT - III: NON-LINEAR LEARNING METHODS
Polynomial Regression, Step Functions, Basis Functions, Regression Splines, Smoothing Splines, Local Regression, Generalized Additive Models, Tree-Based Methods: The Basics of Decision Trees. Bagging, Random Forests, Boosting.

UNIT - IV: VECTOR LEARNING
Support Vector machines, Principle Component Analysis and Clustering Support Vector Machines: Maximal Margin Classifier. Support Vector Classifiers: Support Vector Machines, SVMs with More than Two Classes Relationship to Logistic Regression.

UNIT - V: UNSUPERVISED LEARNING
The Challenge of Unsupervised Learning, Principal Components Analysis, Clustering Methods: K-Means Clustering, Hierarchical Clustering, Practical Issues in Clustering.

TEXT BOOKS
1. An Introduction to Statistical Learning with Applications in R: Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, Springer 2013.
2. The Elements of Statistical Learning: Data Mining, Inference, and Prediction (Second Edition)
3. Trevor Hastie, Robert Tibshirani, Jerome Friedman, Springer (2008).

REFERENCES
1. Introduction to Machine Learning (Second Edition): Ethem Alpaydın, the MIT Press (2010).
2. Pattern Recognition and Machine Learning: Christopher M. Bishop, Springer (2006)
3. Bayesian Reasoning and Machine Learning: David Barber, Cambridge University Press (2012)
4. Machine Learning: The Art and Science of Algorithms that Make Sense of Data: Peter Flach, Cambridge University Press (2012) Machine Learning for Hackers: Drew Conway and John Myles White, O'Reilly (2012)
5. Machine Learning in Action: Peter Harrington, Manning Publications (2012).

WEB REFERENCES

https://github.com/josephmisiti/awesome-machine-learning
https://www.coursera.org/learn/machine-learning
https://www.kaggle.com/wiki/Tutorial

BLUE PRINT OF THE SEMESTER QUESTION PAPER

Section	Type and Choice	Marks	Number of Questions from					Total Questions in each Section
			Unit I	Unit II	Unit III	Unit IV	Unit V	
A	**ANY EIGHT**	2	2	2	2	2	2	10
B	**EITHER OR TYPE**	4	1 Pair	1 Pair	1 Pair	1 Pair	1 Pair	5 Pairs
C	**ANY THREE**	8	1	1	1	1	1	5
TOTAL NUMBER OF QUESTIONS			4	4	4	4	4	20

ELECTIVE – IV: C. SECURITY SYSTEMS - MCS452C

OBJECTIVES
- To introduce the classical encryption techniques
- To understand the concept of network security practices
- To know about system security and web security
- To impart knowledge on wireless network security
- To explore the types of cyber crimes

UNIT – I: CONVENTIONAL ENCRYPTION & CRYPTOGRAPHY
Classical Technique – Modern technique – Algorithms; Public Key Cryptography : Public Key Cryptography – Introduction to Number Theory – Message Authentication and Hash Function – HASH and MAC Algorithm – Digital Signature and Authentication protocol.

UNIT – II: NETWORK SECURITY PRACTICE
Authentication Application – Electronic Mail Security – IP Security Program Security and System Security: Secure programs – Nonmalicious program errors – viruses and Worms – Memory and address protection – control access to general objects – File protection mechanism – user authentication – Trusted operating system design and assurance –Intrusion Detection system.

UNIT – III: SYSTEM SECURITY AND WEB SECURITY
Intruders,– Firewall - Managing Access – Password management - Web Security requirements – SSL and TLS – SET; Client Side Security : Using SSL – Active Content – Web Privacy. Database Security**:** The Database as a Networked Server – Securing database-to-database communication – Reliability and Integrity of database – sensitive data – inference – multilevel databases

UNIT – IV: WIRELESS NETWORK SECURITY
Mobile Security – Encryption Schemes in WLANs – Basic approach to WLAN security and Policy Development – WLAN intrusion process – WLAN security solutions. Digital Watermarking and Steganography: Models of Watermarking – Basic Message Coding – Watermark Security – Content Authentication – Steganography.

UNIT – V: CYBER CRIMES
Introduction – computer crime and cyber crimes; Classification of cyber crimes, Cyber crime and Related Concepts: Distinction between cyber crime and conventional crimes, Reasons for commission of cyber crime, Cyber forensic : Cyber criminals and their objectives, Kinds of cyber crimes – cyber stalking; cyber pornography; forgery and fraud; crime related to IPRs; Cyber terrorism; computer vandalism, Regulation of cyber crimes: Issues relating to investigation, Issues relating to Jurisdiction, Issues relating to Evidence , Relevant provisions under Information Technology Act, 2000, Indian Penal Code, Pornography Act and Evidence Act etc.

TEXT BOOKS
1. Charrles P. Pfleeger, Shari Lawrence Pfleegner, "Security in Computing", Prentice Hall of India,
    2011.

2. William Stallings, "Cryptography and Network Security", 5th Edition, Pearson.

REFERENCES

1. John W.Rittinghouse, James F.Ransome, "Wireless Operaional Security", Elsevier, 2004.
2. Ron Ben Natan,"Implementing Database Security and Auditing", Elsevier, 2005.
3. Lincoln D. Stein, "Web Security", Addison Wesley, 1999.
4. Ingemar J.Cox, Matthew L. Miller Jeffrey A.Bloom, Jessica Fridrich, Ton Kalker, "Digital   Watermarking and Steganography", 2nd Edition, Elsevier.
5. Dr.R.K.Tiwari, P.K.Sastri, K.V.Ravikumar, "Computer Crime and Computer Forensics", 1st Edition, Selective Publishers, 2002.

WEB REFERENCES

www.cryptographyworld.com/
www.ti89.com/cryptotut/home.htm
nptel.ac.in/courses/106105031/
williamstallings.com/Extras/Security-Notes/
http://study.com/academy/lesson/what-is-cyber-crime-definition-types-examples.html

BLUE PRINT OF THE SEMESTER QUESTION PAPER

Section	Type and Choice	Marks	Number of Questions from					Total Questions in each Section
			Unit I	Unit II	Unit III	Unit IV	Unit V	
A	**ANY EIGHT**	2	2	2	2	2	2	10
B	**EITHER OR TYPE**	4	1 Pair	1 Pair	1 Pair	1 Pair	1 Pair	5 Pairs
C	**ANY THREE**	8	1	1	1	1	1	5
TOTAL NUMBER OF QUESTIONS			4	4	4	4	4	20