S.Y.B.Sc. (Computer Science) (CBCS 2018) Semester –III

CS -31 : Object Oriented Programming with C++

Course Outcomes:

After completion of this course, a student shall be able to:

- perform object oriented programming to develop solutions to problems demonstrating usage of control structures, modularity, I/O. and other standard language constructs.
- demonstrate adeptness of object oriented programming in developing solutions to problems demonstrating usage of data abstraction, encapsulation, and inheritance.
- demonstrate ability to implement one or more patterns involving realization of an abstract interface and utilization of polymorphism in the solution of problems which can take advantage of dynamic dispatching.

Total credits: 04 **Total lectures: 60**

Course content

Prerequisite: Knowledge of C Programming Language

1. Principles of Object oriented Programming [04]

Object oriented concepts; Features, advantages and Applications of OOPS

2. Introduction to C++ Programming Language [08]

Tokens, Expressions ,Control structures; Data types, new operators and keywords, using namespace concept; Simple C++ Program; Introduction to Reference variables; Usage of 'this' pointer; Classes and Objects; Access specifiers; Defining Data members and Member functions; Array of objects

3. Functions in C++ [12]

Call by reference, Return by reference; Function overloading and default arguments; Inline function; Static class members; Friend Concept – Function, Class

4. Constructors and destructor [05]

Constructor; Types of constructors; Memory allocation (new and delete); Destructor

5. Operator overloading [08]

Overloading function; Overloading Unary and Binary operators; Overloading using friend function; Type casting and Type conversion

6. Inheritance [06]

Types of inheritance with examples; Constructors and destructor in derived classes; Virtual base classes, Virtual functions and Pure virtual function; Abstract base classes

7. Managing Input and Output using C++ [05]

Managing console I/O; C++ stream classes; Formatted and unformatted console I/O; Usage of manipulators

Reference Books :

1) Object Oriented programming with C++ 4th Edition by e .Balaguruswamy, Tata Mc-Graw Hill Publication.
2) The C++ Programming Language by Bjarne Stroustrup, Addison Wesley, 2000
3) Object oriented programming in C++, Robert Lafore, Galgotia Publication.

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S.Y.B.Sc. (Computer Science) (CBCS 2018) Semester –III

CS-32 : Introduction To .Net Using C#

Course Outcomes:

At the end of this course, a student shall be able to :

- Giving the students the insides of the .net environment in c#.
- It covers the concepts of web servers and web application, server design methodology with an object oriented concepts, client side programming, server side programming
- It also covers usage of recent platform used in developing web applications such as .Net environment like C# and Asp.net

Total credits: 04 **Total lectures: 60**

Course content

1) **Introduction to .Net Technology:** **(12)**

.Net Framework, common Language Runtime, Common Language Specification, Intermediate Language Code, Just-In-Time Compiler, Assemblies, Manifest, Metadata ,Global assembly Cache

2) Introduction TO C# **(10)**

Introducing C#, Overview of C#, Literals, Variables, Data Types, Operators, Expressions, Branching, Looping, Methods, Arrays, Strings, Structures, Enumerations

3) Exception Handling **(10)**

Using Structured Exception(try-catch-finally

4) Windows Forms using C# : **(10)**

Text Box, Buttons, Labels, Checks Boxes, radio Buttons, List Boxes, Combo Boxes, Picture Boxes, Scrollbars, Timer, Menus, Built-in Dialogs, Image List, Toolbars, Status Bar and Progress bars, Event and Delegates, Tracing, Debugging

5) Object Oriented Programming: **(10)**

Class and Objects Properties, methods and events, Constructor and Destructor, Method overloading, Inheritance, Access modifiers(Public, Private, Protected, Friend), Overriding and shadowing, Interfaces, Polymorphism, Private and Shared Classes

6) File Handling: **(08)**

File stream class, Stream Writer, Stream Reader, Binary Reader, Binary Writer Classes, File and Directory Classes

TEXT BOOKS:

1. E. Balagurusamy, “Programming in C#”, Tata McGraw-Hill, 2004. (Unit I, II)
2. J. Liberty, “Programming C#”, 2nd ed., O’Reilly, 2002. (Unit III, IV, V)

REFERENCE BOOKS:

1. Herbert Schildt, “The Complete Reference: C#”, Tata McGraw-Hill, 2004.
2. Robinson et al, “Professional C#”, 2nd ed., Wrox Press, 2002.
3. Andrew Troelsen, “C# and the .NET Platform”, A! Press, 2003.
4. Thamarai Selvi, R. Murugesan, “A Textbook on C#”, Pearson Education, 2003.
5. Programming Microsoft ASP.NET Dino Esposito

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S.Y.B.Sc. (Computer Science) (CBCS 2018) Semester –III

CS– 33 : Linear Algebra

Course Outcomes:

At the end of this course, a student will be able to:

- summarize linear system, matrix transformation, solution of linear systems of equations and LU decomposition.
- understand the real vector spaces, subspaces, linear independence, basis and dimensions.
- find linear independence, linear span, basis and dimension of vector spaces.
- understand the concepts of eigen values and eigen vectors and diagonalization.
- solve kernel and range of linear transformation

Total credits: 04 **Total lectures: 60**

Course content

[1] Linear Equations and Matrices **[15]**

(1.1) Linear systems (1.2) Matrices

(1.3) Dot Product and Matrix Multiplication (1.4) Matrix Transformations

(1.5) Solutions of Linear Systems of Equations (1.6) LU- Factorization.

[2] General Vector Spaces **[15]**

(2.1) Real vector spaces. (2.2) Subspaces.

(2.3) Linear independence. (2.4) Basis and dimensions.

(2.5) Row space, column space and null space. (2.6) Rank and Nullity.

[3] Eigen values and Eigen vectors **[15]**

(3.1) Eigen values and Eigen vectors. (3.2) Diagonalization.

(3.3) Quadratic forms.

(3.4) Using scilab : (i)Find Eigen values and Eigen vectors. (ii) Diagonalization

[4] Linear Transformations **[15]**

(4.1) General linear transformations.

(4.2) Kernel and range. (Rank nullity theorem without proof.)

(4.3) Inverse linear transformation. (4.4) Matrix of general linear transformation

TEXT BOOKS:

(1) S.Y.B.Sc. (Computer Science) Sem.-I, Paper-I Linear Algebra, Nirali Prakashan

(2) S.Y.B.Sc. (Computer Science) Sem.-I, Paper-I Linear Algebra, Vision Publication

(3) F.Y.B.Sc.. (Computer Science) Geometry and Calculus, Nirali Prakashan

(4) F.Y.B.Sc.. (Computer Science) Geometry and Calculus, Vision Publication

(5) Elementary Linear Algebra (Applications Version) by Howard Anton, Chris Rorres. (Seventh Edition) John Wiley & Sons, Inc. Sections: 5.1 to 5.6, 7.1, 7.2, 9.5, 9.6, 8.1 to 8.4

(6) Discrete Mathematical Structures (sixth edition), Kolman, Busby and Ross. PHI. Sections: 9.5, 11.1 to 11.3

REFRENCE BOOKS:

(1) M. Artin, Algebra, Prentice Hall of India , New Delhi, (1994).

(2) Hoffmann and Kunze Linear Algebra, Second Ed. Prentice Hall of India New Delhi, (1998)

(3) S. Lang, Introduction to Linear Algebra, Second Ed. Springer-Verlag, New Yark, (1986).

(4) A. Ramchandra Rao and P. Bhimasankaran, Linear Algebra, Tata mcgraw Hill, New Delhi (1994).

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S.Y.B.Sc. (Computer Science) (CBCS 2018) Semester –III

CS-34 : Computer Oriented Numerical Methods

Course Outcomes :

At the end this course, a students will be able to :

- understand and explain forward and backward pass computation, critical path of PERT and CPM terms.
- solve non- linear equation by using bisection, secant, regula-falsi, Newton-Raphson methods.
- understad creating a polynomial by using Newton's backward and forward formulae, Lagrange's interpolation formula, Hermite interpolation.
- solve integration by using bisection, secant, regula-falsi, Newton-Raphson methods.
- solve differential equation examples on Euler's method, Runge-Kutta second and fourth order formula.

Total credits: 04 **Total lectures: 60**

Course content

[1] PERT and CPM Computations [12]

(1.1) Phases of project schedulding
(1.2) Network logic , numbering the events (Fukerson's rule.)
(1.3) Measure of activity
(1.4) PERT: forward and backwad pass computations slack , critical path.
(1.5) CPM terms, critical path, float.
(1.6) Using scilab
i. Use of ' deff ' command for one and two variables functions.
ii. Draw 2-D and 3-D graph for some standard functions. E.g. x^2 , sin (x), exp(x), x^3+y^3 etc .

[2] Solutions of Non – linear Equations [12]

(2.1) Location of Roots
(2.2) Bisection, Secant, Regula-Falsi and Newton-Raphson methods, Comparison Of these methods
(2.3) Acceleration of convergence Aitken's Process
(2.4) Regula-Falsi method and Newton-Raphson method using Scilab.

[3] Polynomial Interpolation & Approximation [12]

(3.1) Finite differences: Forward, Backward and Central
(3.2) Detection of errors using different tables
(3.3) Newton's backward and forward formulae for interpolation
(3.4) Lagrange's interpolation formulae for unequal intervals
(3.5) Least square approximation by Polynomials up to third degree
(3.6) Hermite Interpolation.
(3.7) Newton Forward, Newton Backward and Lagrange's Interpolation by using Scilab

[4] Numerical Differentiation and Integration [10]

(4.1) Numerical differentiation using interpolating polynomials
(4.2) Trapezoidal rule, Simpson's $(1/3)^{rd}$ rule and Simpson's $(3/8)^{th}$ rule
(4.3) Extrapolation to the limit : Ramberg Interpolation
(4.4) Numerical integration by Simpson's (1/3)rd, numerical integration by Simpson's (3/8)th rule, rule by using Scilab

[5] Solution of Ordinary Differential Equations &solution of Simultaneous Linear Equations **[14]**

(5.1) Numerical Integration By Tayler Series
(5.2) Euler's method
(5.3) Runge-Kutta method: 2^{nd} and 4^{th} orders
(5.4) Predictor corrector method
(5.5) Gaussian Elimination, Pivoting Strategy, Conditional Equations
(5.6) Modification of Gaussian Elimination to Compute Inverse of Matrix
(5.7) Comparison of direct and iterative methods
(5.8) Examples on Euler's method, Runge-Kutta second and fourth order formula by using Scilab.

TEXT BOOK

Prof S.R.Patil; Prof S.G.Gujrathi; Prof D.M. Pandhare; Numerical Methods And Operation Research; Nirali Prakashan,1998.

REFRENCE BOOKS:

1.S.S.Sastry; Introductory methods of Numerical Analysis ; Prentice-Hall of India (3^{rd} edition) 2000
2. J.H.Mathews; Numerical methods for Mathematics, Science and Engineering (2^{nd} edition); Prentice-Hall of India ,1994.
3. R.J. Dromey; How To Solve It By Computer; Prentice-Hall Of India; 1982
4. Anthony Ralston,Philip Rabinowitz; A First Course in Numerical Analysis; (2^{nd} edition) International Student edition; mcgraw-Hill Book Company; TOKYO; 1978
5. Computer Oriented Numerical Methods-Rajaraman.
6. Introduction To Numerical Analysis-C.E. Froberg.
7. Introduction To Applied Numerical Analysis-C.E.Froberg.
8. Numerical Methods that works-Forman S. Action.
9.Numerical Methods in Fortran-J.M.Mcormik.
10. Numerical Methods For SC & Engg - R.G.Stanton (Prentice Hall)

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S.Y.B.Sc. (Computer Science) (CBCS 2018) Semester –III

CS-35 : Digital systems and Microprocessors

Course outcomes:

At the end of this course, a student shall be able to:

- explore the concept of data convertors and its applications.
- implement memory concepts for digital circuit design.
- understand and apply the concepts of microprocessors
- explain the behaviour of multicore technology

Total credits: 04 **Total lectures: 60**

Course content

1. Data Converters (12)

Digital to Analog Converter (DAC): Resistive divider, R-2R ladder, Parameters of DAC. Analog to Digital Converter (ADC): Types of ADC- Flash, Successive approximation, dual slope. Parameters of ADC. Applications of DAC and ADC .

2. **Memory organization (16)**

Memory Architecture, Memory Hierarchy, Introduction to USB storage device, Memory parameters like Access time, speed, capacity, cost , Associative Memory, Cache memory, cache mapping techniques, virtual memory, virtual memory mapping: paging and segmentation.

3. Computer Organization (16)

Concept of Address Bus, Data Bus, Control Bus. Register based CPU organization, stack organization, I/O organization: need of interface, block diagram of general I/O interface. Working concepts like polling, interrupt initiated data transfer.

Concept of DMA , DMA transfer, DMA Controller Serial communication: Synchronous, asynchronous and their data transmission formats, RS–232, General block diagram of PPI and UART

4. Microprocessor (16)

Evolution of Microprocessor (8086 to Pentium 4) General register organization, Stack Organization, Instruction formats, Addressing modes .Generations of microprocessors, general operation of microprocessors Concept of RISC and CISC, Von-Neumann & Harvard Architecture Concept of pipeline. Architecture of basic microprocessors 8086 and basic version of Pentium .Concept of multicore processors.

Reference books

1. Microprocessor and interfacing by Douglas Hall, Tata Mcgraw-Hill Edition
2. Computer organization and Architecture by William Stallings
3. The Intel Microprocessor by Barry B.Brey.
4. Computer architecture and organization by Rifiqzaman and Chandra.
5. Computer Organization J.P. Hays TMH
6. The Pentium Microprocessor by James Antonakos(PEA)
7. The Intel Microprocessor by Barry.B.Brey
8. Digital design : M. Morris Mano, Prentice-Hall of India

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S.Y.B.Sc. (Computer Science) (CBCS 2018) Semester –III

CS-36 : Principles of Communication

Course outcomes

At the end of this course, a student shall be able to:

- Apply the basics of communication systems in day today life
- Implement the techniques modulation, demodulation and multiplexing of signals
- Analyze and use digital communication techniques
- Analyze the concepts in advanced wireless communication

Total credits: 04 **Total lectures: 60**

Course content

1. **Introduction to Electronics Communication (10)**
   Importance of Communication, Elements of communication systems Electromagnetic spectrum, type of communication, Concepts of communication system: channel bandwidth, Nyquist theorem, S/N ratio, channel capacity, error handling, Shannon theorem, concept of companding, Data rate, baud rate, serial communication and protocol.
2. **Modulation and Demodulation. (18)**
   Introduction to concepts of modulation and demodulation. Modulation techniques: Analog modulation: Amplitude, Phase and Frequency modulation, Circuit diagram and working of transistorized amplitude modulator and diode demodulator. Equation of amplitude modulated wave, modulation index and frequency spectrum.
   Digital modulation, PAM, PCM, delta modulation, MODEM – concept of ASK, FSK, QPSK, MSK, GMSK.
3. **Multiplexing and Multiple Access Techniques. (16)**
   Multiplexing ,Space division multiplexing, Time division multiplexing, Frequency Division Multiplexing, Code division multiplexing, Introduction to multiple access, FDMA, TDMA,CDMA
4. **Introduction to wireless and Mobile Communication. (16)**
   Introduction to wireless communication system and its concept. Introduction to antennas, working principle and parameters of antenna. Introduction to mobile communication, Cellular concept, Working of GSM: Hand over, Introduction to GPRS, Wi-Fi and blue tooth Applications. Introduction to RFID, Zigbee.

Recommended Books:

1. Digital and Data Communication, 4th edition by Micheal A. Miller.
2. Communication Electronics by Frenezel Louis E.
3. Wireless Communication, 2nd edition. Rappaport.
4. Mobile Communication. Schiller Jochen.
5. Wireless Communications and Networks. William Stallings

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S.Y.B.Sc. (Computer Science) (CBCS 2018) Semester –III

CS PV: Computer Science Practical - V

Course outcomes:

At the end of this course, a student shall be able to :

- understand how **C++** improves C with object-oriented features.
- learn how to write inline functions for efficiency and performance.
- learn the syntax and semantics of the **C++ programming** language.
- learn how to design **C++** classes for code reuse

Total Credits 2

Course Content

Practical Examination

A) Internal Marks 40 : Completion of journal , attendance and involvement in activities.

B) Annual examination: Maximum marks: 60 Marks and duration is 3 Hrs .
40 marks: Practical work 30 marks and 10 marks for oral

PROGRAM LIST IN C++

1. Write a program in C++ to implement class concept for creating and displaying employee data.
2. Write programs in C++ to implement function overloading and operator overloading(unary, binary , relational).
3. Write a program in C++ to implement Write a program in C++ to implement virtual function.
4. Write a program in C++ to implement constructor and destructor to calculate net salary of n employees.
5. Write a program in C++ to implement the concept of inline functions.
6. Write a program in C++ to use scope resolution operator for member definition.
7. Write a program in C++ to implement how a function can act as a friend with one or more classes.
8. Write programs in C++ to implement simple, hybrid, multiple , multilevel inheritance ..

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S.Y.B.Sc. (Computer Science) (CBCS 2018) Semester –III

CS PVI: Computer Science Practical - VI

Course outcomes:

At the end of this course, a student shall be able to :

- To use basic concepts for building various applications in electronics.
- To understand design procedures of different electronic circuits as per requirement.
- To build experimental setup and test the circuits.
- To develop skills of analyzing test results of given experiments.

Total Credits 2

Course Content

Practical Examination

A) Internal Marks 40 : Completion of journal , attendance and involvement in activities.

B) Annual examination: Maximum marks: 60 Marks and duration is 3 Hrs .
40 marks: Practical work 30 marks and 10 marks for oral

1. Create basic calculator utility in c#.
2. Write c# program using timer & progress bar controls
3. Write a program in c# using list box control , check box control, radio buttons**.**
4. Write program in c# for implementing single and multiple inheritance.
5. Write program in c# for implementing interface, polymorphism
6. Write c# program for exception handling. (Try-Catch)
7. Write program using File handling in c#
8. Write program using control structures.

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S.Y.B.Sc. (Computer Science) (CBCS 2018) Semester –III

CS EIII: Electronics Practical -III

Course outcomes:

At the end of this course, a student shall be able to :

- Use of basic concepts for building various applications in electronics.
- Understand design procedures of different electronic circuits as per requirement.
- Build experimental setup and test the circuits.
- Develop skills of analyzing test results of given experiments.

Total Credits 2

Course Content

- Examination will be conducted on 8 experiments .

Practical Examination

A) Internal Marks 40 : Completion of journal , attendance and involvement in activities.

B)Semester examination: 60 Marks in One session of 3 Hrs .

60 marks Distribution: Practical work 50 marks and 10 marks for oral

Distribution of 50 marks

Circuit diagram / flowchart and algorithm	15	
Connection / program		10
Demonstration and working explanation		10
Observation table		10
Result analysis / conclusion	05	

(Note : Any 8 experiments should be performed)

1. Study of SMPS.
2. Study of 8038 function generator.
3. DC motor drive and speed control.
4. I-V characteristics temperature sensor AD 590.
5. Analog multiplexers.
6. Analog to Digital converter using discrete components/IC LM 234/74148 or IC 7109/Flash ADC
7. Digital to Analog converter using discrete components.
8. Comparison of Monostable using IC-741 and IC-74121.
9. Simple assembly language program : addition,subtraction
10. Simple assembly language program: multiplication, division
11. Simple assembly language program to find smallest and largest number.
12. LM-35 based temperature sensing system/Optocoupler /opto-isolator base system.
13. Low Pass Filter and High Pass Filter using IC-741 Op Amp.
14. Build and test Hamming Code generator and detector circuit

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S.Y.B.Sc. (Computer Science) (CBCS 2018) Semester –III

CS-37 : Cloud Computing - I

Course Outcomes:

At the end of this course, a student shall be able to:

- understand the concepts of cloud computing
- apply cloud computing environment.
- use various platforms
- employ various applications that uses cloud computing

Total credits: 04 **Total lectures: 60**

Course content

1.Introduction to cloud computing: (14)

Introduction to Cloud Computing, History and Evolution of Cloud Computing, Types of clouds, Private Public and hybrid clouds, Cloud Computing architecture, Cloud computing infrastructure, Merits of Cloud computing, , Cloud computing delivery models and services (IaaS, PaaS, SaaS), obstacles for cloud technology, Cloud vulnerabilities, Cloud challenges, Practical applications of cloud computing.

2. Cloud Computing Companies and Migrating to Cloud : (14)

Web-based business services, Delivering Business Processes from the Cloud: Business process examples, Broad Approaches to Migrating into the Cloud, The Seven-Step Model of Migration into a Cloud, Efficient Steps for migrating to cloud., Risks: Measuring and assessment of risks, Company concerns Risk Mitigation methodology for Cloud computing, Case Studies

3. Cloud Cost Management and Selection of Cloud Provider: (14)

Assessing the Cloud: software Evaluation, System Testing, Seasonal or peak loading, Cost cutting and cost-benefit analysis, Selecting the right scalable application. Considerations for selecting cloud solution. Understanding Best Practices used in selection of Cloud service and providers, Clouding the Standards and Best Practices Issue: Interoperability, Portability, Integration, Security, Standards Organizations and Groups associated with Cloud Computing, Commercial and Business Consideration

4. Governance in the Cloud: (12)

Industry Standards Organizations and Groups associated with Cloud Computing, Need for IT governance in cloud computing, Cloud Governance Solution: Access Controls, Financial Controls, Key Management and Encryption, Logging and Auditing, API integration. Legal Issues: Data Privacy and Security Issues, Cloud Contracting models, Jurisdictional Issues Raised by Virtualization and Data Location, Legal issues in Commercial and Business Considerations

5.Cloud deployment models: (6)

public cloud model, private cloud model, hybrid cloud model, community model.

Reference Books:

1. Cloud Computing: A Practical Approach for Learning and Implementation - Srinivasan
2. Cloud Computing : Rajiv Chopra, New Age International Publications
3. Cloud Computing Implementation, Mangement & Security: John W.Rittinghousa, CRC Press
4. Handbook on Cloud Computing, BorivojeFurht, Armando Escalante, Springer, 2010

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S.Y.B.Sc. (Computer Science) (CBCS 2018) Semester –III

CS-38 : Data Warehousing and Data Mining- I

Course Outcomes:

At the end of this course, a student shall be able to:

- design the database architecture for storing large data.
- understand and implement various algorithms used for data mining
- analyze the data using existing data mining tools

Total credits: 04 **Total lectures: 60**

Course content

1 . Overview of DBMS **(6)**

DBMS concepts, Types of DBMS, SQL, and Database query processing

2. Introduction to Data Warehousing **(12)**

Introduction to data warehousing, definition, characteristics of data warehouse, Need, Benefits of a separate data warehouse, evolution of decision support systems, Data warehouse life cycle, building a data warehouse, Data Warehousing Components, Data Warehousing Architecture

3. Multi-dimentional Data Models **(12)**

Data models, Tables, spreadsheets and data cubes, data Marts and types of data marts

4. OLAP and OLTP **(10)**

Concepts, On Line Analytical Processing, Categorization of OLAP Tools, OLAP operations, types of OLAP servers: ROLAP, MOLAP, HOLAP

5. Data Warehouse Design **(10)**

Design, Process of data warehouse design, three tier architecture, back end tools and utilities

6. **Introduction to Data mining** **(10)**

Definition, need for data mining, KDD process, Data mining architecture, Data Mining Functionalities

Reference Books :

1. Data mining concepts and techniques - Jiawei Han and Micheline Kamber
2. Data Mining Data Warehousing- Nilesh magar, Vision Publication
3. Data Mining Techniques- Dr. Arun K. Pujari, Universal Press
4. Principles of Data Mining – Bramer, Springer

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S.Y.B.Sc. (Computer Science) (CBCS 2018) Semester –III

UGSEC-31 : Programming In Python

Course Outcomes:

At the end of this course, a student shall be able to:

- apply the various concepts of programming using Python.
- apply the problem solving skills using Python
- implement the python platform in various applications

Total credits: 02 **Total lectures: 30**

Course content

1. Introduction to Python Scripting (4L)

Why Scripting is Useful in Computational Science, Classification of Programming Languages, Productive Pairs of Programming Languages, Gluing Existing Applications, Scripting Yields Shorter Code, Efficiency, Type-Specification (Declaration) of Variables, Flexible Function Interfaces, Interactive Computing, Creating Code at Run Time, Nested Heterogeneous Data Structures, GUI Programming, Mixed Language Programming, When to Choose a Dynamically Typed Language, Why Python?, Script or Program?

2. Basic Python (6L)

Python identifiers and reserved words, Lines and indentation, multi-line statements, comments, Input/output with print and input functions, command line arguments and processing command line arguments, standard data types - basic, none, boolean (true & False), numbers, Python strings, data type conversion, Python basic operators (Arithmetic, comparison, assignment, bitwise logical), Python membership operators (in & not in), Python identity operators (is & is not), Operator precedence, Control Statements, Python loops, Iterating by subsequence index, loop control statements (break, continue, pass) , Mathematical functions and constants (import math), Random number functions

3. Python strings (6L)

Concept, Slicing, escape characters, String special operations, String formatting operator, Triple quotes, Raw String, Unicode strings, Built-in String methods. Python Lists - concept, creating and accessing elements, updating & deleting lists, basic list operations, reverse, Indexing, slicing and Matrices, built-in List functions, Functional programming tools - filter(), map(), and reduce(), Using Lists as stacks and Queues, List comprehensions

4. Python tuples and sets (6L)

Concept (immutable), creating & deleting tuples, accessing values in a tuple, updating tuples, delete tuple elements, basic tuple operations, Indexing, slicing and Matrices, built- in tuple functions. Sets - Concept, operations, dictionary.

5. Python Classes / Objects (8L)

Object oriented programming and classes in Python - creating classes, instance objects, accessing members, data hiding (the double underscore prefix), built-in class attributes, garbage collection, the constructor, overloading methods and operators, inheritance - implementing a subclass, overriding methods, Recursive calls to methods, Class variables, class methods, and static methods

Reference Books

1. Introducing Python- Modern Computing in Simple Packages – Bill Lubanovic, O'Reilly Publication

2. Magnus Lie Hetland, Beginning Python: From Novice to Professional, Apress
3. Paul Gries, et al., Practical Programming: An Introduction to Computer Science Using Python 3, Pragmatic Bookshelf, 2/E 2014
4. Introduction to Computer Science Using Python- Charles Dierbach, Wiley Publication Learning with Python ", Green Tea Press, 2002
5. E-Books :python_tutorial. pdf, python_book_01.pdf
6. Beginning Programming with Python for Dummies Paperback – 2015 by John Paul Mueller
7. A Beginner's Python Tutorial: http://en.wikibooks.org/wiki/A Beginner%27s Python Tutorial.

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