

SCHOOL OF COMPUTING
DEPARTMENT OF INFORMATION TECHNOLOGY
STUDENT CIRCULAR 2021-2025 BATCH

10.12.2023

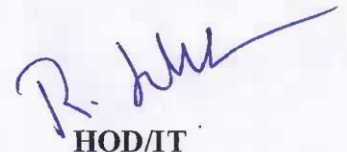
This is to inform you that it is mandatory to select one CBCS subjects for the VI Semester of Academic year 2023-2024 based on your area of interest. You can select one of the following subjects.

List of CBCS

1. SBTA4005 Bioentrepreneurship in Biotechnology
2. SCSA4001 R Programming
3. SCIA4001 Disaster Management
4. SITA1503 Fog and Cloud Computing
5. SEEA3028 Electric Vehicles
6. SMEA4001 Resource Management Techniques

Confirm the CBCS subject through the following Google form on or before 29.12.2023

https://docs.google.com/forms/d/1sqUL5KwdWS2QQ3JFzJwVqleEHby3y4zljTRPNDbV0Uc/edit?usp=sharing_eil_se_dm&ts=66750d31


HOD/IT

Department of Information Technology
Sathyabama Institute of Science and Technology
Chennai - 600 119.

SBTA4005	BIO ENTREPRENEURSHIP IN BIOTECHNOLOGY	L	T	P	EL	C	Total Marks
		3	0	0	0	3	100

COURSE OBJECTIVE

- Introduce students to the principles and concepts of bio entrepreneurship, and how it relates to the life sciences and biotechnology sectors.
- To develop students' understanding of the process of identifying and evaluating entrepreneurial opportunities in the bio industry.

UNIT1: INTRODUCTION TO ENTREPRENEURSHIP**9Hours**

Definition of Entrepreneurship and start up, Types of Entrepreneurships, Essential entrepreneurs' skills, Process of Entrepreneurship, Current status of start-up process registration in India Start-up Agencies in India.

UNIT2: PRODUCTION OF MUSHROOM**9Hours**

Definition of mushroom, classification, life cycle of Oyster mushroom, Type of Mushrooms: Oyster mushroom, Milky mushroom, Reishi. Mushroom production: Substrates, sterilization methods, Process, Value added products, scenario of mushroom cultivation in India.

UNIT3: PRODUCTION OF SERICULTURE AND APICULTURE**9Hours**

Definition of Sericulture, Horticulture, silk worm life cycle and rearing, reeling Scenario of sericulture in India.

Definition of Apiculture, Classification of Honey bee, life cycle, role of honey bee: Drone, Queen, Worker. Harvesting boxes, Extracting Products, apiculture by products, scenario of Apiculture in India.

UNIT4: PRODUCTION OF SPIRULINA AND VERMICOMPOSTING**9Hours**

Definition of SCP, classification of Spirulina, Life cycle, Nutritional Profile and benefits, Production Process and Harvesting methods. Value added products, scenario of Spirulina cultivation in India. Definition of Vermicomposting, Substrates for vermicomposting, Production Process, applications. Scenario of Vermicomposting in India

UNIT5: PRODUCTION OF SEAWEEDS**9Hours**

Classification of Seaweed, Life cycle, Benefits of seaweed, Production Process: Seed Material, methods of Farming, Harvesting Methods, value added products, Scenario of seaweed farming in India.

Total hours:45**COURSE OUTCOMES:**

- CO1.-Describe the importance of Entrepreneurship
 CO2-Summarize the process of initiating startups
 CO3.-Demonstrate the cultivation of mushroom
 CO4.- Analyse the effectiveness of Apiculture
 CO5.-Appraise the process of Vermicompost technology
 CO6.-Evaluate the value products of sea weeds.

TEXT / REFERENCE BOOKS

1. Biotech Consortium India Ltd, Resourcebook,2018.
2. Suman B. Cand Sharma V.P, MushroomcultivationInIndia,2007.
3. Madhan Mohan Rao M, An Introduction to Sericulture,2nd Edition, BSPublications.2019.
4. Jayashree K.V, Thara Devi C.S, Arumugam N, Apiculture, SaraSPublications,2014.
5. KarthiKeyan, Spirulina formula for starting harvest, 2022.
6. Seetha Lekshmy, Santhi R, Vermi technology, SaraSPublications,2012.
7. Bruno Augusto Amato Borges, Seaweed Cultivation, DelPublishing,2017.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max.Marks:100

Exam Duration:3 Hrs.

Part A:10 Questions of 2marks each-No choice

20 Marks

Part B:2 Questions from each unit of internal choice each carrying 16 marks

80 Marks

Name List:

SBTA4005 Bio entrepreneurship in Biotechnology

S.No	Register Number	Name of the student
1	41120001	D. AATHI SIVABALAN
2	41120016	AMAY KANCHHIT
3	41120018	ANAND SAI SATHVIK YELURI
4	41120019	ANBUNITHI.E
5	41120021	ANKIT PRAJAPATI
6	41120027	ARGHYA CHANDRA
7	41120034	AVINASH KUMAR GUPTA

SCSA4001	R PROGRAMMING	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- Use R for statistical programming, computation, graphics, and modeling.
- Fit some basic types of statistical models.
- Be able to expand their knowledge of R on their own.

UNIT1 INTRODUCTION TO R

9Hrs.

History and fundamentals of R Installation and use of R/RStudio/R Shiny, Installing R packages, R-Nuts and Bolts-Getting Data In and Out –Objects in R -Arrays, Data Frame and List -Control Structures and Functions- Loop Functions-Data Manipulation-String Operations- Matrix Operations.

UNIT 2 R DATA INTERFACES

9Hrs.

CSV Files, XSL files, XML files, Web Data-Data Preprocessing Missing Values, Outliers, Principle Component Analysis-Data Visualization – Charts & Graphs-Pie Chart, Bar Chart, Boxplot, Histogram, Line graph, Scatter Plot.

UNIT3 STATISTICAL MODELING IN R

9Hrs.

Descriptive statistics-R Packages: Regression (MASS package) - Distribution (STATS package) - ANOVA - Time Series Analysis.

UNIT4 MACHINE LEARNING IN R

9Hrs.

Classification: Decision Trees, Random Forest, SVM-Clustering: K-Means, Fuzzy-Association Rule Mining-Outlier Detection.

UNIT5 BUILDING R SHINY APPLICATION

9Hrs.

User Interface, Control Widgets, Dynamic Output-R Hadoop: Installation of R Hadoop-rhdfs-rmr2-Data Analysis with R Hadoop-Case Study

- To identify types of data analytics and data visualization tools.

Max.45Hrs.

COURSE OUTCOMES

On completion of the course student will be able to

CO1-List motivation for learning R programming language

CO2-Access online resources for R and import new function packages into the R workspace

CO3-Import, review, manipulate and summarize data-sets in R

CO4-Explore data-sets to create testable hypotheses and identify appropriate statistical tests

CO5-Perform appropriate statistical tests using R

CO6-Create and edit visualizations with R

TEXT / REFERENCE BOOKS

- Hands-On Programming with R: Write Your Own Functions and Simulations By Garrett Golemund, O'Reilly Media, Inc., 2014.
- R for Data Science, Hadley Wickham, Garrett Golemund, "O'Reilly Media, Inc. 2016.
- Introduction to Statistics and Data Analysis-With Exercises, Solutions and Applications in R By Christian Heumann, Michael Schomaker and Shalabh, Springer, 2016

4. The R Software-Fundamentals of Programming and Statistical Analysis-Pierre Lafayede Micheaux, Rémy Drouilhet, Benoit Liquet, Springer 2013
5. A Beginner's Guide to R (Use R) By Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters, Springer 2009

**END SEMESTER EXAMINATION QUESTION PAPER
PATTERN**

Max.Marks:100

Exam Duration:3Hrs.

PART A:10 Questions of 2 marks each-No choice

20 Marks

PART B:2 Questions from each unit with internal choice, each carrying 16 marks

80 Marks

Name List

SCSA4001 R Programming

S.No	Register Number	Name of the student
1	41120002	ABHILASH.B
2	41120010	AKALYA S
3	41120025	ARCHISHAW
4	41120028	V.S.ARUN BALAJI
5	41120029	ARUN KUMAR K
6	41120030	ARVIND B
7	41120049	DEEPANRAJ
8	41120052	DHANANJEYAN S
9	41120053	DHARSHANA L
10	41120056	B. DINIYA
11	41120057	DIVYA DHARSHINI E
12	41120064	HARI SANDEEP
13	41120081	JOYCE DAVID
14	41120084	KAMILATH RIFKA
15	41120087	G.KARHIK
16	41120090	KAVITHA K
17	41120091	V.KAVIYA NIVASHINI
18	41120094	KIRAN
19	41120110	MIRUDHUBASHINI.B.S
20	41120118	NAMAN RAJ
21	41120129	S. NAVITH GURUSAN
22	41120133	NIVENTHAN D
23	41120138	K POOJITHA

SCIA4001	DISASTER MANAGEMENT	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

- To create an awareness towards natural and man-made disasters, disaster preparedness and disaster management

UNIT1 INTRODUCTION TO DISASTERS**12Hrs.**

Natural resources and its importance - understanding on fragile eco-system - characteristics and types of Disasters, Geological and Mountain Area Disasters: Earthquakes, Volcanic eruption, landslides - Wind and Water Related Natural Disaster: Floods, Droughts, Cyclones, Tsunamis - Man Made Disasters: Forest fires, Nuclear, Biological and Chemical disaster - Causes and effects - Disaster Profile of India - Disaster Management cycle.

UNIT2 DISASTER PREPAREDNESS**8Hrs.**

Disaster management, mitigation and preparedness: Disaster Preparedness for People and Infrastructure, Community based Disaster Preparedness Plan - Roles & Responsibilities of Different Agencies and Government: Education, Communication & Training, Central, State, District and local administration, Armed Forces, Police, Para Military Forces, International Agencies, and NGO's - Disaster Mitigation: Strategies, Emerging Trends, Mitigation management and Role of Team and Coordination.

UNIT3 REHABILITATION, RECONSTRUCTION AND RECOVERY**10Hrs.**

Damage assessment – Development of Physical and Economic Infrastructure - Nature of Damage to Houses and Infrastructure due to Disasters - Funding Arrangements for Reconstruction - Monitoring and Evaluation of Rehabilitation Work: Training, Rescue and planning the rescue activities and rehabilitations - Role of Government and NGO's - Participative Rehabilitation Process: Case Studies

UNIT4 DISASTER RESPONSE AND DISASTER MANAGEMENT**8Hrs.**

Disaster Response Plan: Communication, Participation and Activation of Emergency Preparedness Plans, Search, Rescue, Evacuation and other logistic management - Human Behavior and Response Management: Psychological Response and Psychological Rehabilitation, Trauma and Stress Management, rumor and Panic Management, Medical and Health Response to Different Disasters - Relief Measures: Minimum Standard of Relief, essential components of Relief Management, and funding.

UNIT5 RISK ASSESSMENT AND VULNERABILITY ANALYSIS**7Hrs.**

Hazard, Risk and Vulnerability Concept and Relationship Disaster Risk Reduction, People Participation in Risk Assessment - Vulnerability Analysis, Vulnerability Identification - Vulnerability profile of India - Strategies for Survival – Social Infrastructure for Vulnerability Reduction.

Max.45Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1-Know the fragile ecosystem and the types of the disasters
- CO2-Acquire the preparedness and the responsibilities of different agencies on Disaster
- CO3-Understand the rescue, rehabilitation and reconstruction process of disaster management
- CO4-Understand the disaster response and relief measures
- CO5-Understand the concepts of disaster risk
- CO6-Understand the concepts of vulnerability reduction

TEXT / REFERENCE BOOKS

1. Bryant Edwards, "Natural Hazards", Cambridge University Press, U.K, 2005
2. Carter, W. Nick, "Disaster Management, Asian Development Bank", Manila, 1991.
3. Government of India, "Vulnerability Atlas of India", New Delhi, 1997.
4. Sahni, Pardeepet. Al. (eds.), "Disaster Mitigation Experiences and Reflections", Prentice Hall of India, New Delhi, 2002
5. Sahni, Pardeep and Ariya bandu, "Disaster risk reduction in South Asia", Philearning pvt.Ltd. New Delhi, 2012.
6. Sharma.R.K.&Sharma.G.(ed), "Natural Disaster", APH Publishing Corporation, New Delhi, 2005.
7. Taori.K, "Disaster Management through Panchayati Raj", Concept Publishing Company, New Delhi, 2005.
8. NOAA Coastal Services Center, "Linking People Information and Technology",

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max.Marks:100****Exam Duration:3Hrs.****PART A:**10 Questions of 2marks each–No choice**20 Marks****PART B:**2 Questions from each unit of internal choice each carrying 16 marks**80 Marks**

Name list:

SCIA4001 Disaster Management

S.No	Register Number	Name of the student
1	41120003	ABINAYA V
2	41120004	J V ADCHAYA
3	41120007	M Afiya
4	41120008	AJAY SRINIVASAN H
5	41120009	AJONITHAS
6	41120011	AKASH C
7	41120013	AKASH P
8	41120014	S.AKASH
9	41120020	ANGELIN E TANYA
10	41120022	ANTHUS JHONES A
11	41120026	S.B. ARCHITH
12	41120032	ASHWANTH R
13	41120033	ASHWIN.MR
14	41120035	AYUSHI KAREENA
15	41120036	BALACHANDRA KUMAR S
16	41120037	BANDARI MANIKANTA
17	41120038	BARATH
18	41120040	BENITA.S
19	41120041	BERYL CYINTHIA JASIEL.B
20	41120043	BROMELIA.R
21	41120044	CALVIN NESAN S V
22	41120047	CHINTALAPUDI SRIRAMA GOKULA
23	41120048	CHUKKA SAIPOOJA PRANATHI
24	41120054	DHARSHINI
25	41120055	DILIP RAAJ
26	41120060	GODWIN VINO.I
27	41120065	HARISH .G
28	41120066	HARISH KAARTHICK R
29	41120067	HARISH PANDIAN R
30	41120068	S.HASHWATH VELAN
31	41120069	HEMA CHANDRAN. S
32	41120070	HENNY STEPHEN

33	41120072	INNANI SWAYAM
34	41120074	JAWAGAR SRI G
35	41120076	JEGADEESH K
36	41120078	JOHNSINA JOTHI S
37	41120079	JONNA MOHIT
38	41120080	JOSHINAVICTOR J
39	41120083	KAMALESH
40	41120085	KARAN
41	41120086	KARTHIK.A
42	41120088	KASA SAI MANIKANTA
43	41120089	A.KAVISELVAN
44	41120092	KEERTHANA. C
45	41120093	KEERTHANA ANUSHA.C
46	41120097	KOTERU AMRUTHA
47	41120098	KRISHNA PATEL.M
48	41120099	KUMARA VADIVEL.P
49	41120100	LEOSHARLIN JHONSON
50	41120101	LINGA PRAVIN K S
51	41120102	LOKESHAJ J
52	41120103	MADALA GOPI KRISHNA
53	41120104	MADHULIKA.V
54	41120105	R. MADHUMITHA
55	41120106	MAGESHWARAN K
56	41120109	MANOJ KUMAR K
57	41120111	MITRA SRI S
58	41120114	MONICA SRI
59	41120115	MUKESH U
60	41120116	MUKESHRAJ D
61	41120117	MURPHY SURYA. R
62	41120120	NANDYALA DILEEP CHANDRA SRINIVAS
63	41120121	NARAN PREM KUMAR REDDY
64	41120122	NARESH M
65	41120123	NARESH. N
66	41120125	NAVEEN BHARATHI. C.A.R
67	41120127	NAVEEN KUMAR T
68	41120130	NEEL HIRENKUMAR MEHTA
69	41120131	NIMMAGADDA SRI VENKATA KAMESH
70	41120132	NITHISH .A.V
71	41120134	PADMANABHUNI N V M SUHAS KUMAR
72	41120136	PAVEETHRA RR
73	41120137	PEDDIBHOTLA SARVAGNYA

SITA1503	FOG AND CLOUD COMPUTING	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand the basic concepts of cloud computing and cloud enables.
- To understand cloud services and Multi-tenancy computing.
- To study about various models of cloud environments and virtualization.
- To manage the cloud computing infrastructure with security.
- To gain knowledge of cloud and to understand about Fog, edge computing.

UNIT1 UNDERSTANDING CLOUD COMPUTING**9Hrs.**

Basic Concepts and Terminology - Cloud Computing Architectural Framework - Types of Clouds - pros and cons of cloud computing – Cloud Characteristics - difference between web 2.0 and cloud - key challenges in cloud computing – Major Cloud players -Virtualization in Cloud Computing -Parallelization in Cloud Computing - cloud resource management –Cloud Enabling Technology.

UNIT2 CLOUD SERVICE MODELS**9Hrs.**

Software as a Service (SaaS) - Infrastructure as a Service (IaaS)- Platform as a Service (PaaS)- Web services – Service Oriented Architecture (SOA) - Elastic Computing - On Demand Computing- Service Management in Cloud Computing -Multi-tenancy computing architecture.

UNIT3 CLOUD DEPLOYMENT MODELS AND VIRTUALIZATION**9Hrs.**

Deployment models: Public cloud – Private Cloud –Hybrid cloud – Community cloud -Need for virtualization – Types of Virtualization – Virtualization OS – VMware, KVM – System VM – Process VM - Virtual Machine Monitor – Properties – Xen, Hyper V, Virtual Box, Eucalyptus.

UNIT4 MANAGEMENT IN CLOUD COMPUTING & SECURITY**9Hrs.**

Cloud data centers- Energy efficiency in data center - Data Management in Cloud Computing - Mobile cloud computing service models – Open Source and Commercial Clouds, Cloud Simulator – sensor cloud- Fundamental Cloud security– Cloud security threats–Additional considerations–Security solutions as a case study.

UNIT5 FOG COMPUTING**9Hrs.**

From Cloud to Fog-Fog Computing architecture-fog networks-Principles of Edge/P2P networking-Security and privacy in Fog.

Max.45Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1 - Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures.
- CO2 - Implement and install the cloud tools to make enable the cloud computing infrastructures.
- CO3 - Apply and design suitable Virtualization concept, Cloud Resource Management and collaboration services.
- CO4 - Create combinatorial auctions for cloud resources and services for computing clouds Develop and make cloud services as commercial.
- CO5 - Assess cloud and cloud to Fog with IoT.
- CO6 - Ability to understand fog computing architecture.

TEXT/REFERENCE BOOKS

1. Cloud computing concepts, technology and Architecture–Thomas Erl, Zaigham Mahmood, Ricardo Puttini, Pearson,2017.
2. Instant Guide to Cloud Computing Anand Nayar (Ed), Ashok kumar, sudeep Tanwar, BPB,2019.
3. Cloud computing practical approach-Anthony T. Velte, Toby J. Velte Robert Elsen peter TATA McGraw-Hill, New Delhi–2010.
4. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online-Michael Miller-Que 2008.
5. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 2010.
6. Fog Computing Concepts, Frameworks and Technologies, Mahmood, Zaigham (Ed.), Springer, 2018.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max.Marks:100****Exam Duration:3Hrs.****PART A:**10 Questions carrying 2marks each No choice**20Marks****PART B:**2 Questions from each unit of internal choice each carrying 16 marks**80Marks**

Name List:

SITA1503 Fog and Cloud Computing

S.No	Register Number	Name of the student
1	41120005	ADDANKI. RAMYA SRI
2	41120017	AMIRTHASRI.V
3	41120046	CHANDRU K
4	41120058	DOMMETI VENKAT SAI VARUN CHOWDARY
5	41120062	GOKUL RAJ N
6	41120075	JEFFRE J
7	41120077	M.JENITH ASHWIN
8	41120181	Thangam

Name List:

SEEA3028 Electric Vehicles

S.No	Register Number	Name of the student
1	41120006	ADRIEL SAMUEL JEYANATH
2	41120012	AKASH.M
3	41120024	ARAVIND T
4	41120031	ASHLYN TIMOTHEY
5	41120039	BAVIN A
6	41120042	B BINU PRABHU
7	41120059	ELVIS.N
8	41120061	C. GOKUL
9	41120063	HARIHARAN SENTHILKUMAR
10	41120112	MOHAMED IBRAHIM KHAN
11	41120113	MOHAN C

SMEA4001	RESOURCE MANAGEMENT TECHNIQUES	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To Understand importance of optimization of industrial process management
- To solve problems in linear programming and Integer programming
- To develop in a student efficient and effective deployment of an organization's resources when they are needed
- To analyze and appreciate variety of performance measures for various optimization problems

UNIT1 INTRODUCTION AND LINEAR PROGRAMMING**9Hrs.**

Operations Research (OR)- Nature – Characteristics – Phases - Role of OR in Decision making - Outline of OR Models
Linear Programming–Formulation of L.P. problems – Solution by graphical method simplex method, Big Methods.

UNIT2 TRANSPORTATION AND ASSIGNMENT MODEL**9Hrs.**

Transportation problem– Initial Basic feasible solution-North west corner method, Least Cost method, Vogel's approximation method – Test for optimality-MODI method. Assignment problems- Hungarian assignment models-Travelling salesman problems

UNIT3 RESOURCE SCHEDULING AND NETWORK ANALYSIS**9Hrs.**

Problem of Sequencing – Problem with N jobs and 2 machines N Jobs 3 machines N Jobs and m machines and 2 Jobs machines (Graphical method). Project Management -Basic concepts–Network construction and scheduling Critical Path Method (CPM) & Program evaluation review technique (PERT) and resource leveling by network techniques, time – Cost trade off.

UNIT4 INVENTORY CONTROL**9Hrs.**

InventoryControl–VariousTypesofinventorymodels–deterministicinventorymodels–Production model, Purchase model–with and without shortage-Economic Order Quantity (EOQ)–Buffer stock–Shortage quantity, Probabilistic inventory models–Quantity Discount and Price Breaks

UNIT5 QUEUEING THEORY AND REPLACEMENT MODELS**9Hrs.**

Queueing theory – Poisson arrivals and exponential service times, Single channel models only, Replacement policy for items whose maintenance cost increases with time- Consideration of time value of money - Replacement policy- Individual, Group replacement of items that fail completely and suddenly.

Max.45Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to CO1-
Formulate the linear programming problems. CO2-
Analyse transportation and assignment problems. CO3-
Develop the scheduling systems.
CO4-Analyse CPM and PERT methods.
CO5-Describe the different inventory models.
CO6-Design the Queueing theory and examine their placement model.

TEXT/REFERENCE BOOKS

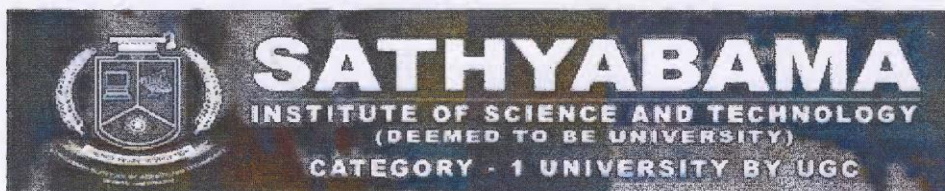
- 1 K. Malik, S.K.Yadav,S.R.Yadav,OptimizationTechniques.IKInternationalPublishingHousePvt.Ltd;FirstEditionedition,2013.
- 2 PK Gupta, D. Shira OperationsResearch.SChandseventhrevisededition,2014.
- 3 Sharma S. D, Operation research Theory, Methods and Application,17thEdn., Kedar Nath Ram Nath Publication,2010.
- 4 Nita H Shah, Ravi M Gor & Hardik Soni, Operationresearch,4thEdn., PHI,2010.
- 5 Edwin K. P. Chong & Stanislaw H. Zak," An Introduction to Optimization" WileyIndia,2017.
- 6 Mohan, Kusum Deep, OptimizationTechniques.NewAgeScience,2009.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max.Marks:100****ExamDuration:3Hrs.****PART A:**10 Questions of 2 marks each–No choice**20 Marks****PART B:**2 Questions from each unit of internal choice, each carrying 16 marks**80 Marks**

Name List:

SMEA4001 Resource Management Techniques

S.No	Register Number	Name of the student
1	41120023	ARAVIND GURUSAMY
2	41120050	DEEPIKA S
3	41120073	JAMES EDVIN S
4	41120107	MAJID FASI AHMED



SCHOOL OF COMPUTING
DEPARTMENT OF INFORMATION TECHNOLOGY
STUDENT CIRCULAR 2020-2024 BATCH

10.05.2023

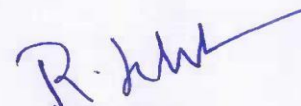
This is to inform you that it is mandatory to select one CBCS subjects for the VII Semester of Academic year 2023-2024 based on your area of interest. You can select one of the following subjects.

List of CBCS

1. SCSA4007 Design and Development Blockchain
2. SCSA4003 Business Analytics
3. SCSA3016 Data Science
4. SCIA4002 Public Health Engineering
5. SMEA4002 Wind and Solar Energy
6. SMEA4001 Resource Management Techniques
7. SECA4007 Real Time System Design

Confirm the CBCS subject through the following Google form on or before 29.05.2023

https://docs.google.com/forms/d/1TEiNaWH2p73oABgYBdrkbH0FaYY6duhtoA0bTT6IS4o/edit?usp=sharing_eil_se_dm&ts=66750e42


HOD/IT

Department of Information Technology
Sathyabama Institute of Science and Technology,
Chennai - 600 119.

SCSA4007	DESIGN AND DEVELOPMENT OF BLOCKCHAIN	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand how blockchain works internally of Bitcoin and Ethereum.
- To learn about the various decentralized blockchain.
- To know the differences between proof of work and stake.
- To design and build own blockchain.
- To integrate own ideas with blockchain using Ethereum Wallet and Smart Contract.

UNIT1 BLOCKCHAIN BASICS

9Hrs.

Basics of Crypto economics- Blockchain – Cryptocurrencies overviewed –Blockchain in Nutshell: Benefits and Challenges – Blockchain types - Blockchain Peer to Peer Network: Consensus Mechanisms, Proof of Work, Proof of Stake, Mining Layer, Propagation Layer, Semantic Layer, Application Layer

UNIT2 COMPONENTS AND STRUCTURE OF BLOCKCHAIN

9Hrs.

Blocks – Chain between the blocks – Digital signatures and Hashing – Block data examples: Bitcoin block, Ethereum block, Block time and Block size, Global Size– Blockchain miners and validators – Blockchain speed: Blockchain throughput and comparison with traditional network

UNIT3 DECENTRALIZATION USING BLOCKCHAIN

9Hrs.

Methods of decentralization – Routes to decentralization – Blockchain and full ecosystem decentralization: Computation, Storage, Communication and decentralization – Smart Contracts – Organization of decentralization: Decentralized Autonomous: Organizations, Corporations, Societies, D Apps and their requirements, Operations of D Apps – Example of D Apps: KYC-Chains, Open Bazaar, Lazooz.

UNIT4 CREATING AN OWN BLOCKCHAIN

9Hrs.

Creating: Basic P2P network, Genesis Blocks and Sharing Blocks–Registering Miners and Creating new blocks– Storing blocks – Creating: Blockchain wallet, API, Command Line Interface– Blockchain Wallet and Transaction: Wallet, Transaction and Colored Coins

UNIT5 ETHEREUM WALLET & SMART CONTRACT

9Hrs.

Ganache Full node Client –IntelliJ Plugin for Solidity–Truffle Suite: Create your Smart Contract –Connect Truffle to Smart Contract – Smart Contract: Hello world, MD5 Smart Contract, Smart Contract with truffle, Deploy the Smart Contract to your deployment network – Truffle Console – Operation with your Smart Contract via the Truffle CLI – Cryptocurrency Mining: Mining Hardware, Miner Types, Mining Pools, Mining Software

Max.45Hrs.

COURSE OUTCOMES

- CO1 : Understanding emerging technology models of blockchain
- CO2 : Known to deal with the component and structure of blockchain
- CO3: Deals to work with various decentralized blockchain
- CO4: Familiar with Ethereum wallet and smart contract
- CO5: Applications and implementation strategies
- CO6: Design and develop own block chain for area time application

TEXT/REFERENCE BOOKS

1. Elad Elron, "The Blockchain Developer A Practical Guide for Designing, Implementing, Publishing, Testing, and Securing Distributed Blockchain-based Projects", A press(2019)
2. Bren Hill, Samanyu Chopra, Paul Valen court, Narayan Prusty, "Blockchain Developer's Guide Develop Smart Applications with Blockchain Technologies - Ethereum, JavaScript, Hyperledger Fabric, and Corda", Packt Publishing (2018)
3. Salman A. Baset, Luc Desrosiers, Nitin Gaur, Petr Novotny, Anthony O'Dowd, Venkatraman Ramakrishna, " Hands-On Blockchain with Hyperledger Building Decentralized Applications with Hyperledger Fabric and Composer", Pack Publishing (2018)
4. Imran Bashir, Narayan Prusty, "Advanced Blockchain Development Build Highly Secure, Decentralized Applications and Conduct Secure Transactions", Pack Publishing(2019)

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max.Marks:100****Exam Duration:3Hrs.****PART A:**10 Questions of 2 marks search–No choice**20 Marks****PART B:**2 Questions from each unit of internal choice each carrying 16 marks**80 Marks**

Name List:

SCSA4007 Design and Development Blockchain

S.No	Register Number	Name of the student
1	40120001	AARTHI. R
2	40120003	ABEL PRIYAKUMAR. P
3	40120005	ABINAYA . R
4	40120011	AMRITHAA ASHOK
5	40120015	BANDARU MAHESH SAI
6	40120019	CHABATHULA VAZRA HIMA BINDHU
7	40120020	CHARULATHA. K
8	40120022	CHINDULURI REDDY VENKATA MOHITHESWAR
9	40120023	CLAUDIA PRINCY. V
10	40120025	DEEPAK. S
11	40120026	DHANALAKSHMI. S
12	40120032	FELISHIA SELAS . C
13	40120044	KAVITHA . V.R
14	40120045	KAVIYA. S
15	40120050	KOLLIMARLA AKSHAY
16	40120052	KRISHNA PRIYA. R.S
17	40120060	MUTHU YASHWANTH. S
18	40120061	NALLA UDAY KIRAN

19	40120064	NIKITA ANGELINE DAVID
20	40120065	PAVITHRAA. S
21	40120067	PRASEMA FEMI GRACE. P.W
22	40120070	PRIYADARSHINI. R
23	40120072	RAJALASHMI . R
24	40120077	SAKTHI VINAYAK
25	40120078	SANJAIKANTH. J
26	40120082	SARAGADAM LAYA NANDAN
27	40120086	SOUMYADEEP DAS
28	40120087	SOWMIYA .R.K
29	40120088	SREERAMOJU SHRADDHA
30	40120091	SRINIVAS. K.N
31	40120095	SURAVARAM DHANUSH
32	40120096	SURIYA. S
33	40120098	THIRISHA . A
34	40120099	THIRUNAVUKARASAR. N
35	40120101	VAIBHAV SINGH
36	40120102	VASANTHA KUMAR. M
37	40120108	VISHWA. L
38	40120110	TULLURI KEERTHINADH
39	40120111	KOLLI SRIKANTH

40	40120113	R.V.NITESH KUMAR
41	40120115	SRIJITH SAI L
42	40120119	KOMMURI VAMSI
43	40120121	YANAMADALA SATYA PRIYANKA

SCSA4003	BUSINESS ANALYTICS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To gain an understanding of how managers use business analytics to formulate and solve business problems and to support manager in decision making.
- To understand the different basic concept/ fundamentals of business statistics.
- To become familiar with the processes needed to develop, report, and analyze business data.

UNIT1 OVER VIEW OF BUSINESS ANALYTICS

9Hrs.

Definitions and Examples in Business Intelligence - Need, Features and Use of Business Intelligence (BI) -BI Components- Data Warehouse- Business Performance Management.

User Interface Business Analytics: Introduction to Business Analytics (BA) – Need- Components (Business Context, Technology, Data Science)-Types (Descriptive, Predictive and Prescriptive)-Business Intelligence versus Business Analytics

UNIT2 TYPES OF DIGITAL DATA

9Hrs.

Definition, Sources, Storage and Characteristics of data - Structured, Unstructured and Semi Structured Data - Importance of data quality-Dealing with missing or incomplete data-Data Classification

Data Ware house: Definition, characteristics, framework- Data lake - Business Reporting, Visual Analytics: Definition, concepts - Different types of charts and graphs-Emergence of data visualization and visual analytics

UNIT3 INTRODUCTION TO DATA MINING

9Hrs.

Data Mining: Concepts and applications - Data mining process - Text & Web Analytics: Text analytics and text mining overview- Text mining applications- Web mining overview- Social media analytics- Sentiment analysis overview- Big Data Analytics: Definition and characteristics of big data-Fundamentals of big data analytics

UNIT4 TRANSACTION PROCESSING

9Hrs.

Data Mining Tasks, OLAP and Multidimensional data analysis, Basic concept of Association Analysis and Cluster Analysis - Transaction processing vs Analytic Processing-OLTP vs OLAP-OLAP Operations-Data models for OLTP(ER model) and OLAP(Star & Snowflake Schema)

UNIT5 BUSINESS PERFORMANCE MANAGEMENT

9Hrs.

Business performance management cycle - KPI, Dashboard - Analytics in Business Support Functions: Sales & Marketing Analytics - HR Analytics - Financial Analytics - Production and operations analytics- Analytics in Industries: Telecom, Retail, Health care, Financial Services- Decision Making under Uncertainty

Case study: prepare a detailed report on applications of analytics in different industries.

Max.45Hrs.

COURSE OUTCOMES

CO1: Comprehend Knowledge of basic concept / fundamentals of business statistics, business intelligence

CO2: Evaluating basic concepts of digital data and data warehouse

CO3: To apply analytics methodologies on various real time data

CO4: To create data schema and transaction processing methodology for a given real time dataset. CO5: Analyze various types of analytics on data from various domains.

CO6: To perform practical application by taking managerial decision and evaluating the Concept of Business Analytics

TEXT/REFERENCE BOOKS

1. Shmueli, Patel, and Bruce: Wiley, Data Mining for Business Intelligence, Concepts, Techniques and Applications, Wiley, 2010
2. Fisher and Raman, The New Science of Retailing, : Harvard Business Press, 2012
3. Ramesh Sharda, Dursun Delen, Efraim Turban Business Intelligence: A Managerial Perspective on Analytics Pearson 3rd edition, 2017
4. R.N. Prasad and Seema Acharya Fundamentals of Business Analytics Wiley 2016
5. U. Dinesh Kumar Business Analytics – The Science of Data Driven Decision Making Wiley 2017
6. Anil Maheshwari Data Analytics McGraw Hill 2017
7. Jesper Thorlund & Gert H. N. Laursen Business Analytics for Managers: Taking Business Intelligence beyond Wiley Latest
8. Sahil Raj, Business Analytics Cengage, 7th edition Wayne L. Winston. ISBN-13: 9789353502553.

**END SEMESTER EXAM QUESTION PAPER
PATTERN**

Max. Marks: 100

Exam Duration: 3 Hrs.

PART A : 10 Questions of 2 marks each- No choice

20 Marks

PART B : 2 Questions from each unit with internal choice, each carrying 16 marks

80 Marks

Name List:

SCSA4003 Business Analytics

S.No	Register Number	Name of the student
1	40120002	ABDUL AJEES. I
2	40120006	AGASH. K
3	40120007	AJAY. B
4	40120009	ALOYSIUS JOSEPH
5	40120010	AMAAN ALI
6	40120012	ANISH KUMAR. A.S
7	40120013	ANTON JUBIN . R
8	40120014	AVINASH . K
9	40120017	BHUVANESHWARAN . S
10	40120018	BOOMINATHAN. D.M
11	40120024	DANISH HARRISON. J
12	40120027	DHANUSH RAJ. M
13	40120028	DINESH RAJA RADHA
14	40120029	DISHABHAVANI. M
15	40120031	DON INIGO. S

16	40120034	HARIHARAN. V
17	40120035	HARISH. A
18	40120037	JABIN RAJA SOLOMON. S
19	40120038	JAGADEESH . V
20	40120039	JANANI. N
21	40120040	JASON KEVIN
22	40120041	JAYASRI. R
23	40120046	KIRTHIGA. V
24	40120048	KISHORE KUMAR. K
25	40120049	KISHOREKUMAR. K
26	40120051	KRISHNA KUMAR VYAS
27	40120053	MANIKKAM. S
28	40120054	MANISH SINGH
29	40120055	MATTA VENKATA RAHUL
30	40120056	MOHAMED ABDULLAH. K
31	40120058	MONEESH. S
32	40120063	NARISSETTY SRINIVASA RAO
33	40120066	PRASANNA KUMAR. S
34	40120068	PRAVEEN. N
35	40120069	PRAVIN. S
36	40120071	RAJA REGAN. A

37	40120074	REEYA B VARGHESE
38	40120076	SAGAR KUMAR
39	40120080	SANJAYKUMAR . S.M
40	40120081	SANTHOSH. J
41	40120083	SELSYA JENIFER. L
42	40120085	SIMSON. J
43	40120089	SRIDEVI. S
44	40120090	SRIJITH. B
45	40120092	SRIRAM. J
46	40120093	SRIVARDHAN. C
47	40120094	SUDHARSAN. P
48	40120097	TAMILINIYAN. P
49	40120100	TUFFIN SANDO. J
50	40120103	VELAN. S
51	40120104	VIGHNESH. SU
52	40120105	VIGNESH. K. S
53	40120106	VIJAYSRINIVASAN. M
54	40120107	VISHVASHWARRAN . V.B
55	40120112	PRANESH PRIYANSHU
56	40120116	OBINNI VEERA VENKATA DURGA SAI SUDHEER
57	40120118	ANKIT KUMAR
58	40120120	KUNAL KUMAR

SCSA3016	DATA SCIENCE	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand the mathematical foundations required for data science.
- To describe a flow process for data science problems.
- To introduce basic data science algorithms and data visualization.
- To learn machine tools and techniques.
- To learn the ideas and tools for data visualization.

UNIT1 LINEAR ALGEBRA**9Hrs.**

Algebraic view-vectors 2D, 3D and D, matrices, product of matrix & vector, rank, null space, solution of over determined set of equations and pseudo-inverse. Geometric view-vectors, distance, projections, eigenvalue decomposition, Equations of line, plane, hyperplane, circle, sphere, Hypersphere.

UNIT2 PROBABILITY AND STATISTICS**9Hrs.**

Introduction to probability and statistics, Population and sample, Normal and Gaussian distributions, Probability Density Function, Descriptive statistics, notion of probability, distributions, mean, variance, covariance, covariance matrix, understanding univariate and multivariate normal distributions, introduction to hypothesis testing, confidence interval for estimates.

UNIT3 EXPLORATORY DATA ANALYSIS AND THE DATA SCIENCE PROCESS**9Hrs.**

Exploratory Data Analysis and the Data Science Process - Basic tools (plots, graphs and summary statistics) of EDA - Philosophy of EDA-The Data Science Process-Data Visualization-Basic principles, ideas and tools for data visualization -Examples of exciting projects-Data Visualization using Tableau.

UNIT4 MACHINE LEARNING TOOLS, TECHNIQUES AND APPLICATIONS**9Hrs.**

Supervised Learning, Unsupervised Learning, Reinforcement Learning, Dimensionality Reduction, Principal Component Analysis, Classification and Regression models, Tree and Bayesian network models, Neural Networks, Testing, Evaluation and Validation of Models.

UNIT5 INTRODUCTION TO PYTHON**9Hrs.**

Data structures- Functions- Numpy- Matplotlib- Pandas- problems based on computational complexity-Simple cases studies based on python (Binary search, common elements in list), Hash tables, Dictionary.

Max.45Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to
 CO1-Explain the basic terms of Linear Algebra and Statistical Inference. CO2- Describe the Data Science process and its components interaction. CO3- Apply EDA and the Data Science process in a case study. CO4-Classify Data Science problems. CO5-Analyse and correlate the results to the solutions. CO6-Simulate Data Visualization in exciting projects.

TEXT / REFERENCE BOOKS

1. Cathy O'Neil and Rachel Schutt. Doing Data Science, Straight Talk From The Frontline. O'Reilly. 2014.
2. Introduction To Linear Algebra- By Gilbert Strang, Wellesley-Cambridge Press, 5th Edition. 2016.
3. Applied Statistics And Probability For Engineers- By Douglas Montgomery. 2016.
4. Jure Leskovek, Anand Rajaraman and Jeffrey Ullman. Mining of Massive Datasets. v2.1, Cambridge University Press. 2014. (free online)
5. Avrim Blum, John Hopcroft and Ravindran Kannan. Foundations of Data Science.
6. Jiawei Han, Micheline Kamber and Jian Pei. Data Mining: Concepts and Techniques, 3rd Edition. ISBN 0123814790. 2011.
7. Trevor Hastie, Robert Tibshirani and Jerome Friedman. Elements of Statistical Learning, 2nd Edition. ISBN 0387952845. 2009. (free online)
8. LEARN PYTHON 3 THE HARD WAY, 3rd Edition, Zed A. Shaw
9. Python for Data Analysis Oreilly, Wes Mc Kinney

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max.Marks:100****Exam Duration:3Hrs.****PART A:** 10 Questions of 2 marks each- No choice**20 Marks****PART B:** 2 Questions from each unit of internal choice, each carrying 16 marks**80 Marks**

Name list

SCSA3016 Data Science

S.No	Register Number	Name of the student
1	40120004	ABHISHEIK. R
2	40120008	ALINA MUSHTAQ
3	40120030	DIVYADHARSINI. P.S
4	40120036	IDRIS AHMED
5	40120062	NAREN. D
6	40120073	RAMASAMY. N
7	40120075	ROHITH. P
8	40120079	SANJAY. S
9	40120084	SHALOM JABARAJ. J
10	40120109	VISHWA. B

		L	T	P	Credits	Total Marks
SCIA4002	PUBLIC HEALTH ENGINEERING	3	0	0	3	100

COURSE OBJECTIVES

- To provide knowledge about the solid waste management and its disposal.
- To implicate the importance of wastewater treatment.
- To create awareness and importance of the Rainwater Harvesting and Artificial Recharge Techniques.
- To provide an awareness about the health impacts due to water, air and land pollution.
- To gain knowledge on various regulatory bodies and acts.

UNIT – I – SOLID WASTE MANAGEMENT

Importance of public health engineering – Role of public health engineer - Sources and types of solid wastes - Waste generation rates and variation - Components of Integrated SWM - Sustainable SWM techniques at source - Segregation and sorting, reduce, reuse, and recycle. Present scenario of SWM in Urban Local Bodies - Dumping of solid waste- sanitary landfills- waste disposal options - Case studies related to reuse of waste.

UNIT – II – WASTEWATER MANAGEMENT

Sewage – classification - Waste water treatment – primary, secondary and tertiary stages - Standards for Disposal – Methods - Self- purification of river- Oxygen sag curve - Land disposal – Sewage farming - Objectives – Sludge characterization – Thickening – Design of gravity thickener- Sludge digestion – Sludge Conditioning and Dewatering – Sludge drying beds- ultimate residue disposal – recent advances - Case studies related to wastewater reclamation.

UNIT – III – WATER QUALITY MANAGEMENT

Role of Environmental Engineer - Water supply - development of public water supply - need for protected water supplies - objectives of water supply systems — Quality of water - physical, chemical and biological aspects - analysis of water - water quality standards- Sustainable Development - Rainwater Harvesting-Artificial Recharge Techniques – Case studies related to water management.

UNIT – IV – HEALTH IMPACTS

Health and environmental effects of water, air and land pollution - Chemicals in drinking water - Sources of air pollution – Sources of land pollutants - Disease - Preventive measures – Case studies related to pollution effects.

UNIT – V – GUIDELINES FOR WATER ACT & AIR ACT

Role of regulatory bodies & Local bodies-CPCB-TWAD Board- CMWSSB etc - Case Studies related to Effective Water Management - National concern for environment: Important environmental protection acts in India – water, air (prevention and control of pollution) act.

COURSE OUTCOMES:

On completion of the course, student will be able to

CO1 – Understand the segregation and 3R from the solid waste.

CO2 – Perform basic design of the unit operations and processes that are used in sewage treatment.

CO3 – Analysis of water quality criteria and standards and their relation to public health.

CO4 – Study on health impacts and its preventive measures.

CO5 – Understand about the various boards for water and air acts.

CO6 – Understand the prevention and control of water and air pollution acts.

TEXT / REFERENCES BOOKS:

1. Khan, I. H., & Ahsan, N. (2019). Textbook of solid waste management. New Delhi: Satish Kumar Jain for CBS Publisher and Distributors.
2. Mantell C.L., (1975), “Solid Waste Management”, John Wiley.
3. “Wastewater Engineering - Treatment and Reuse”, Metcalf and Eddy Inc., (2012), 4th Edition, Tata McGraw Hill Publishing Co. Ltd., New Delhi.
4. Viessman Jr, Hammer J. M, Perez, E.M, and Chadik, P. A, Water Supply and Pollution Control, PHI Learning, New Delhi, 2009
5. CPHEEO (2016). Manual on Municipal Solid Waste Management, Central Public Health and Environmental Engineering Organisation, Ministry of Urban Development, Govt. of India, New Delhi.

Name List

SCIA4002 Public Health Engineering

S.No	Register Number	Name of the student
1	40120016	BHARTI SINGH

SMEA4002	WIND AND SOLAR ENERGY	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand the fundamentals of wind and solar energy and its conversion system
- To study the various types of wind machines and to analyze its performance.
- To study the radiation principles with respective solar energy estimation.
- To discuss about solar thermal technologies and its applications.
- To learn about PV technology principles and understand the various techniques of various solar cells.

UNIT1 WIND ENERGY FUNDAMENTALS AND WIND MEASUREMENTS**9Hrs.**

Introduction: Scope of wind power potential in India Wind Energy Basics, Wind Speeds and scales, Terrain, Roughness, Wind Mechanics, Power Content, Classification of wind turbines, Atmospheric Boundary Layers, Turbulence. Instrumentation for wind measurements, Wind data analysis, tabulation, Wind resource estimation, Betz's Limit, Turbulence Analysis.

UNIT2 WIND MACHINES**9Hrs.**

Types of wind machines, analysis of aero dynamic forces acting on blade, performance, generating systems, energy storage –Applications.

UNIT3 SOLAR RADIATION AND COLLECTORS**9Hrs.**

Solar angles – Sun path diagrams – Radiation – extra terrestrial characteristics - measurement and estimation on horizontal and tilted surfaces - flat plate collector thermal analysis - testing methods- evacuated tubular collectors – concentrator collectors – classification - design and performance parameters - tracking systems - compound parabolic concentrators - parabolic trough concentrators-concentrators with point focus-Heliostats–performance of the collectors.

UNIT4 SOLAR THERMAL TECHNOLOGIES**9Hrs.**

Principle of working, types, design and operation of solar heating and cooling systems – Thermal Energy storage systems –Solar Desalination–Solar cooker: domestic, community–Solar pond–Solar drying.

UNIT5 SOLAR PHOTO VOLTAIC SYSTEM DESIGN AND APPLICATION**9Hrs.**

Semiconductor–properties-energy levels-basic equations of semiconductor devices physics. Solar cells-p-n junction-Solar cell array system analysis and performance prediction - solar cell array design concepts - PV system design – design process and optimization - detailed array design - variation of efficiency with band-gap and temperature – efficiency measurements - high efficiency cells – Solar thermo-photovoltaic - System installation - operation and maintenance – field experience-PV market analysis and economics of SPV systems

Max.45Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

CO1-Understand the basic fundamentals of wind energy and measurements.

CO2-Appreciate the need of Wind Energy and the components used in energy generation and know the classifications

CO3-To explain the technical and physical principles of solar cells and solar collectors.

CO4-Describe the use of solar energy and the components used in the energy production with respect to applications

CO5-To understand the application and design of photo voltaic system.

CO6-Compare Solar, Wind energy systems, their prospects, Advantages and limitations

TEXT / REFERENCE BOOKS

- 1 Vaughn Nelson, Kenneth Starcher, Wind Energy: Renewable Energy and the Environment (Taylor & Francis Series in Energy and the Environment) 3rd Edition, Oct 31, 2018
- 2 Dylan Carter, Renewable Energy: An Introduction, 2018.
- 3 Soteris A. Kalogirou, Solar Energy Engineering process and systems. Publisher: Academic Press, 2014
- 4 Dan Chiras, Solar Electricity Basics: A Green Energy Guide, Publisher: New Society Publishers, 2010.
- 5 Angèle Reinders, Pierre Verlinden, and Photovoltaic Solar Energy: From Fundamentals to Applications, 2017.
- 6 James F. Manwell, Jon G. McGowan, Wind Energy Explained: Theory, Design and Application, 2010

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max.Marks:100****Exam Duration:3Hrs.****PART A :10 Questions of 2marks each- No choice****20Marks****PART B : 2 Questions from each unit of internal choice; each carrying 16marks****80Marks**

Name List

SMEA4002 Wind and Solar Energy

S.No	Register Number	Name of the student
1	40120033	GUNNAM SMARAN

SMEA4001	RESOURCE MANAGEMENT TECHNIQUES	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To Understand importance of optimization of industrial process management
- To solve problems in linear programming and Integer programming
- To develop in a student efficient and effective deployment of an organization's resources when they are needed
- To analyze and appreciate variety of performance measures for various optimization problems

UNIT1 INTRODUCTION AND LINEAR PROGRAMMING**9Hrs.**

Operations Research (OR)- Nature – Characteristics – Phases - Role of OR in Decision making - Outline of OR Models
Linear Programming–Formulation of P problems –Solution by graphical method, simplex method, Big Methods.

UNIT2 TRANSPORTATION AND ASSIGNMENT MODEL**9Hrs.**

Transportation problem–Initial Basic feasible solution–North west corner method, Least Cost method, Vogel's approximation method – Test for optimality–MODI method. Assignment problems- Hungarian assignment models–Travelling salesman problems

UNIT3 RESOURCE SCHEDULING AND NETWORK ANALYSIS**9Hrs.**

Problem of Sequencing – Problem with N jobs and 2 machines N Jobs 3 machines N Jobs and m machines and 2 Jobs machines (Graphical method). Project Management -Basic concepts–Network construction and scheduling Critical Path Method (CPM) & Program evaluation review technique (PERT) and resource leveling by network techniques, time – Cost tradeoff.

UNIT4 INVENTORY CONTROL**9Hrs.**

Inventory Control–Various Types of inventory models–deterministic inventory models–Production model, Purchase model–with and without shortage–Economic Order Quantity (EOQ)–Buffer stock–Shortage quantity, Probabilistic inventory models–Quantity Discount and Price Breaks

UNIT5 QUEUEING THEORY AND REPLACEMENT MODELS**9Hrs.**

Queueing theory – Poisson arrivals and exponential service times, Single channel models only, Replacement policy for items whose maintenance cost increases with time- Consideration of time value of money - Replacement policy- Individual, Group replacement of items that fail completely and suddenly.

Max.45Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1-Formulate the linear programming problems.
- CO2-Analyse transportation and assignment problems.
- CO3-Develop the scheduling systems.
- CO4-Analyse CPM and PERT methods.
- CO5-Describe the different inventory models.
- CO6-Design the Queueing theory and examine the replacement model.

TEXT/REFERENCE BOOKS

- 1 K. Malik, S.K. Yadav, S.R. Yadav, Optimization Techniques. I. International Publishing House Pvt. Ltd; First Edition edition, 2013.
- 2 PK Gupta, D. S. Hira Operations Research. S. Chand seventh revised edition, 2014.
- 3 Sharma S. D., Operation research Theory, Methods and Application, 17th Edn., Kedar Nath Ram Nath Publication, 2010.
- 4 Nita H. Shah, Ravi M. Gor & Hardik Soni, Operation research, 4th Edn., PHI, 2010.
- 5 Edwin K. P. Chong & Stanislaw H. Zak, "An Introduction to Optimization" Wiley India, 2017.
- 6 Mohan, Kusum Deep, Optimization Techniques. New Age Science, 2009.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max. Marks: 100****Exam Duration: 3Hrs.****PART A:** 10 Questions of 2 marks each – No choice**20 Marks****PART B:** 2 Questions from each unit of internal choice, each carrying 16 marks**80 Marks**

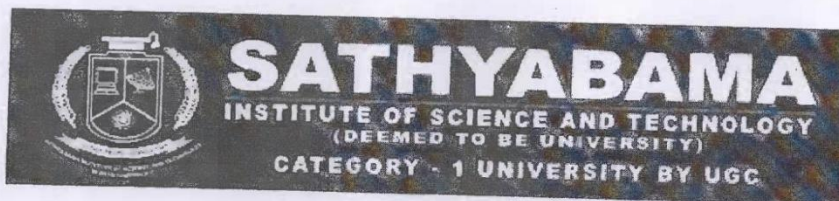
SMEA4001 Resource Management Techniques

S.No	Register Number	Name of the Student
1	40120043	KARRI DUNDY NAGAVEERA SAIPRANAY
2	40120114	NARAMAMIDI SURYA TARUNJEE

Name List

SECA4007 Real Time System Design

S.No	Register Number	Name of the Student
1	40120021	CHERUKU NITHESH REDDY
2	40120042	KALVA POOJITHA



SCHOOL OF COMPUTING
DEPARTMENT OF INFORMATION TECHNOLOGY
STUDENT CIRCULAR 2021-2025 BATCH

10.05.2023

This is to inform you that it is mandatory to select one CBCS subjects for the V Semester of Academic year 2023-2024 based on your area of interest. You can select one of the following subjects.

List of CBCS

1. SBTA4001 Biology for Engineers
2. SCSA3001 Data Mining and Data Warehousing
3. SECA4002 Deep Learning Neural Networks
4. SCIA4001 Disaster Management
5. SECA4004 eHealth
6. SEEA3028 Electric Vehicles
7. SECA3019 Embedded Processors
8. SECA4005 Industrial Internet of Things
9. SCHA3010 Industrial Safety and Hazard Analysis
10. SCSA3091 Internet of Things
11. SBMA4006 Medical Optics and Laser Application
12. SCSA3091 Society 5.0
13. SMEA4002 Wind and Solar Energy

Confirm the CBCS subject through the following Google form on or before 29.05.2023

https://docs.google.com/forms/d/1hGXTrtvUryKh47n3SaUtNwWE-FoiM2IeLk_pbtMmrOo/edit?usp=sharing_eil_se_dm&ts=66750fe3

HOD/IT

Department of Information Technology
Sathyabama Institute of Science and Technology

SBTA4001	BIOLOGY FOR ENGINEERS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVE

- To introduce the basic knowledge of biology which will enable students to integrate biology with varied engineering concepts.

UNIT1 EVOLUTION AND CLASSIFICATION**9Hrs.**

Darwinian evolution & molecular perspective; Introduction to phylogeny - Classification systems in biology, Five kingdom classification, major groups and principles of classification in each kingdom. Systematic and binomial system of nomenclature.

UNIT2 GENETICS**9Hrs.**

The cell concept, structure of prokaryotic, eukaryotic cells, plant cells and animal cells, Structure and function of cell membrane, cell organelles and their function. Tissues in animals and plants, Morphology, anatomy and functions. Concepts of alleles and genes, Mendelian Experiments, Cell cycle (Elementary Idea), mitosis and meiosis, techniques to study mitosis and meiosis.

UNIT3 BIOMOLECULES**9Hrs.**

Biomolecules - classification, salient features - biological significance - carbohydrates, proteins and amino acids- lipids and fats- nucleic acids-vitamins-Enzymes.

UNIT4 BIOTECHNOLOGY**9Hrs.**

Transgenic plants and animals-stem cell and tissue engineering-bioreactors-biopharming-recombinant vaccines-cloning-drug discovery-biological neural networks – bioremediation – biofertilizer – biocontrol biofilters – biosensors - biopolymers-biomaterials–biochips-biomedical instrumentation.

UNIT5 MICROBIOLOGY**9Hrs.**

Brief history of microbiology, Types of microorganisms, Basic idea of domain bacteria, proteobacteria, non-proteo bacteria Gram positive and Gram negative bacteria, lichens, algae, protozoa, helminths, viral structures, viral multiplication, Role of microorganisms in the production of industrial chemicals and pharmaceuticals.

Max.45Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

CO1-Describe the major discoveries in biological sciences

CO2-To understand the types and structures of different types of biomolecules in living systems

CO3-Convey the classification of living beings and its structure and functions.

CO4-Analyze the processes of transcription and translation in both prokaryotes and eukaryotes at molecular level.

CO5-Understand the different classification of microorganism

CO6-Explain the importance of microorganism in industry

TEXT/REFERENCE BOOKS

1. Biology: A global approach: Campbell, N.A.; Reece, J.B.; Urry, Lisa; Cain, M.L.; Wasserman, S.A.; Minorsky, P.V.; Jackson, R.B. Pearson Education Ltd.
2. Outlines of Biochemistry, Conn E.E., Stumpf P.K., Bruening G., Doi R.H., John Wiley and Sons.
3. Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M. W. H. Freeman and Company
4. Molecular Genetics (Second edition), Stent, G.S.; and Calender, R.W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher
5. Microbiology, Prescott, L.M.J.P. Harley and C.A. Klein 1995. 2nd Edition Wm, C. Brown Publishers

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max.Marks:100****Exam Duration:3Hrs.****PART A:** 10 Questions of 2 marks each - No choice**20 Marks****PART B:** 2 Questions from each unit of internal choice; each carrying 16 marks**80 Marks**

Name list

SBTA4001 Biology for Engineers

S.No	Register Number	Name of the student
1	41120076	JEGADEESH K
2	41120078	JOHNSON JOTHI.S
3	41120082	JUDITH SHALOM JOY.J
4	41120092	KEERTHANA. C
5	41120104	MADHULIKA.V
6	41120114	MONICA SRI

SCSA3001	DATA MINING AND DATA WAREHOUSING	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- Identify the scope and necessity of Data Mining & Warehousing for the society.
- Describe various Data Models and Methodologies in Data Warehousing.
- To understand various Tools and techniques in Data Mining.
- To learn how to analyze the data, identify the problems and choose the relevant algorithms.
- To assess the Pros and Cons of various algorithms and analyze their behavior on real datasets.

UNIT1 DATA**9Hrs.**

Introduction - Steps in KDD - System Architecture – Types of data - Data mining functionalities - Classification of data mining systems - Integration of a data mining system with a data warehouse - Issues - Data Preprocessing - Data Mining Application

UNIT2 DATA WAREHOUSING**9Hrs.**

Data warehousing components - Building a data warehouse - Multi Dimensional Data Model - OLAP Operation in the Multi-Dimensional Model - Three Tier Data Warehouse Architecture - Schemas for Multi-dimensional data Model – Online Analytical Processing (OLAP) - OLAP Vs OLTP Integrated OLAP and OLAP Architecture

UNIT3 ASSOCIATION RULE MINING**9Hrs.**

Mining frequent patterns - Associations and correlations - Mining methods - Finding Frequent itemset using Candidate Generation – Generating Association Rules from Frequent Item sets - Mining Frequent items without Candidate Generation - Mining various kinds of association rules - Mining Multi-Level Association Rule - Mining Multi Dimensional Association Rule - Mining Correlation analysis - Constraint based association mining.

UNIT4 CLASSIFICATION AND PREDICTION**9Hrs.**

Classification and prediction - Issues Regarding Classification and Prediction - Classification by Decision Tree Induction - Bayesian classification - Baye's Theorem - Naïve Bayesian Classification - Bayesian Belief Network - Rule based classification - Classification by Backpropagation - Support vector machines - Prediction - Linear Regression

UNIT5 CLUSTERING, APPLICATIONS AND TRENDS IN DATA MINING**9Hrs.**

Cluster analysis - Types of data in Cluster Analysis - Categorization of major clustering methods - Partitioning methods - Hierarchical methods - Density-based methods - Grid-based methods - Model based clustering methods - Constraint Based cluster analysis - Outlier analysis - Social Impacts of Data Mining - Case Studies: Mining WWW - Mining Text Database - Mining Spatial Databases

Max. 45Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

CO1-Assess Raw Input Data and process it to provide suitable input for a range of datasets.

CO2-Design and Model a Data Warehouse.

CO3-Discover interesting patterns from large amount of data.

CO4-Design and Deploy appropriate Classification Techniques.

CO5-Cluster high dimensional Data.

CO6-Apply suitable data mining techniques for various real time applications.

TEXT/REFERENCE BOOKS

1. Jiawei Han and Micheline Kamber, "Data Mining Concepts and Techniques", 2nd Edition, Elsevier, 2007
2. Alex Berson and Stephen J. Smith, "Data Warehousing, Data Mining and OLAP", Tata McGraw Hill, 2007.
3. Pang-Ning Tan, Michael Steinbach and Vipin Kumar, "Introduction to Data Mining", Person Education, 2007.
4. K.P. Soman, Shyam Diwakar and V. Ajay, "Insight into Data Mining Theory and Practice", Easter Economy Edition, Prentice Hall of India, 2006.
5. G.K. Gupta, "Introduction to Data Mining with Case Studies", Easter Economy Edition, Prentice Hall of India, 2006.
6. Daniel T. Larose, "Data Mining Methods and Models", Wiley-Interscience, 2006.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max.marks:100****Exam Duration:3Hrs.****PART A:** 10 Questions of 2 marks each – No choice**20 Marks****PART B:** 2 Questions from each unit of internal choice, each carrying 16 marks**80 Marks**

Name List

SCSA3001 Data Mining and Data Warehousing

S.No	Register Number	Name of the Student
1	41120007	M Afiya
2	41120010	AKALYA S
3	41120011	AKASH C
4	41120019	ANBUNITHI.E
5	41120029	ARUN KUMAR K
6	41120033	ASHWIN.MR
7	41120035	AYUSHI KAREENA
8	41120040	BENITA.S
9	41120042	B BINU PRABHU
10	41120045	CAROLINE PRICY.G
11	41120047	CHINTALAPUDI SRIRAMA GOKULA
12	41120048	CHUKKA SAIPOOJA PRANATHI
13	41120051	V Deepika
14	41120053	DHARSHANA L
15	41120054	DHARSHINI
16	41120056	B. DINIYA
17	41120059	ELVIS.N
18	41120065	HARISH .G
19	41120066	HARISH KAARTHICK R
20	41120069	HEMA CHANDRAN. S
21	41120070	HENNY STEPHEN
22	41120073	JAMES EDVIN S
23	41120079	JONNA MOHIT
24	41120080	JOSHINAVICTOR J
25	41120083	KAMALESH
26	41120089	A.KAVISELVAN
27	41120094	KIRAN
28	41120099	KUMARA VADIVEL.P
29	41120100	LEOSHARLIN JHONSON
30	41120102	LOKESHRAJ J
31	41120103	MADALA GOPI KRISHNA
32	41120106	MAGESHWARAN K

33	41120110	MIRUDHU BASHIN I.B.S
34	41120111	MITRA SRI S
35	41120113	MOHAN C
36	41120115	MUKESH U
37	41120125	NAVEEN BHARATHI. C.A.R
38	41120127	NAVEEN KUMAR T
39	41120128	NAVEEN KUMAR.P
40	41120131	NIMMAGADDA SRI VENKATA KAMESH
41	41120132	NITHISH .A.V
42	41120134	PADMANABHUNI N V M SUHAS KUMAR

DEEP LEARNING NEURAL NETWORK

UNIT I INTRODUCTION TO DEEP LEARNING

Introduction to machine learning - Linear models (SVMs and Perceptron's, logistic regression)- Introduction to Neural Nets: What are a shallow network computes- Training a network: loss functions, back propagation and stochastic gradient descent- Neural networks as universal function approximates.

UNIT II INTRODUCTION TO DEEP LEARNING:

History of Deep Learning- A Probabilistic Theory of Deep Learning- Backpropagation and regularization, batch normalization- VC Dimension and Neural Nets- Deep Vs Shallow Networks Convolutional Networks- Generative Adversarial Networks (GAN), Semi-supervised Learning

UNIT III DIMENSIONALITY REDUCTION

Linear (PCA, LDA) and manifolds, metric learning -Auto encoders and dimensionality reduction in networks - Introduction to Convnet -Architectures – AlexNet, VGG, Inception, ResNet - Training a Convnet: weights initialization, batch normalization, hyperparameter optimization.

UNIT IV DIMENSIONALITY REDUCTION

Optimization in deep learning– Non-convex optimization for deep networks- Stochastic Optimization Generalization in neural networks Spatial Transformer Networks- Recurrent networks, LSTM Recurrent Neural Network Language Models- Word-Level RNNs & Deep Reinforcement Learning - Computational & Artificial Neuroscience

UNIT V APPLICATIONS OF DEEP LEARNING

Imagenet- Detection-Audio WaveNet-Natural Language Processing Word2Vec - Joint Detection BioInformatics- Face Recognition- Scene Understanding- Generating Image Captions

Name list

SECA4002 Deep Learning Neural Networks

S.No	Register Number	Name of the student
1	41120037	BANDARI MANIKANTA
2	41120121	NARAN PREM KUMAR REDDY
3	41120181	K Thangam

DISASTER MANAGEMENT**UNIT 1 INTRODUCTION TO DISASTERS 12 Hrs.**

Natural resources and its importance - understanding on fragile eco-system - characteristics and types of Disasters, Geological and Mountain Area Disasters: Earthquakes, Volcanic eruption, landslides - Wind and Water Related Natural Disaster: Floods, Droughts, Cyclones, Tsunamis - Man Made Disasters: Forest fires, Nuclear, Biological and Chemical disaster - Causes and effects - Disaster Profile of India - Disaster Management cycle.

UNIT 2 DISASTER PREPAREDNESS 8 Hrs.

Disaster management, mitigation and preparedness: Disaster Preparedness for People and Infrastructure, Community based Disaster Preparedness Plan - Roles & Responsibilities of Different Agencies and Government: Education, Communication & Training, Central, State, District and local administration, Armed Forces, Police, Para Military Forces, International Agencies, and NGO's - Disaster Mitigation: Strategies, Emerging Trends, Mitigation management and Role of Team and Coordination.

UNIT 3 REHABILITATION, RECONSTRUCTION AND RECOVERY 10 Hrs.

Damage assessment – Development of Physical and Economic Infrastructure - Nature of Damage to Houses and Infrastructure due to Disasters - Funding Arrangements for Reconstruction - Monitoring and Evaluation of Rehabilitation Work: Training, Rescue and planning the rescue activities and rehabilitations - Role of Government and NGO's - Participative Rehabilitation Process: Case Studies

UNIT 4 DISASTER RESPONSE AND DISASTER MANAGEMENT 8 Hrs.

Disaster Response Plan: Communication, Participation and Activation of Emergency Preparedness Plans, Search, Rescue, Evacuation and other logistic management - Human Behaviour and Response Management: Psychological Response and Psychological Rehabilitation, Trauma and Stress Management, rumour and Panic Management, Medical and Health Response to Different Disasters - Relief Measures: Minimum Standard of Relief, essential components of Relief Management, and funding.

UNIT 5 RISK ASSESSMENT AND VULNERABILITY ANALYSIS 7 Hrs.

Hazard, Risk and Vulnerability: Concept and Relationship: Disaster Risk Reduction, People Participation in Risk Assessment - Vulnerability Analysis, Vulnerability Identification - Vulnerability profile of India - Strategies for Survival - Social Infrastructure for Vulnerability Reduction.

Name list

Disaster Management

S.No	Register Number	Name of the Student
1	41120018	ANAND SAI SATHVIK YELURI
2	41120021	ANKIT PRAJAPATI
3	41120025	archishaw
4	41120027	ARGHYA CHANDRA
5	41120057	DIVYA DHARSHINI E
6	41120084	KAMILATH RIFKA
7	41120095	KISHORE S
8	41120118	NAMAN RAJ
9	41120133	NIVENTHAN D
10	41120138	K POOJITHA

E HEALTH**I- CHEMICAL AND OPTICAL TRANSDUCERS**

PH, PO₂, PCO₂, HCO₃ electrodes, Ion sensor, Anion and Cation sensor, Liquid and solid ion exchange membrane electrode, Enzyme electrode, Principle of fiber optic cable, fiber optic sensors, Photo acoustic sensors, PPG sensors.

II- DIGITAL BIOPOTENTIAL AMPLIFIER

Basic Parameters of Bio potential Amplifier design; Half cell potential, Reference electrodes, polarization effects, Polarizable and non polarizable electrodes, Micro electrodes, Equivalent Circuits Simplified recording of biopotential; Low-Polarization surface electrodes; Single ended bio potential amplifiers; Ultrahigh impedance electrode buffer arrays; Pastless bio potential electrodes.

III SIGNAL CONDITIONING AND MEDICAL SAFETY.

Signal Conditioning circuits- Characteristics of Amplifiers, Differential Amplifiers, Filters, Bridge circuits, A/D Converters. Medical Safety: Electromagnetic Interference Requirements; Transient Voltage protection; Sources of Conducted and radiated interference.

IV TELEMEDICINE AND HEALTH

History and Evolution of telemedicine, Functional diagram of telemedicine system, Tele health, Global and Indian scenario, Ethical and legal aspects of Telemedicine -Confidentiality, Social and legal issues, Safety and regulatory issues, Videoconferencing Real -time Telemedicine integrating doctors / Hospitals. Administration of centralized medical data, security and confidentiality of medical records and access control, Cyber laws related to telemedicine.

V- TELERADIOLOGY, HEALTH INFORMATICS AND APPLICATIONS

Tele radiology: Definition, Basic parts of teleradiology system: Image Acquisition system Display system, Tele pathology, multimedia databases, color images of sufficient resolution, Dynamic range, spatial resolution, compression methods, Interactive control of color, Medical information storage and management for telemedicine - patient information medical history, test reports, medical images diagnosis and treatment. Hospital information system - Doctors, paramedics, facilities available. Pharmaceutical information system. Introduction to robotics surgery, telesurgery. Telecardiology, Teleoncology, Telemedicine access to health education and self care

Name list

SECA4004 E Health

S.No	Register Number	Name of the Student
1	41120008	AJAY SRINIVASAN H
2	41120013	AKASH P
3	41120081	JOYCE DAVID

Name list

SEEA3028 Electric Vehicles

S.No	Register Number	Name of the Student
1	41120088	KASA SAI MANIKANTA
2	41120119	NAMBU AAKASH NARAYANAN

SECA3003	EMBEDDED PROCESSORS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand the architecture of PIC, ARM and DSP processor.
- To familiar is the students in writing assembly programming and interfacing with Peripherals using PIC Microcontroller.
- To understand the difference between Microcontroller and DSP processor.

UNIT1 INTRODUCTION TO PIC MICRO CONTROLLERS**9Hrs.**

Introduction to PIC – Compare Von Neumann architecture and Harvard architecture, RISC Vs CISC - Features of PIC - Architecture of PIC16F8XX-Pin Configuration-Addressing modes-Instruction set-Simple Programs.

UNIT2 PI CON CHIP PERIPHERALS**9Hrs.**

Memory-Core SFR-Interrupts-I/O Ports-Timers-CCP modules-Capture Mode-Compare Mode-PWM Mode-Serial communication module-USART-SPI interface-I2C interface Analog Comparator, ADC.

UNIT3 APPLICATIONS USING PIC**9Hrs.**

Programming Languages-Compilers-Assemblers-Directives-MPLAB IDE-Interfacing-Switches & Push buttons-LEDs -seven segment displays-LCD-Key pad Interfacing, Timer applications – Case study Temperature monitoring System- Case study Digital Clock.

UNIT4 ARM PROCESSOR**9Hrs.**

Architecture of ARM Controller– Registers, Pipeline organization 3stage & 5stage, Thumb mode of operation-D/A and A/D converter, sensors, actuators and their interfacing – Case study- Temperature sensing, Light sensing, Introduction to Internet of Things, smart home concepts.

UNIT5 DSP PROCESSORS**9Hrs.**

Introduction - fixed and floating point –Core architecture of ADSP218X- Arithmetic Logic Unit (ALU) –Multiplier and Accumulator (MAC) Unit- Barrel Shifter-Data Address Generator (DAG)- Program Sequencer- Functional Diagram of TMS320C54XX.

Max:45Hrs.**COURSE OUTCOME**

On completion of the course, student will be able to

CO1-Understand in architecture and function of PIC microcontrollers.

CO2-Explain the discussion of on chip peripherals of PIC microcontrollers.

CO3-Do assembly and C program exercise with various I/O modules.

CO4-Understand the architecture of ARM.

CO5-Understand the need of DSP processor for signal processing applications and its architecture.

CO6-Design real-time application using PIC Microcontroller.

TEXT/REFERENCE BOOKS

1. Danny Causey, Rolin McKinlay, Muhammad Ali Mazidi, "PIC Microcontroller and Embedded Systems: Using assembly and C for PIC18", 1st Edition, Micro Digital Edition; 2nd Edition, 2016.
2. Andrew Sloss, Dominic Symes, Chris Wright, "ARM System Developer's Guide: Designing and Optimizing System Software", Elsevier, 1st Edition, 2004.
3. F. Vahid and T. Givargis, "Embedded System Design: A Unified Hardware/Software Introduction", Wiley India Pvt. Ltd., 2002.
4. B Venkataramani MBhaskar, "Digital Signal processors Architecture, Programming and Applications", Tata McGraw Hill, 2nd Edition, 2002.

USEFUL LINKS

1. <https://www.mikroe.com/ebooks/pic-microcontrollers-programming-in-c>
2. www.analog.com.
3. www.ti.com.
4. www.dspguide.com.
5. <https://swayam.gov.in/courses/5424-jan-2019-embedded-system-design-with-arm>

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max.Marks:100****Exam Duration:3Hrs.****PART A:** 10 Questions of 2 marks each - No choice**20 Marks****PART B:** 2 Questions from each unit of internal choice; each carrying 16 marks**80 Marks**

Name list

SECA3019 Embedded Processor

S.No	Register Number	Name of the Student
1	41120034	AVINASH KUMAR GUPTA
2	41120061	C. GOKUL

INDUSTRIAL INTERNET OF THINGS:**UNIT 1 INTRODUCTION TO INDUSTRIAL INTERNET**

Innovation and IIoT – Intelligent Devices – Industrial Internet – Health care – Oil and Gas Industry – Smart Office – Logistics – IoT Innovations in Retail.

UNIT 2 TECHNICAL AND BUSINESS INNOVATORS OF INDUSTRIAL INTERNET

Miniaturization – Cyber Physical Systems – Wireless technology – IP Mobility – Network Functionality Virtualization – Cloud and Fog - Big Data and Analytics – M2M Learning and Artificial Intelligence.

UNIT 3 IIOT REFERENCE ARCHITECTURE

Industrial Internet Architecture Framework – Functional Viewpoint – Operational Domain, Information Domain, Application Domain, Business Domain – Implementation View point – Architectural Topology – Three Tier Topology – Data Management

UNIT 4 INDUSTRIAL INTERNET SYSTEMS

Introduction-Proximity Network Protocols – WSN Edge Node – Legacy Industrial Protocols – RS232 Serial Communications, 40-20ma Current Loop, Field Bus Technologies – Modern Communication Protocols – Industrial Ethernet – Industrial Gateways.

UNIT 5 INDUSTRIAL INTERNET SYSTEMS

Introduction-Proximity Network Protocols – WSN Edge Node – Legacy Industrial Protocols – RS232 Serial Communications, 40-20ma Current Loop, Field Bus Technologies – Modern Communication Protocols – Industrial Ethernet – Industrial Gateways.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max.marks:100****Exam Duration:3Hrs.****PART A:** 10 Question of 2 marks each – No choice**20 Marks****PART B:** 2 Questions from each unit of internal choice, each carrying 16 marks**80 Marks**

Name List

SECA4005 Industrial Internet of Things

S.No	Register Number	Name of the Student
1	41120086	KARTHIK.A
2	41120087	G.KARHIK
3	41120117	MURPHY SURYA. R
4	41120123	NARESH. N
5	41120126	NAVEEN KUMAR.S

Name list

SCHA3010 Industrial Safety and Hazard Analysis

S.No	Register Number	Name of the Student
1	41120023	ARAVIND GURUSAMY
2	41120044	CALVIN NESAN S V
3	41120060	GODWIN VINO.I
4	41120063	HARIHARAN SENTHILKUMAR

SITA3008	INTERNET OF THINGS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand the concepts of Internet of Things
- To identify the various elements of an IoT System.
- To understand the various means of communication from Node/Gateway to Cloud Platforms.
- To identify types of data analytics and data visualization tools.
- To make students aware of security concerns and challenges while implementing IoT solutions.

UNIT1 INTRODUCTION TO IOT**9Hrs.**

Introduction to IoT, Current technological trends and future prospects, - Evolution of IoT, Business Scope, Relation with embedded system,- Basic Architecture of an IoT, From M2M to IoT, M2M towards IoT, IoT Value Chains, An emerging industrial structure for IoT.

UNIT2 ELEMENTS OF IOT**9Hrs.**

Application Sensors & Actuators - Edge Networking (WSN) – Gateways - IoT Communication Model – WPAN & LPWA, Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards, Wearable Development Boards.

UNIT3 COMMUNICATION AND CONNECTIVE TECHNOLOGIES**9Hrs.**

IoT Communication Model, Cloud computing in IoT, IoT in cloud architecture, Logging onto cloud, Selecting and Creating cloud service, cloud based IoT platforms-IBM Watson, Google cloud.

UNIT4 DATA ANALYTICS AND IOT PLATFORM**9Hrs.**

Big Data Analytics, Apache Hadoop, Using Hadoop MapReduce for Batch Data Analysis, Apache Storm, Data Visualization, Visualization tools for IoT.

UNIT5 HANDS-ON PROJECTS**9Hrs.**

Industry 4.0 concepts. Sensors and sensor node and interfacing using any Embedded target boards (Raspberry Pi/ Intel Galileo/ARM Cortex/ Arduino), DIY Kits – Soil moisture monitoring, Weather monitoring, Air quality Monitoring, Movement Detection.

Max.45Hrs.**COURSE OUTCOMES**

On Completion of the course, student will be able to

CO1-To learn and understand the technology and current trends in Internet of things

CO2-To understand the various elements of IoT system and hardware devices.

CO3-To learn the programming languages and platforms for building IoT applications.

CO4-To understand the cloud computing and its relevance for developing IoT applications.

CO5-To design and implement IoT applications that manages bigdata with data analytics and visualization tools.

CO6-To implement hands-on projects using an appropriate software and hardware devices in various applications.

TEXT / REFERENCE BOOKS

1. The Internet of Things: Applications and Protocols, Wiley publications. Author(s): Oliver Hersent, David Boswarthick, Omar Elloumi.
2. Architecting the Internet of Things, Springer publications. Author(s): Dieter Uckelmann, Mark Harrison, Florian Michahelles.
3. Internet of Things with Arduino Cookbook, Packt Publications. Author(s): Marco Schwatz.
4. Internet of Things and Data Analytics, Wiley Publications.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max.marks:100****Exam Duration:3Hrs.****PART A:** 10 Questions of 2 marks each – No choice**20 Marks****PART B:** 2 Questions from each unit of internal choice, each carrying 16 marks**80 Marks**

Name List

SITA3008 Internet of Things

S.No	Register Number	Name of the Student
1	41120001	D. AATHI SIVABALAN
2	41120005	ADDANKI RAMYA SRI
3	41120012	AKASH M
4	41120014	S AKASH
5	41120017	AMIRTHASRI.V
6	41120020	ANGELIN E TANYA
7	41120022	ANTHUS JHONES A
8	41120024	ARAVIND T
9	41120026	S.B. ARCHITH
10	41120036	BALACHANDRA KUMAR S
11	41120041	BERYL CYINTHIA JASIEL.B
12	41120049	DEEPANRAJ
13	41120068	S.HASHWATH VELAN
14	41120091	V.KAVIYA NIVASHINI
15	41120093	KEERTHANA ANUSHA.C
16	41120096	KOLLA UDAY
17	41120097	KOTERU AMRUTHA
18	41120105	R. MADHUMITHA
19	41120120	NANDYALA DILEEP CHANDRA SRINIVAS
20	41120122	NARESH M
21	41120124	NAULLA SATHYAVASHIST
22	41120129	NAVITH GURUSAN S
23	41120135	PANNEM KUSHAL
24	41120136	PAVEETHRA RR
25	41120137	PEDDIBHOTLA SARVAGNYA

SBMA4006	MEDICAL OPTICS AND LASER APPLICATIONS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To introduce the concept of optical properties of tissues and their measurements.
- To have knowledge on Lasers used in medicine.
- To analyse the applications of Lasers for diagnosis, surgery and therapy.

UNIT1 OPTICAL PROPERTIES**9Hrs.**

Refraction, Scattering, Absorption, Instrumentation for absorption, Scattering and emission measurements, Light transport inside the tissue, Tissue properties Laser tissue Interaction-Chemical-Thermal Electromechanical – Photo banalities processes.

UNIT2 LASERS USED IN MEDICINE**9Hrs.**

Types of laser, construction and working principle of solid state laser, Atomic laser, Molecular laser, Liquid dye laser, Diode laser, Solid state dye laser

UNIT3 SURGICAL APPLICATIONS OF LASERS**9Hrs.**

Lasers in ophthalmology-Dermatology-Types of lasers used in dermatology-Dentistry-Types of Dental lasers-Urology-Surgical therapy in urology-Otolaryngology-Tissue welding-Specifications

UNIT4 NON-THERMAL DIAGNOSTIC APPLICATIONS**9Hrs.**

Optical coherence tomography, Elastography, Laser Induced Fluorescence (LIF)-Imaging, FLIM Raman Spectroscopy and Imaging, FLIM-Holographic and speckle application of lasers in biology and medicine.

UNIT5 THERAPEUTIC APPLICATIONS**9Hrs.**

Photo therapy, Photodynamic therapy (PDT)-Principle and mechanism-Oncological and non-oncological applications of PDT-Bio stimulation effect-applications-Laser Safety Procedures.

Max.45Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

CO1-Understand the basic concepts of optical properties and their interaction with the tissues

CO2-Acquire knowledge about the various kinds of Lasers used in medicine.

CO3-Apply the lasers techniques in Surgery

CO4-Analyse the application of Laser in diagnosis

CO5-Explore the Laser techniques used in therapy

CO6-Identify the use of Lasers that can be used for specific medical application

TEXT / REFERENCE BOOKS

1. Abraham Katzir, Lasers and Optical Fibers in Medicine, Academic Press Edition, 1998.
2. Tuan VoDirh, Biomedical Photonics-Handbook, CRC Press, Boca Raton, 2003.
3. G. David Baxter, Therapeutic Lasers-Theory and practice, Churchill Livingstone Publications Edition-2001.
4. Helena Jelinkova, "Lasers for medical applications: Diagnostics, Therapy and Surgery", Woodhead Publishing, 1st edition, 2013.
5. Markolf H. Neimz, "Laser tissue interactions-Fundamentals and applications", Springer, 3rd edition, 2014.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max.Marks:100****Exam Duration:3Hrs.****PART A:** 10 Questions of 2 marks each-No choice**20 Marks P****ART B:** 2 Questions from each unit of internal choice each carrying 16 marks**80 Marks**

Name List

SBMA4006 Medical Optics and Laser Application

S.No	Register Number	Name of the Student
1	41120101	LINGA PRAVIN K S
2	41120108	MANDAPAKA GANESH
3	41120109	MANOJ KUMAR K

SCSA3091	SOCIETY5.0	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand the society5.0, Cyberspace and Physical Space to solve
- To provide knowledge and overview about Bigdata, IoT and Artificial Intelligence for Society5.0.
- Discuss To understand Augmented Reality and Virtual Reality, Next Generation Sensors
- To discuss about Challenges and Technologies towards Society5.0, Security of Cyber Physical Systems
- Discuss to apply society5.0 Innovation with Future Trends with Applications

UNIT1 INTRODUCTION TO SOCIETY 5.0**9Hrs.**

Introduction –Schema of society 5.0-Characteristics of Society 5.0. Introduction to communication technologies: Artificial Intelligence – robotics - 3D Printing. People: Centric Society -Knowledge Sharing- Physical space- Cyberspace – Humanity VS Society 5.0 –Elements of Society5.0-Data Driven to Society- Modeling real world Issues.

UNIT2 EMERGING TECHNOLOGIES WITH SOCIETY5.0**9Hrs .**

Introduction to Big Data – Issues and Challenges in the traditional systems –Intelligent Data Analysis–Big Data Storage Statistical Concepts:Sampling Distributions-Re-Sampling-Prediction Error–Random Sampling–Artificial Intelligence–Foundations of AI - Intelligent agent - Types of agents - Structure - Problem solving agents -Internet of Things- Introduction to IoT- Basic Architecture of an IoT, From M2M to IoT, M2M towards IoT-Robotics- Robotics system components - Robot classification Coordinate frames-degree of freedom-dynamic stabilization of robots.

UNIT3 INTRODUCTION TO INDUSTRY4.0**9Hrs.**

Introduction-Globalization and Emerging Issues, LEAN Production Systems, Smart and Connected Business Perspective, Cyber Physical Systems and Next Generation Sensors, Augmented Reality and Virtual Reality, Artificial Intelligence, Big Data and Advanced Analysis- An emerging industrial structure for IoT -Cybersecurity in Industry 4.0-Basics of Industrial IoT. Common Issues in Industry4.0 and Society5.0.

UNIT4 CHALLENGES AND TECHNOLOGIES TOWARDS SOCIETY5.0**9Hrs.**

Overcome with Economic Development and Solution to Social Problems in Society5.0-Security of Cyber Physical Systems- Embedded and CPS security - attacks and countermeasures, authentication, confidentiality, data integrity, authorization, access control, malware attacks and counter-measures, security protocols- Social Issues in Society 5.0 - human-centered society (Society 5.0)- Sustainable Development Goals-Economic Advancement- Resolution to Social Problems.

UNIT5 INNOVATION WITH FUTURE TRENDS WITH APPLICATIONS

Mobility–HealthCare–Agriculture–Food Products–Disaster Prevention..

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1: Understand the Social Problems By A System That Highly Integrates Cyberspace and Physical Space to solve
- CO2: Get Skills for Economic Development and A Human-Centred Society that balances Economic Advancement
- CO3: Achieve a High Degree of Convergence Between Cyberspace (Virtual Space) And Physical Space (Real Space).
- CO4: Use of Emerging Technologies with Society 5.0 To Achieve More Production / Avoid Loss of Productions
- CO5: Internet and IoT, Big data for production lines to be adaptive, intelligent, and flexible enough to meet the update requests.
- CO6: Design and apply in Health Care, Agriculture, Food Products, Disaster Prevention

TEXT/REFERENCE BOOKS

1. Society5.0 A People–Centric Super–Smart Society, Hitachi–Utokyo Laboratory, Springer, 2020.
2. Society5.0 Industry of the Future Technologies Methods and Tools By Bruno Salgues, Willey, 2018
3. Stuart J. Russel, Peter Norvig, “Artificial Intelligence A Modern Approach”, 3rd Edition, Pearson Education, 2009.
4. The Internet of Things: Applications and Protocols, Wiley publications. Author(s): Oliver Hersent, David Boswarthick, Omar Elloumi., 2012.
5. McKerrow P.J. “Introduction to Robotics”, Addison Wesley, USA, 1991.

END SEMESTER EXAM QUESTION PAPER PATTERN**Max.Marks:100****Exam Duration:3Hrs.****PART A** 10 Questions of 2 marks each-No choice**20Marks****PART B:** 2 Questions from each unit with internal choice, each carrying 16 marks**80Marks**

Name List

SCSA3091 Society 5.0(CBCS)

S.No	Register Number	Name of the Student
1	41120002	ABHILASH.B
2	41120004	J V ADCHAYA
3	41120006	ADRIEL SAMUEL JEYANATH
4	41120009	AJONITHAS
5	41120028	V.S.ARUN BALAJI
6	41120031	ASHLYN TIMOTHEY
7	41120039	BAVIN A
8	41120050	DEEPIKA S
9	41120052	DHANANJEYAN S
10	41120064	HARI SANDEEP
11	41120067	HARISH PANDIAN R
12	41120112	MOHAMED IBRAHIM KHAN

SMEA4002	WIND AND SOLAR ENERGY	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand the fundamentals of wind and solar energy and its conversion system
- To study the various types of wind machines and to analyze its performance.
- To study the radiation principles with respective solar energy estimation.
- To discuss about solar thermal technologies and its applications.
- To learn about PV technology principles and understand the various techniques of various solar cells.

UNIT1 WIND ENERGY FUNDAMENTALS AND WIND MEASUREMENTS**9Hrs.**

Introduction: Scope of wind power potential in India. Wind Energy Basics, Wind Speed and scales, Terrain, Roughness, Wind Mechanics, Power Content, Classification of wind turbines, Atmospheric Boundary Layers, Turbulence. Instrumentation for wind measurements, Wind data analysis, tabulation, Wind resource estimation, Betz's Limit, Turbulence Analysis.

UNIT2 WIND MACHINES**9Hrs.**

Types of wind machines, analysis of aerodynamic forces acting on blade, performance, generating systems, energy storage – Applications.

UNIT3 SOLAR RADIATION AND COLLECTORS**9Hrs.**

Solar angles – Sun path diagrams – Radiation – extra terrestrial characteristics - measurement and estimation on horizontal and tilted surfaces - flat plate collector thermal analysis - testing methods- evacuated tubular collectors – concentrator collectors
– classification - design and performance parameters - tracking systems - compound parabolic concentrators - parabolic trough concentrators - concentrators with point focus - Heliostats – performance of the collectors.

UNIT4 SOLAR THERMAL TECHNOLOGIES**9Hrs.**

Principle of working, types, design and operation of solar heating and cooling systems – Thermal Energy storage systems – Solar Desalination – Solar cooker: domestic, community – Solar pond – Solar drying.

UNIT5 SOLAR PHOTOVOLTAIC SYSTEM DESIGN AND APPLICATION**9Hrs.**

Semiconductor – properties – energy levels – basic equations of semiconductor devices physics. Solar cells – p-n junction – Solar cell array system analysis and performance prediction - solar cell array design concepts - PV system design – design process and optimization - detailed array design - variation of efficiency with band-gap and temperature – efficiency measurements - high efficiency cells – Solar thermo-photovoltaic - System installation - operation and maintenance – field experience - PV market analysis and economics of SPV systems

Max.45Hrs.**COURSE OUTCOMES**

On completion of the course, student will be able to

- CO1-Understand the basic fundamentals of wind energy and measurements.
- CO2-Appreciate the need of Wind Energy and the components used in energy generation and know the classifications
- CO3-To explain the technical and physical principles of solar cells and solar collectors.
- CO4-Describe the use of solar energy and the components used in the energy production with respect to applications
- CO5-To understand the application and design of photovoltaic system.
- CO6-Compare Solar, Wind energy systems, their prospects, Advantages and limitations

TEXT / REFERENCE BOOKS

- 1 Vaughn Nelson, Kenneth Starcher, Wind Energy: Renewable Energy and the Environment (Taylor & Francis Series in Energy and the Environment) 3rd Edition, Oct 31, 2018
- 2 Dylan Carter, Renewable Energy: An Introduction, 2018.
- 3 Soteris A. Kalogirou, Solar Energy Engineering: Processes and Systems. Publisher: Academic Press, 2014
- 4 Dan Chiras, Solar Electricity Basics: A Green Energy Guide, Publisher: New Society Publishers, 2010.
- 5 Angèle Reinders, Pierre Verlinden, and Photovoltaic Solar Energy: From Fundamentals to Applications, 2017.
- 6 James F. Manwell, Jon G. McGowan, Wind Energy Explained: Theory, Design and Application, 2010

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max.Marks:100****Exam Duration:3Hrs.****PART A:**10 Questions of 2 mark each-No choice**20 Marks****PART B:**20 questions from each unit of internal choice; each carrying 16 marks**80 Marks**

Name list

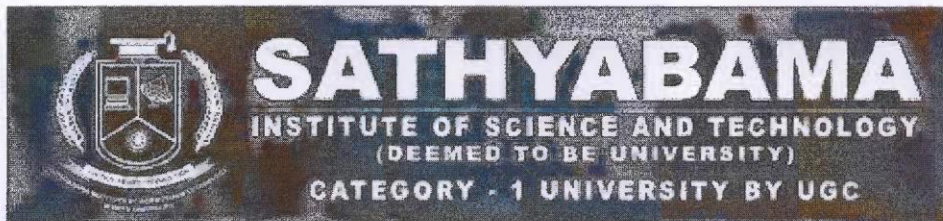
SMEA4002 Wind and Solar Energy (CBCS)

S.No	Register Number	Name of the Student
1	41120003	ABINAYA V
2	41120016	AMAY KANCHHIT
3	41120030	ARVIND B
4	41120032	ASHWANTH R
5	41120038	BARATH
6	41120043	BROMELIA.R
7	41120046	CHANDRU K
8	41120055	DILIP RAAJ
9	41120058	DOMMETI VENKAT SAI VARUN CHOWDARY
10	41120062	GOKUL RAJ N
11	41120072	INNANI SWAYAM
12	41120074	JAWAGAR SRI G
13	41120075	JEFFRE J
14	41120077	M.JENITH ASHWIN
15	41120085	KARAN
16	41120090	KAVITHA K
17	41120098	KRISHNA PATEL.M
18	41120107	MAJID FASI AHMED
19	41120116	MUKESHRAJ D
20	41120130	NEEL HIRENKUMAR MEHTA



SCHOOL OF COMPUTING DEPARTMENT OF INFORMATION TECHNOLOGY

ACADEMIC YEAR 2023-2024 ELECTIVES



SCHOOL OF COMPUTING
DEPARTMENT OF INFORMATION TECHNOLOGY

STUDENT CIRCULAR 2022-2026 BATCH

20.12.2023

This is to inform you that it is mandatory to select one elective subjects for the IV Semester of Academic year 2023-2024 based on your area of interest. You can select one of the following subjects.

List of Electives

1. SITA3008 Internet of Things
2. SITA3004 User Interface Design & Implementations

Confirm the elective subject through the following Google form on or before 25.12.2023

https://docs.google.com/forms/d/19JsKnu2Uno1MsvB0iSGWSmietHPD1kS76vTF28JtUmw/edit?usp=sharing_eil_se_dm&ts=66750589


HOD/IT

Department of Information Technology
Sathyabama Institute of Science and Technology
Chennai - 600 119.

SITA3008	INTERNET OF THINGS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand the concepts of Internet of Things
- To identify the various elements of an IoT System.
- To understand the various means of communication from Node / Gateway to Cloud Platforms.
- To identify types of data analytics and data visualization tools.
- To make students aware of security concerns and challenges while implementing IoT solutions.

UNIT 1 INTRODUCTION TO IOT

9 Hrs.

Introduction to IoT, Current technological trends and future prospects, - Evolution of IoT, Business Scope, Relation with embedded system, - Basic Architecture of an IoT, From M2M to IoT, M2M towards IoT, IoT Value Chains, An emerging industrial structure for IoT.

UNIT 2 ELEMENTS OF IOT

9 Hrs.

Application Sensors & Actuators - Edge Networking (WSN) – Gateways - IoT Communication Model – WPAN & LPWA, Overview of IoT supported Hardware platforms such as: Raspberry pi, ARM Cortex Processors, Arduino and Intel Galileo boards, Wearable Development Boards.

UNIT 3 COMMUNICATION AND CONNECTIVE TECHNOLOGIES

9 Hrs.

IoT Communication Model, Cloud computing in IoT, IoT in cloud architecture, Logging on to cloud, Selecting and Creating cloud service, cloud based IoT platforms - IBM Watson, Google cloud.

UNIT 4 DATA ANALYTICS AND IOT PLATFORM

9 Hrs.

Big Data Analytics, Apache Hadoop, Using Hadoop MapReduce for Batch Data Analysis, Apache Storm, Data Visualization, Visualization tools for IoT.

UNIT 5 HANDS-ON PROJECTS

9 Hrs.

Industry 4.0 concepts. Sensors and sensor Node and interfacing using any Embedded target boards (Raspberry Pi / Intel Galileo/ARM Cortex/ Arduino), DIY Kits – Soil moisture monitoring, Weather monitoring, Air quality Monitoring, Movement Detection.

Max. 45 Hrs.

COURSE OUTCOMES

On Completion of the course, student will be able to

- CO1 - To learn and understand the technology and current trends in Internet of things.
- CO2 - To understand the various elements of IoT system and hardware devices.
- CO3 - To learn the programming languages and platforms for building IoT applications.
- CO4 - To understand the cloud computing and its relevance for developing IoT applications.
- CO5 - To design and implement IoT applications that manages big data with data analytics and visualization tools.
- CO6 - To implement hands-on projects using an appropriate software and hardware devices in various applications.

TEXT / REFERENCE BOOKS

1. The Internet of Things: Applications and Protocols, Wiley publications. Author(s): Oliver Hersent, David Boswarthick, Omar Elloumi.
2. Architecting the Internet of Things, Springer publications. Author(s): Dieter Uckelmann, Mark Harrison, Florian Michahelles.
3. Internet of Things with Arduino Cookbook, Packt Publications. Author(s): Marco Schwatz.
4. Internet of Things and Data Analytics, Wiley Publications.

END SEMESTER EXAMINATION QUESTION PAPER
PATTERN

Max. Marks: 100**Part A:** 10 Questions of 2 marks each – No choice**Part B:** 2 Questions from each unit of internal choice, each carrying 16 marks**Exam Duration: 3 Hrs.****20 Marks****80 Marks**

Name List:**SITA3008 Internet of Things**

S.NO	Register Number	Name of the Student
1	42120004	AARUTHRA V
2	42120018	ALLWIN A
3	42120019	AMAL RAJ A
4	42120021	ANAND P
5	42120022	ANANDHAKANNAN S
6	42120024	ANTHONY ASWIN E
7	42120025	ARAVINDAN M
8	42120027	ARIVAZHAGAN M
9	42120032	ARUN PRAKASH A
10	42120038	BALACHANDRAN K
11	42120043	BHARATHI D
12	42120045	BOAZ AARON ANAND
13	42120052	Deepak Raj M
14	42120054	DHANUSH K V
15	42120055	DHANUSH M
16	42120060	DINESH PRABU M
17	42120061	ELANCHEZHIAN V
18	42120079	HARISHKUMAR A
19	42120083	HARSHATH VIJAY V B
20	42120101	KANISH T
21	42120118	LINGESHWAR K S
22	42120122	MOHAMMED AFZAL M
23	42120128	MATHAN KUMAR R
24	42120132	MOHAMED IRFAAN K
25	42120134	MOHAMMED JABIR
26	42120136	MUHAMMAD ANWAR S
27	42120137	MURALIDHARAN B
28	42120150	NIVEDHA LOGESWARI S
29	42120153	PETHAPERUMAL N
30	42120154	PIRATHEEPAN L
31	42120157	PRAVIN KUMAR P
32	42120158	PRIYADHARSHINI K R
33	42120162	RAGUL S
34	42120165	RAKESH S
35	42120167	RAMAKRISHNAN A
36	42120169	RAVEENESSHAN T
37	42120179	RISHIKESH R

SITA3004	USER INTERFACE DESIGN AND IMPLEMENTATION	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To explain hypertext and style sheet languages.
- To apply Responsive Web Design Framework and features.
- To illustrate the basics of JavaScript, jQuery and allied scripting languages for Web design.
- To build Server side JS frameworks.
- To design client side JS frameworks.

UNIT 1 UI DESIGN

9 Hrs.

HTML5: What is HTML5 - Features of HTML5 – Semantic Tags – New Input Elements and tags - Media tags (audio and video tags) – Designing Graphics using Canvas API - Drag and Drop features – Geolocation API - Web storage (Session and local storage). CSS3: What is CSS3 – Features of CSS3 – Implementation of border radius, box shadow, image border, custom web font, backgrounds - Advanced text effects (shadow) - 2D and 3D Transformations - Transitions to elements - Animations to text and elements.

UNIT 2 RESPONSIVE WEB DESIGN (RWD)

9 Hrs.

Responsive Design: What is RWD – Introduction to RWD Techniques – Fluid Layout, Fluid Images and Media queries - Introduction to RWD Framework. Twitter Bootstrap – Bootstrap Background and Features - Getting Started with Bootstrap - Demystifying Grids – Off Canvas - Bootstrap Components - JS Plugins – Customization.

UNIT 3 INTRODUCTION TO JAVASCRIPT AND JQUERY

9 Hrs.

Introduction - Core features - Data types and Variables - Operators, Expressions and Statements - Functions & Scope - Objects - Array, Date and Math related Objects - Document Object Model - Event Handling – Browser Object Model - Windows and Documents - Form handling and validations. Object-Oriented Techniques in JavaScript - Classes – Constructors and Prototyping (Sub classes and Super classes) – JSON – Introduction to AJAX. Introduction – jQuery Selectors – jQuery HTML - Animations – Effects – Event Handling – DOM – jQuery DOM Traversing, DOM Manipulation – jQuery AJAX.

UNIT 4 INTRODUCTION TO SERVER-SIDE JS FRAMEWORK – NODE.JS

9 Hrs.

Introduction - What is Node JS – Architecture – Feature of Node JS - Installation and Setup - Creating web servers with HTTP (Request & Response) – Event Handling - GET & POST implementation - Connect to SQL Database using Node JS – Implementation of CRUD operations.

UNIT 5 INTRODUCTION TO CLIENT-SIDE JS FRAMEWORK

9 Hrs.

Introduction to Angular 4.0 - Needs & Evolution – Features – Setup and Configuration – Components and Modules – Templates – Change Detection – Directives – Data Binding - Pipes – Nested Components. Template - Model Driven Forms or Reactive Forms - Custom Validators. Introduction to ReactJS - React Components- Build a simple React component- React internals -Component inter communication- Component composition- Component styling.

Max. 45 Hrs.

COURSE OUTCOMES

On Completion of the course, student will be able to

CO1 - Develop web pages and style sheets using HTML and CSS3 respectively.

CO2 - Design responsive websites with RWD techniques.

CO3 - Apply JavaScript and allied scripting languages for implementing object models and functions.

CO4 - Demonstrate Server Side JS Framework for application development.

CO5 - Use Client Side JS Framework for redefining the application development. CO6 - Develop User Interface Designs using the frameworks

TEXT / REFERENCE BOOKS

1. Harvey and Paul Deitel & Associates, Harvey Deitel and Abbey Deitel, "Internet and World Wide Web - How to Program", 5th Edition, Pearson Education, 2011.
2. Achyut S Godbole and Atul Kahate, "Web Technologies", 2nd Edition, Tata McGraw Hill, 2012.
3. Thomas A Powell, Fritz Schneider, "JavaScript: The Complete Reference", 3rd Edition, Tata McGraw Hill, 2013.
4. David Flanagan, "JavaScript: The Definitive Guide, 6th Edition", O'Reilly Media, 2011.
5. Bear Bibeault and Yehuda Katz, "jQuery in Action", January 2008.
6. Web link for Responsive Web Design - <https://bradfrost.github.io/this-is-responsive/>.
7. Ebook link for JavaScript - https://github.com/jasonzhuang/tech_books/tree/master/js.
8. Krasimir Tsonev, "Node.js by Example Paperback", May 2015.
9. Web link for Node.js : <https://nodejs.org/en/>.
10. Artemij Fedosejev "React.js Essentials" (<http://pepa.holla.cz/wp-content/uploads/2016/12/React.js-Essentials.pdf>).

**END SEMESTER EXAMINATION QUESTION PAPER
PATTERN**

Max. Marks:100

PART A: 10 Question of 2 marks each – No choice

PART B: 2 Questions from each unit of internal choice, each carrying 16 marks

Exam Duration:3 Hrs.

20 Marks

80 Marks

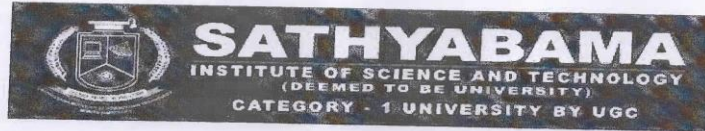
Name List:**SITA3004 User Interface Design & Implementations**

S.NO	Register Number	Name of the Student
1	42120001	AAKASH G G
2	42120002	AAKASH T
3	42120003	AARON M
4	42120005	ABDUL KALAM AASATH J
5	42120006	ABHINAV J
6	42120007	ABISHAI DANIEL S
7	42120008	ADARSH S
8	42120009	ADITHIYAA K B
9	42120010	AHAMED M
10	42120011	AJAY DHARSHAN F
11	42120012	AJAY RAJ V
12	42120013	AJITH KUMAR K
13	42120014	AKILAN J
14	42120015	AKSHAYA V
15	42120016	ALAMELU MANGAI C
16	42120017	ALEX VINTO BAR J
17	42120020	AMIN ABIATHU J
18	42120023	ANGELIN JENIFER S
19	42120026	ARAVINDHAN K
20	42120028	ARIVU SUDAR R
21	42120029	ARJUN G V
22	42120030	AROCKIA ANTO DEEPAK R
23	42120031	ARUMUGANATHAN R
24	42120033	ARAVIND J
25	42120034	ASWIN S
26	42120035	ASWIN B
27	42120036	ATHYUL THOMAS V S
28	42120039	BALAJI R
29	42120040	BALAKRISHNAN J
30	42120041	BALASREE R
31	42120042	BENJAMIN SANTHOSH J
32	42120044	BHUVANESWARI B N
33	42120046	BOOBALAN S
34	42120047	CHANDRASEKAR M
35	42120048	CHRISTO SHAM K
36	42120049	CLEN MACKESON M
37	42120050	DEEPAK K Y
38	42120051	DEEPAK A
39	42120053	DHANASEKAR.S
40	42120056	DHARANI K

41	42120057	DHARSHINI SABARI SARAVANAN
42	42120058	DHILIPHEN R K
43	42120059	DHIVIYASHREE S
44	42120062	ELVIS LEON
45	42120063	FAISAL B
46	42120064	FATHIMUNISHA A
47	42120065	FAZIL R
48	42120066	GANAPURAM NITHIN
49	42120067	GANESHVEL K P
50	42120068	GOKUL K N
51	42120069	GOKUL L
52	42120070	GOWTHAM R
53	42120071	GOWTHAM N
54	42120072	GURULINGARAJA D
55	42120073	HALITH B
56	42120074	HARINI G
57	42120075	HARINI RAJKUMARAN
58	42120076	HARINI S
59	42120077	HARISH T
60	42120078	HARISH V
61	42120080	HARISHRAGAVENDRA C
62	42120081	HARSH KUMAR S
63	42120082	HARSHA VARDHANA D
64	42120084	HARSHITA S
65	42120085	HEMA VARSHINI G B
66	42120086	JANANI V
67	42120088	JAYAKUMAR A
68	42120089	JAYANTH R
69	42120090	JAYASHREE HERO
70	42120091	JEEVAREKHA A
71	42120092	JEFRIN
72	42120093	JERALD ANDERSON J A
73	42120094	JEROME RICHARD D
74	42120095	JESSICA HEIZAL R
75	42120096	JINU J
76	42120097	JOHN SAHAYA AZAR J
77	42120098	KAACVIYA D
78	42120099	KAMESH B
79	42120100	KAMESHWARAN M
80	42120102	KAVIPRIYAN T
81	42120103	KEERTHI RAJ V
82	42120104	KEERTHANA I
83	42120105	KIRTHIKA A
84	42120106	KISHORE S
85	42120107	KISHORE KUMAR C

86	42120108	KISHORE S Y
87	42120109	KONAR VICKNESH IRULAPPAN
88	42120110	KOUSHICK R
89	42120111	KRISHNA B
90	42120112	KRITHIK SRIVATSAV B
91	42120113	KRITHIKA S
92	42120114	KRITHIKA V
93	42120115	LENARAM R
94	42120116	LEONAL MARSHALL P
95	42120117	LINGESH N
96	42120119	LISHANTH S
97	42120120	LOKESHVARAN N
98	42120121	LOKESHWAR S
99	42120123	MADHAN KUMAR R
100	42120124	MADHAVAN S
101	42120125	MADHUMITHA V
102	42120126	MARIA JANSI M
103	42120127	MARIYAVISHAL C
104	42120129	MIFFY R
105	42120130	MIRON SHAMAL T
106	42120131	MOHAMED ARSHATH M
107	42120133	MOHAMED SUJAATH S
108	42120135	MONISHA G
109	42120138	MURASOLIMARAN E
110	42120139	MUTHU KUMARAN S
111	42120140	NAGA PRADEEPA J
112	42120141	NANDHAGOPAL M
113	42120142	NANDHINI V
114	42120143	NANDHITHA MURALIDHAR
115	42120144	NANDHITHA V
116	42120145	NARESH S
117	42120146	NASEEMA BEGUM
118	42120147	NAVEEN T K
119	42120148	NAVEENKUMAR S
120	42120149	NIVASHINI S M
121	42120151	PAVAN S
122	42120152	PAVITHRA S
123	42120155	POOJA S
124	42120156	PRAVEENA S
125	42120159	PRIYADHARSHINI L
126	42120160	PUGAZHANTI S
127	42120161	RABEEYA M
128	42120163	RAHUL K
129	42120164	RAKESH M
130	42120166	RAKSHANA BEGAM A

131	42120168	RATHISH PRIYADHARSHAN .R
132	42120170	RAVI PRASAD R
133	42120171	REGINOLD ROCH A
134	42120172	REKHA V
135	42120173	RESHMA M
136	42120174	RHEMA M
137	42120175	RICHARD XAVIER AK
138	42120177	RINO D
139	42120178	RISHIK YOGAN S
140	42120180	RITHIK RAGHAVENDRA M



SCHOOL OF COMPUTING
DEPARTMENT OF INFORMATION TECHNOLOGY
STUDENT CIRCULAR 2020-2024 BATCH

22.12.2023

This is to inform you that it is mandatory to select one elective subjects for the VIII Semester of Academic year 2023-2024 based on your area of interest. You can select one of the following subjects.

List of Electives

1. SCSA1701 Cyber Physical Systems
2. SCSA3008 Distributed database and Information Systems

Confirm the elective subject through the following Google form on or before 28.12.2023

https://docs.google.com/forms/d/1QTLbVZd9QEVU4Wt9n4cDSnUGamODFa4bYZ1go9sUvo4/edit?usp=sharing_eil_se_dm&ts=66750921


HOD/IT

Department of Information Technology
Sathyabama Institute of Science and Technology
Chennai - 600 119.

SCSA1701	CYBER PHYSICAL SYSTEMS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To introduce basics of cyber-physical system and Industrial revolution 4.0 concepts.
- To develop an exposition of the challenges in implementing a cyber-physical system.
- To analyze the functional behavior of CPS based on standard modeling formalisms.
- To design CPS requirements based on operating system and hardware architecture constraints.
- To understand the concepts involved in Cyber Physical Systems Security.

UNIT 1 INTRODUCTION TO INDUSTRY 4.0 AND CYBER PHYSICAL SYSTEM

9 Hrs.

Industry 4.0 - Globalization and Emerging Issues, The Fourth Revolution - Smart and Connected Business Perspective, Basics of Industrial IoT - Industrial Processes - Industrial Sensing & Actuation, Industrial Internet Systems - Basic principles of design and validation of CPS - Cyber-Physical Systems (CPS) in the real world-Next Generation Sensors, Collaborative Platform and Product Lifecycle Management, Augmented Reality and Virtual Reality, Artificial Intelligence, Trends of Industrial Big Data and Predictive Analytics for Smart Business Transformation.

UNIT 2 EMBEDDED SYSTEMS MODELING AND DESIGN AND CPS - PLATFORM COMPONENTS 9 Hrs.

Embedded Systems definition, specification, and languages. Concepts, requirements, examples. Embedded system models at different abstraction levels. Test benches, design under test, Intellectual Property components. Discrete event simulation, semantics, algorithms. Design, analysis techniques for decentralized computer architectures, communication, and hardware - software systems. - Cyber Physical System Hardware Platform - Processors, Sensors, Actuators - Network - WirelessHart, CAN, Automotive Ethernet - Software stack -Real-Time Operating system (RTOS) -Scheduling Real Time control tasks.

UNIT 3 SENSORS, ACTUATORS AND SENSOR NETWORKS & REAL-TIME AND DISTRIBUTED SYSTEMS

9 Hrs.

Fundamental principles and applications of sensors, actuators. Smart sensors and microsensor/microactuator array devices. Introduction to signal processing and sensor/actuator networks, deployment and architecture, wireless communication, multiple access control layer, data gathering, routing and querying, collaborating signal processing - Time dependent systems, clock synchronization, real-time communication protocols, specification of requirements, task scheduling. Validation of timelines, real-time configuration management. Middleware architecture for distributed real-time and secure services.

UNIT 4 SECURITY OF CYBER PHYSICAL SYSTEMS

9 Hrs.

Embedded and CPS security - attacks and countermeasures, authentication, identification, confidentiality, data integrity, authorization, access control, malware attacks and counter-measures, security protocols. Privacy issues - vehicular devices and smart metering. Applications of public key and symmetric cryptography, - digital certificates, credentials. Security and vulnerability of cyber-physical infrastructure networks - Mobile and wireless network security, Robust wireless infrastructure - Cloud computing and data security, Event Awareness and System Monitoring for Cyber Physical Infrastructure.

UNIT 5 CYBER-PHYSICAL SYSTEMS CASE STUDIES AND PROJECTS

9 Hrs.

Automotive: SW controllers for Antilock braking system, Adaptive Cruise Control, Lane Departure Warning, Suspension Control - Healthcare: Artificial Pancreas/Infusion Pump/Pacemaker - Green Buildings: automated lighting, AC control - power distribution grid - robotics - civil infrastructure - avionics - Transportation.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - An ability to expose the student to real world problems in CPS and Industrial revolution 4.0 best practices.
- CO2 - Identify the limitations of some computational models.
- CO3 - Apply the theoretical knowledge the design of compilers.
- CO4 - Student can Analyze and verify the correctness of CPS implementations against system requirements and timing constraints.
- CO5 - Categorize the essential modeling formalisms of Cyber-Physical Systems (CPS). CO6 - Ability to understand cyber modelling systems.

TEXT / REFERENCE BOOKS

1. "Industry 4.0: The Industrial Internet of Things", by Alasdair Gilchrist (Apress).
2. "Industrial Internet of Things: Cyber manufacturing Systems" by Sabina Jeschke, Christian Brecher, Houbing Song, Danda B. Rawat (Springer).
3. Edward A. Lee and Sanjit A. Seshia, Introduction to Embedded Systems, A Cyber-Physical Systems Approach, Second Edition, <http://LeeSeshia.org>, ISBN 978-1-312-42740-2, 2015.
4. Rajeev Alur. Principles of Cyber-Physical Systems. MIT Press. 2015.
5. K. J. Astrom and R. M. Murray. Feedback Systems: An Introduction for Scientists and Engineers. Princeton University Press, 2009. http://www.cds.caltech.edu/~murray/amwiki/index.php/Main_Page.
6. Sajal Das, Krishna Kant, and Nan Zhang, Securing Cyber-Physical Critical Infrastructure - Foundations & Challenges, Morgan Kaufmann, 2012.

**END SEMESTER EXAMINATION QUESTION PAPER
PATTERN****Max. Marks:100****PART A:** 10 Questions of 2 marks each - No choice**PART B:** 2 Questions from each unit of internal choice, each carrying 16 marks**Exam Duration:3 Hrs.****20 Marks****80 Marks**

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SCSA1701 Cyber Physical Systems

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10	40120018	BOOMINATHAN. D.M
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14	40120022	CHINDULURI REDDY VENKATA MOHITHESWAR
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17	40120026	DHANALAKSHMI. S
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33	40120062	NAREN. D

34	40120063	NARISSETTY SRINIVASA RAO
35	40120064	NIKITA ANGELINE DAVID
36	40120065	PAVITHRAA. S
37	40120066	PRASANNA KUMAR. S
38	40120067	PRASEMA FEMI GRACE. P.W
39	40120068	PRAVEEN. N
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44	40120075	ROHITH. P
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48	40120084	SHALOM JABARAJ. J
49	40120088	SREERAMOJU SHRADDHA
50	40120090	SRIJITH. B
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56	40120112	Pranesh Priyanshu
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SCSA3008	DISTRIBUTED DATABASE AND INFORMATION SYSTEMS	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand the role of databases and database management systems in managing organizational data and information.
- To understand the techniques used for data fragmentation, replication and allocation during the distributed database design process.
- To discuss the issues involved in resource management and process.
- To Perceive the building blocks and design of information systems.
- To acquire knowledge of information systems on Business operations.

UNIT 1 INTRODUCTORY CONCEPTS AND DESIGN OF (DDBMS)

9 Hrs.

Data Fragmentation - Replication and allocation techniques for DDBMS - Methods for designing and implementing DDBMS - designing a distributed relational database - Architectures for DDBMS - Cluster federated - parallel databases and client server architecture - Overview of query processing.

UNIT 2 DISTRIBUTED SECURITY AND DISTRIBUTED DATABASE APPLICATION TECHNOLOGIES

9

Hrs.

Overview of security techniques - Cryptographic algorithms - Digital signatures - Distributed Concurrency Control - Serializability theory - Taxonomy of concurrency control mechanisms - Distributed deadlocks – Distributed Database Recovery - Distributed Data Security - Web data management - Database Interoperability.

UNIT 3 ADVANCED IN DISTRIBUTED SYSTEMS

9 Hrs.

Authentication in distributed systems - Protocols based on symmetric cryptosystems - Protocols based on asymmetric cryptosystems - Password-based authentication - Unstructured overlays - Chord distributed hash table - Content addressable networks (CAN) - Tapestry - Some other challenges in P2P system design - Tradeoffs between table storage and route lengths - Graph structures of complex networks - Internet graphs - Generalized random graph networks.

UNIT 4 FUNDAMENTALS OF INFORMATION SYSTEMS

9 Hrs.

Defining information – Classification of information – Presentation of information systems – Basics of Information systems – Functions of information systems – Components of Information systems- Limitations of Information systems – Information System Design.

UNIT 5 ENTERPRISE COLLABORATION SYSTEMS

9 Hrs.

Groupware – Types of groupware – Enterprise Communication tools – Enterprise Conferencing tools – Collaborative work management tools – Information System for Business operations – transaction processing systems – functional Information Systems – Decision Support systems – Executive Information systems – Online Analytical processing.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Identify the introductory distributed database concepts and its structures.
- CO2 - Produce the transaction management and query processing techniques in DDBMS.
- CO3 - To develop in-depth understanding of relational databases and skills to optimize database performance in practice.
- CO4 - Critiques on each type of databases.
- CO5 - Analyse, Design and present the information systems.
- CO6 - Designing of decision support system and tools for Business operations.

TEXT / REFERENCE BOOKS

1. George Coulouris, Jean Dollimore, Tim Kindberg, "Distributed Systems Concepts and Design", Fifth Edition, Pearson Education Asia, 2012.
2. Ajay D. Kshemkalyani, Mukesh Singhal, "Distributed Computing: Principles, Algorithms, and Systems", Cambridge University Press, 2008.
3. Distributed Databases - Principles and Systems; Stefano Ceri; Giuseppe Pelagatti; Tata McGraw Hill; 2006.
4. Ralph Stair and George Reynolds. , "Principles of Information Systems" Course Technology, Inc., 2006

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. marks:100**PART A:** 10 Question of 2 marks each – No choice**PART B:** 2 Questions from each unit of internal choice, each carrying 16 marks**Exam Duration:3 Hrs.****20 Marks****80 Marks**

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SCSA3008 Distributed database and Information Systems

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49	40120105	K.S.Vignesh
50	40120107	Vishvashwarran V B
51	40120108	Vishwa L
52	40120110	Keerthinadh Tulluri
53	40120111	Kolli Srikanth
54	40120116	OBINNI SUDHEER
55	40120122	Vivek Kumar
56	40120123	Jeevesh Nandan

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59	40120126	NUGGU VENKATA BHASKAR
60	40120127	SURIYA.V
61	40120132	TISHA ANANTS
62	40120133	Tungala Halesh
63	40120134	Kripashankar Manglam
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SCHOOL OF COMPUTING
DEPARTMENT OF INFORMATION TECHNOLOGY
STUDENT CIRCULAR 2021-2025 BATCH

20.12.2023

This is to inform you that it is mandatory to select one elective subjects for the VI Semester of Academic year 2023-2024 based on your area of interest. You can select one of the following subjects.

List of Electives

1. SITA1602 Cyber Security
2. SITA3003 Advanced Java Programming

Confirm the elective subject through the following Google form on or before 27.12.2023

https://docs.google.com/forms/d/112Gsrw4DZtylBOKzg_rO7YKI55ZxLN3tAHek-qv4LEE/edit?usp=sharing_eil_se_dm&ts=66750a01


HOD/IT

Department of Information Technology
Sathyabama Institute of Science and Technology
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SITA1602	CYBER SECURITY	L	T	P	Credits	Total Marks
		3	*	0	3	100

COURSE OBJECTIVES

- To explore the aspects of classic and public key cryptography.
- To acquire knowledge on standard algorithms used to provide confidentiality, integrity and authenticity.
- To become aware of system security components.
- To know the technological aspects of security.
- To explore the vulnerabilities in any computing system.

UNIT 1 INTRODUCTION

9 Hrs.

Basic Concepts – Security Architecture, Attacks, Services, Mechanisms, Model - Cryptography Basics - Symmetric Ciphers – Transposition, Substitution, Rotor Machines – Block Cipher – Data Encryption Standard – Confidentiality using Symmetric Encryption

UNIT 2 PUBLIC KEY CRYPTOGRAPHY

9 Hrs.

Principles – RSA algorithm – Key Management – Diffie Hellman Key Exchange – Message Authentication – Requirements, Functions, Message Authentication – Hash Functions – Digital Signatures – Authentication Protocols

UNIT 3 SYSTEM SECURITY

9 Hrs.

Intruders – Detection – Password Management – Malicious Software – Virus – Countermeasures – Distributed Denial of Service Attacks – Firewalls – Design Principles – Trusted Systems

UNIT 4 OPERATIONS AND PHYSICAL SECURITY

9 Hrs.

Origin – Process – Laws – Physical Security – Controls – Protecting People – Protecting Data – Protecting Equipment

UNIT 5 APPLICATION SECURITY

9 Hrs.

Software Development Vulnerabilities – Buffer Overflow – Race Condition – Web Security – Database Security – Tools

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to CO1 - Identify the basics of cryptography.

CO2 - Provide security of the data over the network. CO3 - Explore the aspects of system security.

CO4 - Illustrate operations and physical security aspects.

CO5 - Analyse the vulnerabilities in any computing system and hence be able to design a security solution. CO6 - Design and implement secure applications.

TEXT / REFERENCE BOOKS

1. William Stallings, "Cryptography and Network Security", 4th Edition, Pearson, 2009.
2. Jason Andress, Steven Winterfeld, "The Basics of Information Security", 2nd Edition, Elsevier, 2014.
3. Harold F. Tipton, Micki Krause Nozaki, "Information Security Management Handbook", 6th Edition, Vol.5, CRC Press, 2012.
4. Behrouz A. Forouzan, "Cryptography and Network Security", Tata McGraw-Hill, 2008.
- 5.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100

Exam Duration: 3 Hrs.

PART A: 10 Questions carrying 2 marks each – No choice

20 Marks

PART B: 2 Questions from each unit of internal choice, each carrying 16 marks

80 Marks

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7	41120008	H Ajay Srinivasan
8	41120009	Ajonithas.J
9	41120012	AKASH
10	41120013	akash P
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20	41120028	Arun Balaji VS
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22	41120030	Arvind B
23	41120031	Ashlyn Timothy D
24	41120032	Ashwanth R
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26	41120034	Avinash Kumar Gupta
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28	41120036	Balachandra Kumar S
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89	41120130	Neel Mehta
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107	41120160	Sangeetha S
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113	41120166	Sasikumar.I
114	41120167	Nazia.Shaik
115	41120168	Shakthi Ganesh S
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117	41120170	Sharon Christy R
118	41120171	shilpa s
119	41120172	Shiva Ganapathy Raaj C S S
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131	41120192	Veronica J
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133	41120194	Vignesh Kumar.V
134	41120196	Vikash Rai
135	41120197	VINISH R
136	41120198	Vinoliya. S
137	41120199	VINOTH V
138	41120200	Vishal k S
139	41120203	VITHUN M.A
140	41120204	Yathun thirshna
141	41120205	Yogesh.A
142	41120207	B kumar chaitanya
143	41120951	LEVESH KUMAR V

SITA3003	ADVANCED JAVA PROGRAMMING	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To know about Enterprise architecture models.
- To introduce the basics of session tracking.
- To understand JSP and to write Custom Tags.
- To know about the development of Enterprise Java Beans.
- To have knowledge in advanced Java programming concepts.

UNIT 1 INTRODUCTION & DATABASE PROGRAMMING

9 Hrs.

J2EE Platform – Enterprise architecture styles – J2EE run times – J2EE API – J2EE architecture – Containers – Introduction to J2EE technologies – Naming and directory services. Database programming with JDBC – JDBC/ODBC bridge – Establishing a connection – Creating and executing SQL statements – Querying – Report statements – Scrollable and updatable result sets – Java.sql packages – JDBC data sources – Connection pooling.

UNIT 2 SERVLET PROGRAMMING

9 Hrs.

Introduction to Servlet Programming - Servlet Implementations - Servlet configuration - Servlet exceptions - Servlet Life Cycle - Servlet Programming - Servlet Security- Servlet communication - Advanced Servlets : Approach to Session Tracking - Demonstrating Session - Lifecycle with Cookies - A simple shopping cart using Sessions - Servlet Context Interface - Servlet Collaboration.

UNIT 3 JSP AND JAVA MAIL

9 Hrs.

Java Server Pages : Intro to JSP - JSP Directives - Scripting elements - Standard Auctions - Implicit objects - Scope - JSP pages as XML documents - JSP Sample Program - Design Strategies - JSP tag Extensions-A simple TAG - Writing TAGExtensions. Java Mail API: Introduction to Java Mail - Mail Protocols- Java Mail Overview- Quick, Send me a Email: An example program

UNIT 4 ENTERPRISE JAVA BEANS

9 Hrs.

Overview of EJB-EJB Middleware Architecture - EJB Architecture- EJB Containers and its services - Design of EJB Tier -Session java Beans- Stateless and Stateful Beans, Entity Beans and Persistence - Container Vs Bean Managed Persistence, Message Driven Bean - Relationships, EJB Container Services.

UNIT 5 STRUTS

9 Hrs.

Struts: Development Models-Basic Components of Struts – Struts2 Architecture-Interceptors-Validation- Building simple struts Application.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - Implement JDBC connectivity.
- CO2 - Implement advanced Servlets.
- CO3 - Implement JSP and Java Mail.
- CO4 - Implement EJB.
- CO5 - Implement Struts.
- CO6 - To develop enterprise java applications thereby meeting the industrial requirements.

TEXT / REFERENCE BOOKS

1. Subrahmanyam Allamaraju and Cedric Buest , "Professional Java Server Programming", A press, J2EE 1.3, 2007.
2. Jim Keogh , "Completer Reference, J2EE", Tata McGraw Hill, 2007.
3. James Holmes-Struts, "The complete Reference", 2nd Edition, Tata McGraw Hill, 2007.

4. <http://www.java.sun.com/tutorial>.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. marks:100

Exam Duration: 3 Hrs.

PART A: 10 Questions of 2 marks each – No choice

20 Marks

PART B: 2 Questions from each unit of internal choice, each carrying 16 marks

80 Marks

Name List:

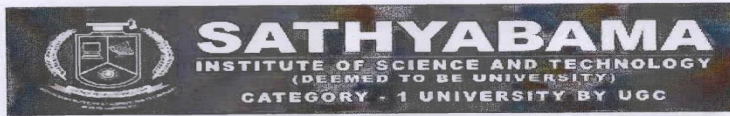
SITA3003 Advanced Java Programming

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72	41120104	Madhulika V
73	41120105	Madhumitha.R
74	41120106	MAGESHWARAN.K
75	41120107	Majid Fasi Ahmed
76	41120112	Mohamed Ibrahim Khan
77	41120113	mohan c
78	41120114	MONICA SRI M
79	41120116	Mukeshraj D
80	41120117	Murphy Surya R
81	41120118	Naman Raj
82	41120119	Nambu Aakash narayan
83	41120120	NANDYALA DILEEP CHANDRA SRINIVAS
84	41120122	Naresh M
85	41120123	Naresh N
86	41120125	Naveen Bharathi C A R
87	41120127	Naveen Kumar T
88	41120129	S Navith guruan
89	41120130	Neel Mehta
90	41120131	Nsv kamesh
91	41120133	Niventhan
92	41120134	PADMANABHUNI N V M SUHAS KUMAR
93	41120136	Paveethra RR
94	41120137	P SARVAGNYA
95	41120141	Pratik
96	41120142	princy angelin.B
97	41120144	Priyadharsini.k
98	41120145	Ragav Subramanian R
99	41120146	R.RAGHULPRASATH
100	41120148	Ramachandran G
101	41120150	Resheb Kumar CP
102	41120151	Rethisha R
103	41120154	Safiya Farheen A
104	41120156	Sairam S

105	41120158	Durgamohan
106	41120159	Sambratha S
107	41120160	Sangeetha S
108	41120161	T.Sanjeetha
109	41120162	santhiya M
110	41120163	Santhiya Mary. X
111	41120164	Saruhashini.H
112	41120165	Sashaanth
113	41120166	Sasikumar.I
114	41120167	Nazia.Shaik
115	41120168	Shakthi Ganesh S
116	41120169	Shalini D
117	41120170	Sharon Christy R
118	41120171	shilpa s
119	41120172	Shiva Ganapathy Raaj C S S
120	41120176	SUBBIAH S
121	41120177	Surugu Alekya
122	41120178	RD SURYA
123	41120180	sweetie cyindia
124	41120182	Tharun H
125	41120183	Thavish. E
126	41120184	Thejasri
127	41120186	THOTLA KESHAV CHANDRA YADAV
128	41120187	Jhansi
129	41120188	Vamshi
130	41120189	Vajra vishnu vardhan
131	41120192	Veronica J
132	41120193	VETRIVEL M
133	41120194	Vignesh Kumar.V
134	41120196	Vikash Rai
135	41120197	VINISH R
136	41120198	Vinoliya. S
137	41120199	VINOTH V
138	41120200	Vishal k S
139	41120203	VITHUN M.A
140	41120204	Yathun thirshna
141	41120205	Yogesh.A
142	41120207	B kumar chaitanya
143	41120951	LEVESH KUMAR V



SCHOOL OF COMPUTING
DEPARTMENT OF INFORMATION TECHNOLOGY
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20.05.2023

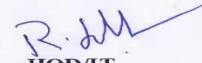
This is to inform you that it is mandatory to select one elective subjects for the V Semester of Academic year 2023-2024 based on your area of interest. You can select one of the following subjects.

List of Electives

1. SBAA4004 Entrepreneurship
2. SITA1503 Fog and Cloud Computing
3. SCSA1303 Software Engineering

Confirm the elective subject through the following Google form on or before 25.05.2023

https://docs.google.com/forms/d/1tpag06dNbP1tUF1tdPGopSJ2TzJGpIk3Ln5MVobfNEA/edit?usp=sharing_eil_se_dm&ts=66750aba


HOD/IT

Department of Information Technology
Sathyabama Institute of Science and Technology,
Chennai - 600 119.

VENTURE CREATION

Overview

This course is designed to enable students to build an entrepreneurial mindset, explore the concept of entrepreneurship, Design thinking, understand the startup journey from opportunity identification to a validated MVP, build sustainable business model, Business planning & financial feasibility and creation of pitch deck.

Couse Credits: 3

Credit Structure: L-3; T-0; P-0; EI -0 C-3

Course Learning Objectives:

1. To develop an entrepreneurial mindset, understand the concept of entrepreneurship and identify personal strengths and weaknesses
2. To understand the design thinking process and apply design thinking to real-world problems
3. To identify problems and opportunities and develop ideas for new ventures by assessing market potential
4. To develop a value proposition, business model canvas, build MVP to create sustainable differentiation for the venture with a well-structured business plan, unit economics, go-to-market strategies and funding plan for managing business growth
5. To build an idea pitch and deliver it with confidence to potential stakeholders

Course Learning Outcome:

Upon completion of the course, students will be able

1. To define entrepreneurship and explain emerging trends in entrepreneurship
2. To identify and evaluate business opportunities and assess market potential
3. To conduct customer discovery, market research, build a lean canvas, develop a business plan and marketing strategies
4. To identify sources of funding and develop a funding strategy, understand basic legal requirement for starting and running a business
5. To build an idea pitch and deliver it with confidence to various stakeholders

Course Contents

Unit	Unit title	Descriptors
Unit 1	Introduction to Entrepreneurship	Defining Entrepreneurship, evolution the concept & Emerging Trends in Entrepreneurship (Domain specific), Understanding the unique opportunities; Why be an Entrepreneur? Entrepreneurship in Indian Scenario &

		Its role in economic development; Success stories of Entrepreneur (Domain specific); Entrepreneurial style assessment tool; Developing the Entrepreneurial mindset- Attributes & skills, recognizing your sweet spot for starting up; Principles of Effectuation; Myths about Entrepreneurship; Types of Entrepreneurs; Entrepreneur vs Intrapreneur; Role of Entrepreneurial Teams
Unit 2	Design Thinking & Opportunity Discovery	Introduction to Design Thinking for startups; Design Thinking principles & process; Define the problem using Design thinking principles and validate Problem; Generation of ideas, Idea generation techniques and evaluating creative ideas; Identify problem worth solving; Sharpen your Problem Pitch
Unit 3	Customer, Markets and creating a sustainable differentiation	Differentiate between a customer and a consumer; Who is your customer and what is your segment ; Customer Job, Pains, and Gains using Value proposition Canvas; Build solution using Value Proposition Canvas; Market Estimation-TAM,SAM,SOM; Competitive analysis; Minimum viable product – what is MVP: Build - Measure - Learn, differentiate between solution Demo & MVP; How to validate MVP- Achieve a Product – Market fit
Unit 4	Business Model, Business Planning and Go to Market strategies	Introduction to Business model, Business plan ; Lean approach 9 block lean canvas model; Financial feasibility: Costs, revenue streams, Pricing, Financial Projections, Key Financial Metrics using financial template, Managing growth & targeting scale, Unit economics; Selecting the Right Channel; Introduction to Digital Marketing and tools; Branding strategy
Unit 5	Funding strategy	Sources of funds: Debt & Equity ; Map the Start-up Lifecycle Funding Options; Build an Investor ready pitch deck

Assessment

Assessment	Internal evaluation	External examination
Weightages	50%	50%

Internal Assessment

Component 1	Component 2	
Milestone 1 & 2	Milestone 3&4	Pitch presentation
20 marks	20 marks	10 marks

Note :

- Internal evaluation will be based on Milestone deck submission in the LMS NextGen Platform provided by Wadhwani Foundation and presentation.
- The students form venture teams and work with their venture idea. This practice venture will converge to a Milestone, a pitch deck presentation created by students

in the templates provided as part of the Ignite program.

External Examination

- Written examination for 50 marks on the Ignite program content.

Teaching Learning Process (Pedagogy)

The program is driven by facilitator with top-notch curated material, real life examples and case studies, access to experts and mentors, masterclasses and expert webinars. The Ignite program is hosted in the LMS NextGen Platform provided by Wadhvani Foundation. The program helps students to build practice ventures with the help of milestone deck to gain global jury certification. Students successfully completing the course will get an opportunity to get their milestone deck evaluated by team of global jury. On qualifying the global jury based on rubric assessment the student venture team gains a global jury certification from Wadhvani Foundation.

References

1. Hisrich, R. D., Peters, M. P., & Shepherd, D. A. (2017). Entrepreneurship (10th ed.). McGraw-Hill Education.
2. Ries, E. (2011). The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses. Crown Business.
3. Blank, S. G., & Dorf, B. (2012). The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company. K&S Ranch.
4. Roy, R. (2017). Indian Entrepreneurship: Theory and Practice. New Delhi: Oxford University Press.
5. Chandan, J. S., & Rana, S. S. (2019). Entrepreneurship Development and Management. New Delhi: McGraw Hill Education.
6. Sinek, S. (2011). Start with Why: How Great Leaders Inspire Everyone to Take Action. Portfolio.
7. Choudhary, R., & Mehta, N. (2019). From Zero to One: How to Build a Successful Startup in India. Notion Press.
8. Osterwalder, A., & Pigneur, Y. (2010). Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers. John Wiley & Sons.
9. Mitra, P., & Banerjee, A. (2019). Startup Minds: The Entrepreneur's Journey from Idea to Success. SAGE Publications India.
10. Thiel, P. (2014). Zero to One: Notes on Startups, or How to Build the Future. Crown Business.
11. Zappos, T. (2010). Delivering Happiness: A Path to Profits, Passion, and Purpose. Business Plus.

Name List:

VENTURE CREATION

S.NO	Register Number	Name of the student
1	41120004	Adchaya Jv
2	41120005	ADDANKI RAMYASRI
3	41120006	Adriel samuel
4	41120009	Ajonithas.J
5	41120012	Akash M
6	41120016	Amay Kanchhit
7	41120018	Anand Sai Sathvik Yeluri
8	41120020	Angelin E Tanya
9	41120021	Ankit Prajapati
10	41120022	Anthis Jhones
11	41120023	Aravind Gurusamy
12	41120024	Aravind T
13	41120025	Archi Shaw
14	41120026	Archith sb
15	41120027	Arghya Chandra
16	41120031	Ashlyn Timothy D
17	41120035	Ayushi Kareena
18	41120036	Balachandra Kumar s
19	41120037	Bandari Manikanta
20	41120039	Bavin . A
21	41120042	Binuprabhu B
22	41120044	Calvin nesan S.V
23	41120050	Deepika T S
24	41120051	Deepika.V
25	41120055	S R DILIP RAAJ
26	41120057	Divya Dharshini E
27	41120059	Elvis N
28	41120060	GODWIN VINO. I
29	41120061	Gokul.C
30	41120063	HARIHARAN S
31	41120064	Hari Sandeep
32	41120065	Harish.G
33	41120066	Harish kaarthick
34	41120067	Harish pandiyan R
35	41120068	Hashwath velan
36	41120069	Hemachandran S
37	41120072	Swayam Innani
38	41120076	Jegadeesh K
39	41120078	Johnsina Jothi S
40	41120091	Kaviya Nivashini V

SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY	41	41120092	KEERTHANA C
	42	41120093	Keerthana anusha.C
	43	41120098	Krishna patel
	44	41120104	Madhulika V
	45	41120105	Madhumitha.R
	46	41120107	Majid Fasi Ahmed
	47	41120112	Mohamed Ibrahim khan
	48	41120114	MONICA SRI M
	49	41120117	MURPHY SURYA R
	50	41120121	Naran prem kumar reddy
	51	41120124	NAULLA SATHYAVASHIST
	52	41120126	NAVEEN KUMAR S
	53	41120130	Neel Mehta
	54	41120133	NIVENTHAN
	55	41120136	Paveethra RR
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	62	41120161	T.Sanjeetha
	63	41120165	SASHAANTH S
	64	41120169	Shalini D
	65	41120170	Sharon Christy.R
	66	41120171	Shilpa s
	67	41120172	Shiva Ganapathy Raaj C S S
	68	41120173	S.J.SIVA SREE
	69	41120175	SREETAL ADHVAIT AAHLAAD
	70	41120176	SUBBIAH S
	71	41120194	Vignesh kumar .V
	72	41120203	Vithun M.A
	73	41120207	B kumar chaitanya

SCHOOL OF COMPUTING

SITA1503	FOG AND CLOUD COMPUTING	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To understand the basic concepts of cloud computing and cloud enables.
- To understand cloud services and Multi-tenancy computing.
- To study about various models of cloud environments and virtualization.
- To manage the cloud computing infrastructure with security.
- To gain knowledge of cloud and to understand about Fog, edge computing.

UNIT 1 UNDERSTANDING CLOUD COMPUTING

9 Hrs.

Basic Concepts and Terminology - Cloud Computing Architectural Framework - Types of Clouds - pros and cons of cloud computing – Cloud Characteristics - difference between web 2.0 and cloud - key challenges in cloud computing - Major Cloud players - Virtualization in Cloud Computing - Parallelization in Cloud Computing - cloud resource management – Cloud Enabling Technology.

UNIT 2 CLOUD SERVICE MODELS

9 Hrs.

Software as a Service (SaaS) - Infrastructure as a Service (IaaS)- Platform as a Service (PaaS)- Web services - Service Oriented Architecture (SoA) - Elastic Computing - On Demand Computing- Service Management in Cloud Computing - Multi-tenancy computing , architecture.

UNIT 3 CLOUD DEPLOYMENT MODELS AND VIRTUALIZATION

9 Hrs.

Deployment models: Public cloud – Private Cloud –Hybrid cloud – Community cloud - Need for virtualization – Types of Virtualization – Virtualization OS – VMware, KVM – System VM – Process VM - Virtual Machine Monitor – Properties - Xen, Hyper V, Virtual Box, Eucalyptus .

UNIT 4 MANAGEMENT IN CLOUD COMPUTING & SECURITY

9 Hrs.

Cloud data centres - Energy efficiency in data centre - Data Management in Cloud Computing - Mobile cloud computing service models – Open Source and Commercial Clouds, Cloud Simulator – sensor cloud- Fundamental Cloud security – Cloud security Threads – Additional considerations – Security solutions a case study.

UNIT 5 FOG COMPUTING

9 Hrs.

From Cloud to Fog - Fog Computing architecture - fog networks - Principles of Edge/P2P networking - Security and privacy in Fog.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 - Analyze the Cloud computing setup with its vulnerabilities and applications using different architectures.

CO2 - Implement and install the cloud tools to make enable the cloud computing infrastructures.

CO3 - Apply and design suitable Virtualization concept, Cloud Resource Management and collaboration services.

CO4 - Create combinatorial auctions for cloud resources and services for computing clouds Develop and make cloud services as commercial.

CO5 - Assess cloud and cloud to Fog with IoT.

CO6 - Ability to, understand fog computing architecture.

TEXT / REFERENCE BOOKS

1. Cloud computing concepts, technology and Architecture – Thomas Erl, Zaigham Mahmood, Ricardo Puttini , Pearson , 2017.
2. Instant Guide to Cloud Computing, Anand Nayar (Ed), Ashokkumar, sudeep Tanwar, BPB, 2019.
3. Cloud computing a practical approach - Anthony T.Velte, Toby J. Velte Robert Elsenpeter TATA McGraw - Hill, New Delhi – 2010.
4. Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online - Michael Miller - Que 2008.
5. Cloud Security: A Comprehensive Guide to Secure Cloud Computing, Ronald L. Krutz, Russell Dean Vines, Wiley-India, 2010.
6. Fog Computing Concepts, Frameworks and Technologies ,Mahmood, Zaigham (Ed.), Springer , 2018.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN**Max. Marks: 100****PART A:** 10 Questions carrying 2 marks each – No choice**PART B:** 2 Questions from each unit of internal choice, each carrying 16 marks**Exam Duration: 3 Hrs.****20 Marks****80 Marks**

Name list:

SITA1503 Fog and Cloud Computing

S.NO	Register Number	Name of the Student
1	41120001	Aathisivabalan.D
2	41120002	ABHILASH B
3	41120003	Abinaya.V
4	41120007	AFIYA.M
5	41120010	Akalya S
6	41120011	Akash.c
7	41120028	Arun Balaji VS
8	41120033	Ashwin M R
9	41120040	Benita S
10	41120041	Beryl Cynthia Jasiel
11	41120045	Caroline Pricy. G
12	41120047	Chinthalapudi sri rama gokula
13	41120048	Chukka Saipooja Pranathi
14	41120052	S.Dhananjeyan
15	41120054	Dharsini M
16	41120056	B Diniya
17	41120074	Jawagar Sri G
18	41120079	Jonna Mohit
19	41120081	JOYCE DAVID
20	41120084	Kamilath Rifka S
21	41120086	KARTHIK. A
22	41120087	G KARTHIK
23	41120088	Kasa sai manikanta
24	41120089	Kaviselvan.A

25	41120094	Kiran M
26	41120097	Koteru Amrutha
27	41120099	Kumara vadivel.P
28	41120100	Leo Sharlin
29	41120101	LINGA PRAVIN K S
30	41120102	LOKESH RAJ J
31	41120103	M.Gopi krishna
32	41120109	Manoj Kumar K
33	41120110	Mirudhubashini B S
34	41120111	Mitra Sri.S
35	41120113	Mohan.c
36	41120115	Mukesh U
37	41120119	Nambu Aakash Narayana
38	41120125	Naveen Bharathi C A R
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43	41120137	P.sarvaganya
44	41120138	Poojitha K
45	41120140	Prathima S
46	41120143	Priyadharshini.S
47	41120144	Priyadharsini.k
48	41120145	Ragav Subramanian R
49	41120146	R.RAGHULPRASATH
50	41120148	RAMACHANDRAN.G
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60	41120184	Thejasri
61	41120185	Theoder paul A
62	41120186	T. Keshav chandra yadav
63	41120187	V.Jhansi
64	41120189	vajra vishnu vardhan
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66	41120191	Varsha V
67	41120195	Vijay Athithiya M
68	41120197	VINISH.R
69	41120198	Vinoliya. S
70	41120199	VINOTH V
71	41120200	Vishal
72	41120204	A yathun thirshna
73	41120205	Yogesh.A
74	41120206	YUKESH V
75	41120043	Bromelia.R
76	41120193	VETRI VEL M
77	41120116	Mukeshraj D
78	41120053	Dharshana L

SCSA1303	SOFTWARE ENGINEERING		L	T	P	Credits	Total Marks
			3	0	0	3	100

COURSE OBJECTIVES

- Software process models and compare their applicability.
- Identify the key activities in managing a software project.
- Concepts of requirements engineering and Analysis Modelling.
- Apply systematic procedure for software design and deployment.
- Compare and contrast the various testing and maintenance.

UNIT 1 SOFTWARE PROCESS AND PROJECT MANAGEMENT

9 Hrs.

The evolving role of software – the changing nature of software- Life cycle models - Water fall - Incremental - Spiral - Evolutionary - Prototyping – Concurrent development – Specialised process models - Verification - Validation - Life cycle process - Development process - System engineering hierarchy - Introduction to CMM - Levels of CMM.

UNIT 2 REQUIREMENT ANALYSIS AND SPECIFICATIONS

9 Hrs.

Functional And Non-Functional - User - System - Requirement Engineering Process - Feasibility Studies –communication practices- Requirements - Elicitation - Validation and management - Fundamental of requirement analysis – Analysis principles – Structured System Analysis - Software prototyping - Prototyping in the Software Process - Data - Functional and Behavioral Models - Structured Analysis and Data Dictionary.

UNIT 3 SOFTWARE DESIGN

9 Hrs.

Design process - Modular design - Design heuristic - Design model and document - Architectural design - Software architecture - Data design - Architecture data - Transform and transaction mapping - User interface design - User interface design principles.

UNIT 4 TESTING AND IMPLEMENTATION

9 Hrs.

Levels - Software Testing Fundamentals - Types of s/w test - White box testing- Basis path testing - Black box testing - Control Structure testing- Regression testing strategies - Strategic approach and issues - UNIT testing - Integration testing - Validation testing - System testing and debugging. Case studies - Writing black box and white box testing- Coding Practices- Refactoring.

UNIT 5 PROJECT MANAGEMENT AND ESTIMATION

9 Hrs.

Software cost estimation - COCOMO model - Quality management - Quality concepts- SQA - Software reviews - Formal technical reviews - Formal approaches of SQA and software reliability - Software maintenance - SCM - Need for SCM - Version control - Introduction to SCM process - Software configuration items. Re-Engineering - Software reengineering - Reverse engineering - Restructuring - Forward engineering.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to:

- CO1 - Identify and apply software lifecycle model for a given problem and will know the criteria for each level of CMM. CO2 - Comprehend types of requirements and summarize Requirement Engineering Process.
- CO3 - Design data, functional and behavioral model for any given software requirement.
- CO4 - Identify and analyze levels of testing and perform white box testing and black box testing for a given problem.
- CO5 - Describe concepts of software quality assurance and software configuration management.
- CO6 - Compare and contrast forward engineering, reverse engineering and reengineering.

TEXT / REFERENCE BOOKS

1. Pressman, "Software Engineering and Application", 7th Edition, McGraw International Edition, 2009.
2. Ian Sommerville, "Software Engineering", 8th Edition, Pearson Education, 2008.
3. Stephan Schach, "Software Engineering", Tata McGraw Hill, 2007.
4. Pfleeger and Lawrance, "Software Engineering: Theory and Practice" Pearson Education, Second Edition, 2001.
5. Rajib Mall, "Fundamentals of Software Engineering", Third Edition, PHI Learning Private Limited, 2009.
6. Pankaj Jalote, "Software Engineering, A Precise Approach", Wiley India, 2010.
7. Kelkar S.A., "Software Engineering", Prentice Hall of India Pvt Ltd, 2007.

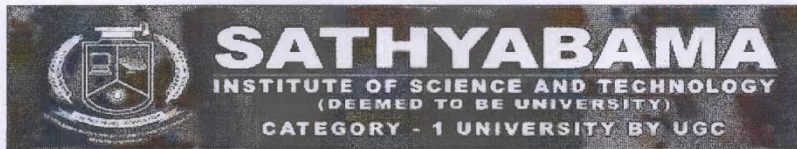
Max. Marks: 100**Exam Duration: 3 Hrs.****PART A:** 10 Questions carrying 2 marks each – No choice**20 Marks****PART B:** 2 Questions from each unit of internal choice, each carrying 16 marks**80 Marks**

Name List:

SCSA1303 Software Engineering

S.NO	Register Number	Name of the student
1	41120008	H Ajay Srinivasan
2	41120017	Amirthasri V
3	41120038	Barath C
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6	41120058	Varun dommeti
7	41120062	Gokul raj. N
8	41120073	JAMESEDEVIN
9	41120080	Joshinavictor
10	41120082	Judith Shalom Joy J
11	41120085	Karan
12	41120096	KOLLA UDAY
13	41120108	MANDAPAKA GANESH
14	41120120	NANDYALA DILEEP CHANDRA SRINIVAS
15	41120123	Naresh N
16	41120128	Naveenkumar.p
17	41120129	NAVITH GURUSAN S
18	41120135	PANNEM KUSHAL
19	41120139	Pragya Sharma
20	41120142	Princy angelin.B
21	41120147	Rahul Ram P
22	41120152	ROJA MUTHIAH N
23	41120153	A.Royster
24	41120155	SAI DEEPAK S
25	41120159	Sambratha S
26	41120163	X. Santhiya Mary
27	41120164	H.Saruhashini
28	41120168	Shakthi Ganesh S
29	41120183	Thavish. E
30	41120192	Veronica J
31	41120196	VIKASH RAI

32	41120013	AKASH P	SCHOOL OF COMPUTING
33	41120014	S.AKASH	
34	41120019	Anbunithi E	
35	41120122	Naresh M	
36	41120095	Kishore S	
37	41120090	Kavitha K	
38	41120030	Arvind B	
39	41120029	Arun kumar k	
40	41120162	santhiya M	
41	41120188	V Venkatasai vamshi Krishna	
42	41120202	VISHWA BHARATHI J	
43	41120032	Ashwanth. R	
44	41120083	Kamalesh k	
45	41120118	Naman Raj	
46	41120075	Jeffre	
47	41120077	M JENITH ASHWIN	
48	41120106	Mageshwaran.k	
49	41120174	M. Sowri Rajan	
50	41120034	AVINASH KUMAR GUPTA	



SCHOOL OF COMPUTING
DEPARTMENT OF INFORMATION TECHNOLOGY
STUDENT CIRCULAR 2020-2024 BATCH

10.05.2023

This is to inform you that it is mandatory to select one elective subjects for the VII Semester of Academic year 2023-2024 based on your area of interest. You can select one of the following subjects.

List of Electives

1. SCSA3019 Augmented Reality and Virtual Reality
2. SCSA4001 R Programming

Confirm the elective subject through the following Google form on or before 20.05.2023

https://docs.google.com/forms/d/1-IRPy6FYKnNVIzXtLcq9IEaEOq00NnCIEbv163Nf0QI/edit?usp=sharing_eil_se_dm&ts=66750bcd

HOD/IT

Department of Information Technology
Sathyabama Institute of Science and Technology,
Chennai - 600 119.

SCSA3019	AUGMENTED AND VIRTUAL REALITY	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- To make students to know the basic concepts and framework in virtual reality.
- To teach students the principles and multidisciplinary features in virtual reality.
- To teach students the technology for multimodal user interaction and perception in VR, in particular the visual, audial and haptic interface and behavior.
- To teach students the technology for managing large scale VR environment in real time.
- To provide students with an introduction to the VR system framework and development tools.

UNIT 1 INTRODUCTION OF VIRTUAL REALITY

9 Hrs.

Fundamental Concept and Components of Virtual Reality- Primary Features and Present Development on Virtual Reality - VR systems - VR as a discipline-Basic features of VR systems-Architecture of VR systems-VR hardware -VR input hardware: tracking systems, motion capture systems, data gloves-VR output hardware: visual displays.

UNIT 2 I/O INTERFACE & TECHNIQUES IN VR

9 Hrs.

Multiple Modals of Input and Output Interface in Virtual Reality: Input -- Tracker, Sensor, Digital Glove, Movement Capture, Video-based Input, 3D Menus & 3D Scanner etc. Output -- Visual / Auditory / Haptic Devices. Interactive Techniques in Virtual Reality: Body Track, Hand Gesture, 3D Manus, Object Grasp.

UNIT 3 VISUAL COMPUTATION IN VIRTUAL REALITY

9 Hrs.

Fundamentals of Computer Graphics-Software and Hardware Technology on Stereoscopic Display-Advanced Techniques in CG: Management of Large Scale Environments & Real Time Rendering -Development Tools and Frameworks in Virtual Reality: Frameworks of Software Development Tools in VR. X3D Standard; Vega, MultiGen, Virtoolsetc

UNIT 4 INTRODUCTION OF AUGMENTED REALITY

9 Hrs.

System Structure of Augmented Reality-Key Technology in AR-- AR software development - AR software. Camera parameters and camera calibration. Marker-based augmented reality. Pattern recognition. AR Toolkit

UNIT 5 APPLICATION OF VR IN DIGITAL ENTERTAINMENT

9 Hrs.

VR Technology in Film & TV Production.VR Technology in Physical Exercises and Games. Demonstration of Digital Entertainment by VR.3D user interfaces - Why 3D user interfaces. Major user tasks in VE.Interaction techniques for selection, manipulation and navigation.3DUI evaluation.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to CO1 - Design and implement the VR system.

CO2 - Implement the Augmented Reality software.

CO3 - Analyze and design the framework in VR using various software development tools in VR. CO4 - Design the multi modal user interface.

CO5 - Describe the principles and features of VR and AR.

CO6 - Recognize the technologies used to manage the large scale VR environment in real time.

TEXT / REFERENCE BOOKS

1. Sherman, William R. and Alan B. Craig. Understanding Virtual Reality – Interface, Application, and Design, Morgan Kaufmann, 2002.
2. Fei GAO. Design and Development of Virtual Reality Application System, Tsinghua Press, March 2012.
3. Guangran LIU. Virtual Reality Technology, Tsinghua Press, Jan. 2011.
4. Burdea, G. C. and P. Coffet. Virtual Reality Technology, Second Edition. Wiley-IEEE Press, 2003/2006.

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks:100

PART A: 10 Question of 2 marks each – No choice

PART B: 2 Questions from each unit of internal choice, each carrying 16 marks

Exam Duration:3 Hrs.

20 Marks

80 Marks

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SCSA3019 Augmented Reality and Virtual Reality

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SCHOOL OF COMPUTING

SCSA4001	R PROGRAMMING	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES

- Use R for statistical programming, computation, graphics, and modeling.
- Fit some basic types of statistical models.
- Be able to expand their knowledge of R on their own.
- To identify types of data analytics and data visualization tools.

UNIT 1 INTRODUCTION TO R

9 Hrs.

History and fundamentals of R, Installation and use of R / R Studio / R Shiny, Installing R packages, R – Nuts and Bolts - Getting Data In and Out – Objects in R - Arrays, DataFrame and List - Control Structures and Functions- Loop Functions-Data Manipulation- String Operations- Matrix Operations.

UNIT 2 R DATA INTERFACES

9 Hrs.

CSV Files, XSL files, XML files, Web Data- Data Preprocessing: Missing Values, Outliers, Principle Component Analysis - Data Visualization – Charts & Graphs- Pie Chart, Bar Chart, Box plot, Histogram, Line graph, Scatter Plot.

UNIT 3 STATISTICAL MODELING IN R

9 Hrs.

Descriptive statistics- R Packages: Regression (MASS package) - Distribution (STATS package) - ANOVA - Time Series Analysis.

UNIT 4 MACHINE LEARNING IN R

9 Hrs.

Classification: Decision Trees, Random Forest, SVM – Clustering: K-Means, Fuzzy - Association Rule Mining - Outlier Detection.

UNIT 5 BUILDING R SHINY APPLICATION

9 Hrs.

User Interface, Control Widgets, Dynamic Output - R Hadoop: Installation of RHadoop-rhdfs –rmr2-Data Analysis with RHadoop- Case Study.

Max. 45 Hrs.

COURSE OUTCOMES

On completion of the course, student will be able to

- CO1 - List motivation for learning R programming language
- CO2 - Access online resources for R and import new function packages into the R workspace
- CO3 - Import, review, manipulate and summarize data-sets in R
- CO4 - Explore data-sets to create testable hypotheses and identify appropriate statistical tests
- CO5 - Perform appropriate statistical tests using R
- CO6 - Create and edit visualizations with R

TEXT / REFERENCE BOOKS

1. Hands-On Programming with R: Write Your Own Functions and Simulations By Garrett Golemund, O'Reilly Media, Inc., 2014.
2. R for Data Science, Hadley Wickham, Garrett Golemund, O'Reilly Media, Inc. 2016.
3. Introduction to Statistics and Data Analysis - With Exercises, Solutions and Applications in R By Christian Heumann, Michael Schomaker and Shalabh, Springer, 2016
4. The R Software-Fundamentals of Programming and Statistical Analysis - Pierre Lafaye de Micheaux, Rémy Drouilhet, Benoit Liquet, Springer 2013
5. A Beginner's Guide to R (Use R) By Alain F. Zuur, Elena N. Ieno, Erik H.W.G. Meesters, Springer 2009

END SEMESTER EXAMINATION QUESTION PAPER PATTERN

Max. Marks: 100

Exam Duration: 3 Hrs.

PART A: 10 Questions of 2 marks each-No choice

20 Marks

PART B: 2 Questions from each unit with internal choice, each carrying 16 marks

80 Marks

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