CSOL01	**Programming with Java**	L	T	P	C
		4	0	0	3

Course Objectives:
1. To understand the basic concepts and fundamentals of platform independent object oriented language.
2. To demonstrate skills in writing programs using exception handling techniques and multithreading.
3. To understand streams and efficient user interface design techniques.

Course Outcomes: After successful completion of the course, the students are able to
1. Use the syntax and semantics of java programming language and basic concepts of OOP.
2. Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.
3. Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes.
4. Design event driven GUI and web related applications which mimic the real word scenarios.

Course Content:

UNIT I   12 Periods
Introduction: Introduction to java, java buzzword, data types, dynamic initialization, scope and life time, operators, control statements, arrays, type conversion and casting, finals & blank finals.
Classes and Objects: Concepts, methods, constructors, usage of static, access control, this key word, garbage collection, overloading, parameterpassing mechanisms, nested classes and inner classes.
Inheritance: Basic concepts, access specifiers, usage of super key word,method overriding, final methods and classes, abstract classes, dynamicmethod dispatch, Object class.

UNIT II   12 Periods
Interfaces: Differences between classes and interfaces, defining aninterface, implementing interface, variables in interface and extendinginterfaces.
Packages: Creating a Package, setting CLASSPATH, Access controlprotection, importing packages.
Exception Handling: Concepts of Exception handling, types ofexceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes.

UNIT III   12 Periods
Strings: Exploring the String class, String buffer class, Command-linearguments.
Library: Date class, Wrapper classes.
Multithreading: Concepts of Multithreading, differences betweenprocess and thread, thread life cycle, Thread class, Runnable interface,creating multiple threads, Synchronization, thread priorities, inter threadcommunication, daemon threads, deadlocks.
I/O Streams: Streams, Byte streams, Character streams, File class, Filestreams.

UNIT IV   12 periods
Applets: Concepts of Applets, life cycle of an applet, creating applets, passing parameters to applets, accessing remote applet, Color class and Graphics
Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling events.
AWT: AWT Components, windows, canvas, panel, File Dialog boxes, Layout Managers, Event handling model of AWT, Adapter classes, Menu, Menu bar.

Learning Resources:
Text Book:
1. Java The Complete Reference 9th Edition, Herbert Schildt, McGraw Hill Education (India) Private Limited, New Delhi.

Reference Books:
1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI.
2. Introduction to Java programming, By Y.DanielLiang,Pearson Publication.

CSOL02	Relational Database Management Systems(RDBMS) Open Elective	L	T	P	C
		4	0	0	3

Course Objectives:
1. To understand the fundamental concepts, historical perspectives, current trends, structures, operations and functions of different components of Databases.
 2. To understand the types of integrity constraints in a relational database system and the concepts of SQL to create and access the database.
3. To understand basic concepts of ER model and database design using normalization process.
4. To understand transaction processing.

Course Outcomes: After successful completion of the course, the students are able to
1. Describe the basic concepts of database systems.
2. Explain various data models and database system architectures.
3. Write queries to access database using SQL.
4. Design a database using normalization theory and explain the conceptsof transaction processing.

Course Content:

UNIT I   12 Periods

Databases and Database Users: Introduction - An Example - Characteristics of the Database Approach - Actors on the Scene - Workers behind the Scene - Advantages of Using the DBMS Approach.

Database System Concepts and Architecture: Data Models, Schemas, and Instances - Three-Schema Architecture and Data Independence - Database Languages and Interfaces - The Database System Environment - Centralized and Client/Server Architectures for DBMSs.

UNIT II   12 Periods

Data Modeling Using the Entity-Relationship (ER) Model: Using High- Level Conceptual Data Models for Database Design - An Example Database Application - Entity Types, Entity Sets, Attributes, and Keys - Relationship Types, Relationship Sets, Roles, and Structural Constraints - Weak Entity Types.

The Relational Data Model and Relational Database Constraints: Relational Model Concepts - Relational Model Constraints and Relational Database Schemas - Update Operations, Transactions, and Dealing with Constraint Violations.

UNIT III   12Periods

SQL-99: Schema Definition, Constraints, Queries, and Views: SQL Data Definition and Data Types - Specifying Constraints in SQL - Schema Change Statements in SQL - Basic Queries in SQL - More Complex SQL Queries - INSERT, DELETE, and UPDATE Statements in SQL - Views (Virtual Tables) in SQL.

Functional Dependencies and Normalization for Relational Databases: Informal Design Guidelines for Relation Schemas - Functional Dependencies - Normal Forms Based on Primary Keys - General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form.

Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Processing - Transaction and System Concepts - Desirable Properties of Transactions -Characterizing Schedules Based on Recoverability -Characterizing Schedules Based on serializability.

Learning Resources:
Text Book:
1. Fundamentals of Database Systems, RamezElmasri and SHamKanthB.NavatePearson Education, 5th edition.

Reference Books:
1. Introduction to Database Systems, C.J.Date Pearson Education.
2. Data Base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill, 3rdEdition.
3. Data base System Concepts, Abraham Silberschatz, Henry.F.Korth, McGraw hill, 5th edition.

CSOL03	Introduction to Python Programming	L	T	P	C
	Open Elective				
		4	0	0	3

Course Objectives:
1. To introduce the fundamentals of Python Programming language.
2. To impart knowledge of Object – Oriented Programming using Python
3. To teach students processing of files, mutable and immutable data types.

Course Outcomes
After completion of the course, the students will be able to
1. Discuss the fundamentals of Python programming language.
2. Create user defined functions, strings, lists and perform searching & sorting.
3. Explain Object – Oriented programming features of Python and process tuples and sets.
4. Write programs to manipulate dictionaries and files.

Course Content:

UNIT I   [CO1]15 Periods
Basics of Python Programming: Python Character set, Token, Python Core Data Type , The print() function, Assigning value to a variable, Multiple assignments,, Writing simple programsin Python, the input() Function, Python inbuilt Functions: the ord and chr functions

Operators and Expressions: Introduction, Operators and Expressions, Arithmetic operators Operator precedence and Associativity, Changing Precedence and Associativity, Bit Wise operator, The compound Assignment operator.

Decision making statements: Introduction, Boolean operators Decision making statements, Conditional Expressions.
Loop Control Statements: The while, range, for, Nested Loops, The break statement, The continue statement

UNIT II   [CO2]15 Periods
Functions: Introduction, Syntax and Basics of a Function, Use of a Function, parameters with Arguments in a Function The local and Global scope of a variable, The return Statement, Recursive Functions.

Strings: Introduction, the str class, Basic Inbuilt Python functions for String, the index[] Operator, Traversing a String, Immutable strings, String operators, String operations.

Lists & List Processing: Searching: Linear search, Binary search,Sorting: Bubble sort, Selection sort and Insertion sort;
UNIT III   [CO3]15 Periods
Object Oriented Programming: Classes, objects and Inheritance, Introduction, Defining Classes, Method Overloading, Inheritance.

Tuples and Sets: Tuples, Creating Tuple() Function, inbuilt function for Tuples, Indexing and Slicing Operationsin Tuples, passing Arguments and Variable length Arguments in Tuples Lists and Tuple, Traverse Tuples from a List, The zip() Function inverse zip Function; More Programs in Tuples.

Sets: Creating Sets, The set in and not in operator, The python set classes, Set Operations

UNIT IV   **[CO4]15 Periods**

Dictionaries: Need for Dictionaries, Basics of Dictionaries, creating a Dictionary, Adding and Replacing Values, retrieving values Formatting Dictionaries, Deleting Items, Comparing Two Dictionaries, The Methods of Dictionary Class, Traversing Dictionaries, Nested Dictionaries, Simple Programs in Dictionaries, and Polynomials as Dictionaries.

File Handling: Introduction, Need for File handling Text input and output, The seek() Function, Binary Files, Accessing and manipulating Files and Directories in a Disk.

Learning Resources:

Text Book:

1.   Programming and Problem Solving with Python-Ashok Namdev Kamthane and Amit Ashok Kamthane , Tata McGraw Hill,2018 Edition

Reference Books:

1. Beginning Python from novice to professional by Magnus Lie Hedland, 2ndEdition,Apress
2. ProgramminginPython3–AcompleteintroductiontothePythonLanguagebyMark Summerfield,Pearson.
3. Learning Python by Mark Lutz, 5thEdition,O'Reilly.
4. Programming Python by Mark Lutz, 4thEdition,O'Reilly.

CSOL04	Internet of Things	L	T	P	C
	Open Elective	4	0	0	3

Course Objectives:

1. Elaborate the interconnection and integration of the physical world and IOT.
2. Relate the virus IOT applications and its infrastructures.
3. Categorize the concept of setting up IOT devices with python.
4. Explain the concepts of interfacing sensors with raspberry pi.

Course Outcomes:

1. Explain the physical and logical design of IoT.
2. Discuss the application areas of IoT.
3. Explain the network management protocols and M2M system management.
4. Design IoT applications using Raspberry Pi.

Course Content:

UNIT I   [CO1]   12 periods

Introduction & Concepts: Introduction to Internet of Things, Physical Design of IOT.

Design of IOT: Logical Design of IOT, IOT Enabling Technologies, IOT Levels.

UNIT II   [CO2]   12periods

Domain Specific IOTs: Home Automation, Cities, Environment, Energy, Retail.

Applications: Logistics, Agriculture, Industry, Health & Life Style.

UNIT III   [CO3]   12 periods

M2M & System Management: M2M, Difference between IOT & M2M, SDN & NFV for IOT, Software defined Networking, Network Function Virtualization, Need for IOT Systems Management.

NETCONF-YANG: Simple Network Management Protocol, Limitations of SNMP, Network Operator Requirements, NETCONF, YANG, IOT Systems, management with NETCONF-YANG

UNIT IV   [CO4]   `   12 periods

Logical Design using Python:
Control Flow, Functions, Modules, Packages, File Handling, Date/Time Operations, Classes, Python Packages
IOT Physical Devices: What is IOT Device, Exemplary Device, Board, Linux on Raspberry Pi.

Endpoints: Interfaces, and Programming & IOT Devices.

Learning Resources:

Text Book:

1. Vijay Madisetti, Arshdeep Bahga, Internet of Things A Hands-On-Approach, 2014, ISBN: 9780996025515

Reference Books:

1. Adrian McEwen, Designing the Internet of Things, Wiley Publishers, 2013, ISBN: 978-1-118-43062-0
2. Daniel Kellmereit, The Silent Intelligence: The Internet of Things, 2013, ISBN: 0989973700
3. Internet of Things: Design Principles and Applications

Web References:

1. https://en.wikipedia.org/wiki/Internet_of Things
2. www.iot-a.eu/