



3-Year Bachelor of Computer Application (BCA) Curriculum and Syllabus

Five Semester

Course Code	Course Title	Contact Hrs. / Week			Credit
		L	T	P	
Theory					
TIU-UTR-T301	Career Advancement and Skill Development – (SAP-ABAP)	2	0	1	3
TIU-UCA-T319	Environment and Ecology	2	0	0	2
TIU-UCA-T317	SSAD & Software Engineering	2	1	0	3
TIU-UCA-T315	OOP with Python	2	1	0	3
TIU-UCA-T313	Web Technologies	2	1	0	3
TIU-UCA-E307	Computer Graphics and Multimedia (Elective I)	3	1	0	4
TIU-UCA-E309	Compiler Design (Elective I)				
Practical					
TIU-UCA-L315	Python Programming Lab	0	0	3	2
TIU-UCA-L313	Web Design Lab	0	0	3	2
TIU-UCA-L307	Computer Graphics & Multimedia Lab (Elective I)	0	0	3	2
TIU-UCA-L309	Compiler Designing Lab (Elective I)				
Sessional					
TIU-UES-S399	Entrepreneurship Skill Development	0	0	4	2
Total Credits					26

Approved by:

External Expert-1 (Prof. Subhadip Basu, J.U.)

External Expert-2 (Prof. Amlan Chakraborty, C.U.)

HOD - (Prof. A.B. Chaudhuri)



Detailed Syllabus

Career Advancement and Skill Development (SAP – ABAP)

TIU-UTR-T301

L-T-P: 2-0-1

Credit: 3

Introduction to SAP-ABAP

Environment & Ecology

TIU-UCA-T319

L-T-P: 2-0-0

Credit: 2

UNIT I -Fundamentals of Environment & Ecology

Environment definition, Environmental Segments, Concepts of Ecosystem: Fundamentals of Ecology and Ecosystem, Components of ecosystem, Food chain, Food web, Tropic level, Energy flow. Introduction, types, characteristic features, structure and function of the following ecosystem: Forest, Grassland, Desert and Aquatic ecosystem. Effects of human activities

s on environment: Agriculture, Housing, Industry, Mining and Transportation activities, Basics of Environmental Impact Assessment Sustainable Development.

UNIT II - Natural Resources Water Resources - Availability and Quality aspects.

Mineral Resources, Soil, Material cycles- Carbon, Nitrogen and Sulphur Cycles. Energy, Different types of energy, Conventional and Non-Conventional Sources Hydro Electric, Fossil Fuel based, Nuclear, Solar, Biomass and Geothermal energy and Bio-gas. Gas Hydrates, Hydrogen as an alternative future source of Energy.

UNIT III - Environmental Pollution & Current Environmental Issues of Importance

Definition causes effects and control measures of: Air Pollution, Water pollution, Land pollution, Noise pollution. Climate Change and Global warming: Effects, Acid Rain, Ozone Layer depletion, Photochemical Smog, Solid waste management, Waste water treatment.

UNIT IV - Environment Quality Standards Ambient air quality standards, Water quality parameters and standards; Turbidity, pH, Suspended solids, hardness, residual chlorine, sulfates, phosphates, iron and manganese, DO, BOD, COD.

UNIT V - Green IT Fundamentals: Business, IT, and the Environment – Green computing: carbon foot print, scoop on power – Green IT Strategies: Drivers, Dimensions, and Goals – Environmentally Responsible Business: Policies, Practices, and Metrics. Initiatives and Standards, Minimizing Power Usage, Cooling, Changing the Way of Work, Going Paperless, Greening Your Information Systems.

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Recommended Books:

Main Reading:

1. Environmental Chemistry by B.K.Sharma & H. Kaur, Goel Publishing House.
2. Environmental Chemistry by A. K De, New Age International Publishers.

Supplementary Reading:

1. Instrumental method of Analysis by B.K. Sharma, Goel Publishing House.
2. A Test Book of Environmental Chemistry & Pollution Control by S. S. Dara, S. Chand and Co.
3. Environmental Chemistry by Samir K. Banerjee, Prentice Hall of India Pvt.Ltd. New Delhi.

SSAD &Software Engineering

TIU-UCA-T317

L-T-P: 2-1-0

Credits: 3

Introduction, software life-cycle models, software requirements specification, formal requirements specification and verification axiomatic and algebraic specifications, function-oriented software design, object-oriented design, UML, design patterns, user interface design, Modular Design, coding and unit testing, integration and systems testing, Black & white box testing, debugging techniques, software quality SEI CMM and ISO-9001.software reliability and fault-tolerance, software project planning, monitoring, and control, software maintenance, computer-aided software engineering (CASE), software reuse

Recommended Books:

Main Reading:

- 1 Pankaj Jalote, "Software Project Management in Practice", Addison Wesley; 1 edition (31 January 2002).
3. R. Pressman, "Software Engineering", McGraw-Hill Higher Education; 8 edition (1 March 2014)

Supplementary Reading:

- 1.Shari Ptleeger, "Software Engineering", 2001 , Pearson Education.
2. K. K. Agarwal and Y. Singh, "Software Engineering", New Age International.

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OOP with Python
TIU-UCA-T315

L-T-P: 2-1-0

Credits: 3

Detailed Syllabus:

Introduction to Python , The basic elements of python, Branching Programs, Control Structures, Strings and Input, Iteration, Functions, Scoping and Abstraction Functions and scoping, Specifications, Recursion, Global variables, Modules, Files, System Functions and Parameters, Structured Types, Mutability and Higher-Order Functions Strings, Tuples, Lists and Dictionaries, Lists and Mutability, Functions as Objects, Testing, Debugging, Exceptions and Assertions, Types of testing – Black-box and Glass-box, Debugging, Handling Exceptions, Assertions, Classes and Object-Oriented Programming Abstract Data Types and Classes, Inheritance, Encapsulation and Information Hiding, Simple Algorithms and Data structures Search Algorithms, Sorting Algorithms, Hash Tables, Regular Expressions – REs and Python, Plotting using PyLab.

Books for Main Reading:

1. John V Guttag. “Introduction to Computation and Programming Using Python”, Prentice Hall of India
2. R. Nageswara Rao, “Core Python Programming”, dreamtech
3. Wesley J. Chun. “Core Python Programming - Second Edition”, Prentice Hall
4. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, “Data Structures and Algorithms in Python”, Wiley.

Books for Supplementary Reading:

1. Kenneth A. Lambert, “Fundamentals of Python – First Programs”, CENGAGE Publication
2. Luke Sneeringer, “Professional Python”, Wrox
3. “Hacking Secret Ciphers with Python”, Al Sweigart, URL <https://inventwithpython.com/hacking/chapters>

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Web Technologies
TIU-UCA-T313

L-T-P: 2-1-0

Credits: 3

HTML: Introduction to HTML, HTML Tags, Creating Forms, Creating tables, managing home page

CSS: Introduction to CSS, Three ways to use CSS, CSS Properties, Designing website, working with Templates

Java Script: Introduction to Javascript, Three ways to use Javascript, Working with events, Client-side Validation

JQuery: Introduction to JQuery, Validation using JQuery, JQuery Forms, JQuery Examples

AJAX: - Introduction to AJAX

Introduction to PHP, PHP Basics, PHP Variables , Global Array and Expression, PHP Operators , PHP Conditional Events and Switch case, PHP Flow Control and Loops, Types of Error in PHP, PHP Function , PHP Function with Argument , PHP Array , Types of Array , Foreach Loop, PHP String Manipulation and Regular Expression, PHP Global Array , PHP Session and COOKIE, PHP Object Oriented Programming, MySQL, Database basics, Indexes, PHP MyAdmin Connect & Pconnect, MySQL Create, MySQL Insert, MySQL Select, MySQL Update, MySQL Delete, MySQL Truncate, MySQL Drop, WHERE condition, Order By, Group By, Having, LIKE, AND OR operators , Using SQL functions AVG, COUNT, SUM, MIN, MAX, LCASE, UCASE, Importing and Exporting CSV Files, INNER Join, MySQL LEFT Joins, MySQL RIGHT Joins, Complex SQL Queries, Full Text Search, Web Streaming.

Security: - Authentication, and Encryption

Recommended Books:

Main Reading:

1. Jennifer Niederst Robbins, Learning Web Design Paperback – 3 Nov 2012 , Shroff; Fourth edition (3 November 2012)

Supplementary Reading:

1. Jennifer Niederst Robbins, Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics [Kindle Edition], O'Reilly Media; 4 edition (10 August 2012)

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Computer Graphics and Multimedia

TIU-UCA-E307

L-T-P: 3-1-0

Credits: 4

Application of Computer Graphics, Graphics Devices, Cathode Ray Tube, Raster Scanning, Raster Refresh graphics displays.

Graphics Operations –2D & 3D Graphics, Bezier, B-Spline, Hermite, Bresenham Line & Circle

Drawing Algorithms, Polygon filling, Edge Filling Algorithms.

Clipping—Cohen-Sutherland subdivision line clipping algorithm, Mid-Point subdivision algorithm, 2-dimensional clipping algorithm (Convex Boundaries & Partially visible lines), Cyrus-Beck algorithm for Partially & Totally Visible Lines) , Visible Surfaces- Floating Horizon Algo. ,

Upper & Lower Horizon, Roberts algo, Warnock algo, Scan-line Z-buffer algo.

Rendering- introduction (illumination models), shading- Gouraud Shading, Phong Shading.

Shadowing- Shadow Algorithms

Multimedia: basic concepts, design, hardware, standards – MPEG, JPEG, MIDI, multimedia design methodology, Introduction to Stereo Vision, development and testing

Recommended Books:

Main Reading:

- 1- D Heam & P M Baker, Computer Graphics, Prentice Hall of India (Second Edition), 1995.
- 2- Woo, Neider, Davis, Shreiner, OpenGL Programming Guide, Third Edition, 2000, Pearson Education Asia, 2000.
- 3- T. Vaughan, Multimedia, making it working, Fifth edition, 2001, McGraw Hill.

Supplementary Reading:

- 1- J D Foley & A Van Dam, Fundamentals of interactive Computer Graphics, Addison Wesley (Second Edition).
- 2- S Harrington, Computer Graphics - A Programming, McGraw Hill Approach International Ed.
- 3- Rajneesh Agrawal & Bharat Bhushan Tiwari, Multimedia Systems, Excel Publications, 2000.

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Compiler Design

TIU-UCA-E309

L-T-P: 3-1-0

Credits: 4

Compiler structure: analysis-synthesis model of compilation, various phases of a compiler, tool based approach to compiler construction.

Lexical analysis: interface with input, parser and symbol table, token, lexeme and patterns, difficulties in lexical analysis, error reporting, and implementation. Regular definition, Transition diagrams, LEX.

Syntax analysis: context free grammars, ambiguity, associativity, precedence, top down parsing, recursive descent parsing, transformation on the grammars, predictive parsing, Bottom up parsing, operator precedence grammars, LR parsers (SLR, LALR, LR), YACC. Syntax directed definitions: inherited and synthesized attributes, dependency graph, evaluation order, bottom up and top down evaluation of attributes, L- and S-attributed definitions.

Type checking: type system, type expressions, structural and name equivalence of types, type conversion, overloaded functions and operators, polymorphic functions. Run time system: storage organization, activation tree, activation record, parameter passing Symbol table, dynamic storage allocation. Intermediate code generation: intermediate representations, translation of declarations, assignments Intermediate Code generation for control flow, boolean expressions and procedure calls, implementation issues. Code generation and instruction selection: issues, basic blocks and flow graphs, register allocation, code generation DAG representation of programs, code generation from dags, peep hole optimization, code generator generators, specifications of machine. Code optimization, source of optimizations, and optimization of basic blocks, loops, global dataflow analysis, and solution to iterative dataflow equations. Code improving transformations, dealing with aliases, data flow analysis of structured flow graphs

Recommended Books:

Main Reading:

1. A.v. Aho . J.D.ullman ,Principles of Compiler Design -, Pearson Education.
- 2.Nandini Prasad K. S. Principles Of Compiler Design, Elsevier India

Supplementary Reading:

1. Allen I. Holub, Compiler Design in C (Prentice-Hall software series) Hardcover – 1990
2. 2. K. Muneeswaran, Compiler Design, OUP India(Oxford).

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Python Programming Lab

TIU-UCA-L315

L-T-P: 0-0-3

Credits: 2

Computer programming with Python.

Web Technology Lab

TIU-UCA-L313

L-T-P: 0-0-3

Credits: 2

Lab to complement theoretical paper TIU-UCA-T305

Web Pages should be designed using HTML, CSS, JavaScript, JQuery, AJAX.

Elective I (Lab)

TIU-UCA-L307 & (or) TIU-UCA-L309

L-T-P: 0-0-3

Credits: 2

Assignments will be given by the concerned faculty.

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