List of New Courses Introduced in the Academic Year 2020-2021

EVEN SEM

S.No	Course Code	Name of the Course
1	SCSA1204	Python Programming
2	SAIC4002	Society 5.0
3	SCSA2402	Code Optimization and Debugging-II

SCSA1204	PYTHON PROGRAMMING	L	T	P	Credits	Total Marks
		3	0	0	3	100

COURSE OBJECTIVES
- ➢ To understand why Python is a useful scripting language for developers.
- ➢ To learn how to use lists, tuples, and dictionaries in Python programs.
- ➢ To build and package Python modules for reusability.
- ➢ To understand how to read and write files in Python.
- ➢ To learn how to use exception handling in Python applications for error handling.
- ➢ To design and program Python applications.

UNIT 1   INTRODUCTION   9Hrs.
History of Python- Introduction to the IDLE interpreter (shell) - Data Types - Built-in function - Conditional statements - Iterative statements- Input/output functions - Compound Data Types - Nested compound statements – Introduction to Object Oriented Concepts.

UNIT 2   FILES AND EXCEPTIONS HANDLING, MODULES, PACKAGES   9Hrs.
File Operations –Iterators - Exception handling - Regular Expressions- Creating Modules-Import Statement-Introduction to PIP-Installing Packages via PIP-Using Python Packages.

UNIT 3   GUI PROGRAMMING   9 Hrs.
GUI Programming in Python - Introduction to GUI library - Layout management - Events and bindings - Fonts – Colours - Canvas - Widgets (frame, label, button, check box, entry, listbox, message, radiobutton, text, spinbox).

UNIT 4   DATABASE AND NETWORK   9Hrs.
Database (using NoSQL): Connector Module –Cursor – Statements - Exceptions in database.   Network connectivity: Socket module - Client – Server – Email – URLAccess.

UNIT 5   CASE STUDY   9Hrs.
Web Programming using Python Image Processing – Facebook Analysis – Twitter Analysis.

Max. 45 Hrs.

COURSE OUTCOMES
- **CO1:** Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python.
- **CO2:** Do the decision making and write functions in Python.
- **CO3:** ExplainhowtodesignGUIApplicationsinPythonandevaluatedifferentdatabaseoperations.
- **CO4:** Design and develop Client Server network applications using Python.
- **CO5:** Ability to design real life situational problems and think creatively about solutions of them.
- **CO6:** Apply the best features of mathematics, engineering and natural sciences to program real life problems.

TEXT /REFERENCE BOOKS
1. Y. Daniel Liang, "Introduction to Programming Using Python", Pearson,2013.
2. Python Notes for Professionals by Stack Overflow Documentation (https://books.goalkicker.com/PythonBook/)
3. Dr. Charles R. Severance, " Python for Everybody- Exploring Data Using Python 3", 2016.
4. Paul Gries, Jennifer Campbell, Jason Montojo, "Practical Programming: An Introduction to Computer Science using Python 3", Pragmatic Bookshelf, 2nd Edition,2014.
5. Magnus Lie Hetland, "Beginning Python: From Novice to Professional",Apress.

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

SAIC4002	SOCIETY 5.0	L	T	P	Credits	Total Marks
		2	0	2	2	100

COURSE OBJECTIVES
➢ To understand the society 5.0, Cyberspace and Physical Space to solve
➢ To Provide knowledge and overview about Big data, IoT and Artificial Intelligence for Society 5.0.
➢ Discuss To understand Augmented Reality and Virtual Reality, Next Generation Sensors
➢ To discuss about Challenges and Technologies towards Society 5.0, Security of Cyber Physical Systems
➢ Discuss to apply society 5.0 Innovation with Future Trends with Applications

UNIT 1   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 Society 5.0-Data Driven to Society- Modeling real world Issues.

UNIT 2   EMERGING TECHNOLOGIES WITH SOCIETY 5.0   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
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UNIT III   INTRODUCTION TO INDUSTRY 4.0   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 -Cyber security in Industry 4.0-Basics of Industrial IoT. Common Issues in Industry 4.0 and Society 5.0.

UNIT IV   CHALLENGES AND TECHNOLOGIES TOWARDS SOCIETY 5.0   9hrs
Overcome with Economic Development and Solution to Social Problems in Society 5.0- Security of Cyber Physical Systems -Embedded and CPS security - attacks and countermeasures, authentication, identification, 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.

UNIT V   INNOVATION WITH FUTURE TRENDS WITH APPLICATIONS   9hrs
Mobility – Health Care –Agriculture- Food Products – Disaster Prevention.

                                                                                        MAX.45 Hours
COURSE OUTCOMES

On completion of the course the 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-Centered 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 updated
         requests.
    CO6: Design and apply in Health Care, Agriculture, Food Products, Disaster Prevention

SCSA2402	CODE OPTIMIZATION AND DEBUGGING - II	L	T	P	Credits	Total Marks
		0	0	2	1	100

COURSE OBJECTIVES

- ➢ To analyze the programming logic and apply the appropriate design approach.
- ➢ To optimize the speed of the program by using proper utilization of available memory.
- ➢ To make use of performance tools for tracking the application.
- ➢ To have a capacity to analyze and design software systems, components to meet desired needs.
- ➢ To have a working ability and grasping attitude to design and conduct object-oriented analysis.

SUGGESTED LIST OF EXPERIMENTS

1. Implement minimum heap allocation in java.
2. Implement string builder in java.
3. Implement concurrency control using java.
4. Checking the current log level using java.
5. Implement Garbage collection using java.
6. Implement grid line in object oriented analysis and design.
7. Implement grid with two sets of diagonal lines in object oriented analysis and design.
8. Implement concurrency in object oriented analysis and design.
9. Implement design optimization for removing non usable associations in object oriented analysis and design.
10. Implement sparing and storing derived attributes associations in object oriented analysis and design.

COURSE OUTCOMES

On completion of the course, student will be able to

CO1 - Understand the impact of performance hits during application
runtime. CO2 - Implement optimal functions for improving the
performance.
CO3 - Analyze the proper utilization of memory for code.
CO4 - Design experiments using UML, as well as to analyze and evaluate their models.
CO5 - Discussing and understanding analysis and design heuristics that are involved in the
course.
CO6 - Students will learn and understand how to map one style of diagrammatic notations into
another.