



KOLHAN UNIVERSITY

Chaibasa, Jharkhand, India

**Syllabus for
Four Year Undergraduate Programme (FYUGP)
of**

***Bachelor of Science in Information Technology
(B.Sc. IT)***

Semester - 4

**With Effect From
Academic Year 2022 - 2023**

**As Per Revised Curriculum and Credit Framework for the
FYUGP under the provisions of NEP - 2020**

B.Sc.I.T.CourseStructureF.Y.U.G.P.(Semester-IV)

Sem	Paper Code	Paper Title	L-T-P	Credits	Contact Hours
IV	AEC-4	<i>Language and Communication Skills:</i> (MIL-2/ English-2)		2	
	VAC-2	Value Added Course-2		2	
	MN-2B (Theory)	Web Technology	3-0-0	3	45
	MN- 2B (Practical)	Web Technology Lab	0-0-1	1	30
	MJ-6 (Theory)	Java Programming	3-0-0	3	45
	MJ-7 (Theory)	Operating System Concepts	3-0-0	3	45
	MJ-8 (Theory)	Numerical Methods	4-0-0	4	60
	MJ(Practical-4)	Java programming and OS Lab	0-0-2	2	60
	Total Credits			20	

MN-2A:Web Technology		
3 Credits	45 Class Hours	Semester IV.

OBJECTIVES

- To learn about basics of web programming
- Learn HTML, Java Script, XML for scripting
- Learn Making static and dynamic websites

Course Outcomes

- Know the fundamentals of web programming
- Perform web based programming.
- Design static and dynamic websites

Detailed Syllabus:

Unit-1 5 classes	HTML: Introduction to HTML, HTML Tags, HTML Documents, Header Section, Body Section, Headings, Link Documents using Anchor Tag, Formatting Characters, Font tag, Images and Pictures, Listing, Tables in HTML.
Unit-2 12 classes	CSS: Style sheet and its properties, inline, embedded, External & Imported Style sheet. Forms, Frames and Embedding Multimedia: Introduction to Frame, <frameset> and <frame> Tag with its Attributes, Creating Frames, Linking Frames, <noframes> tag, Complex Framesets, Floating or Inline Frame. Forms : <Form> Tag and its Attributes, <Input> Tag and its Attributes, Form Controls: TextControls, Password Fields, Radio Buttons, Checkboxes, Reset and Submit Buttons, Form Control-Selection, Option Processing and Text Area, Hidden Fields.
Unit-3 8 classes	XML: Overview of XML, Creating XML Documents, Rules for Well-Formed XML, Discerning Structure, Working with Mixed content, Adding Comments, CDATA Sections, Creating a DTD-The Concept of a Valid XML Document, Creating a DTD for an existing XML File.
Unit-4 10 classes	Java Script: Data Types, Variables, Operators, Conditional Statements, Array Objects, Date Objects, String Objects, Use of Java Script in Web Pages, Advantages of Java Script, Type Casting, Array, Operators and Expression, Conditional Checking, Function
Unit-5 10 classes	PHP: Preparing the Use PHP, Exploring PHP for the First Time, Understanding PHP Basics, Displaying PHP Output, Managing PHP Program Flow. Planning a PHP Web Application, Creating and Using a Logon Window, Managing System Data, Updating a PHP Web Application.

Text Books:

- Harvey M. Deitel, Paul J. Deitel, Abbey Deitel; **Internet and World Wide Web: How to Program** (Fifth Edition); Pearson Education, 2012
- Thomas A. Powell, **HTML & CSS: The Complete Reference** (Fifth Edition); McGraw Hill, 2010
Don Gosselin;
- **Comprehensive Java Script;** Web Warrior Series, Course Technologies Inc

MN-2A:Web Technology (Lab)		
1 Credits	30 Class Hours	Semester IV.

Objectives:

- To learn about basics of web programming
- Learn HTML, Java Script, XML for scripting
- Learn PHP based programming
- Learn Making static and dynamic websites

Course Outcomes:

After the completion of this course, students will be able to:

- Know the fundamentals of web programming
- Elaborate on the web based programming
- Perform web based programming.
- Design static and dynamic websites

List of Programs as Assignments:

- India is a large country. Different regions observe variations in climate. The spoken language of one state is quite different from that of another. They wear different types of garments. They celebrate different festivals and perform varied religious rites. People belonging to diverse cultures belong to different religious faiths. In spite of these diversities, Indians feel a sense of unity and oneness among them. Thus, we conclude that India is a land of Unity in Diversity.
 - All the headings should be H2 and green colour.
 - Main heading should be H1 and centre aligned.
 - The background should be yellow colour.
 - There are 10 paragraphs so each of them should be made using P tag.
 - The Introduction and Conclusion paragraphs should have “Times New Roman” font, the size should be 12 and colour should be blue.
 - All the remaining paragraphs text should be pink and magenta coloured in an alternate way.
 - There should be one meaningful picture in the web page with specific dimension.
- Create a webpage with the following:
 - A superscript and subscript tag
 - Pre tag
 - Paragraph tag
 - Anchor tag
 - Image tag
 - Definition list tag
 - Horizontal line tag
 - Break tag
 - Heading tag
- Create a webpage with a form loaded into it and take input of three strings through three textboxes and then concatenate them without using any built-in function.

- Write a JavaScript program to calculate and display the aggregate and percentage of three subjects' (Physics, Chemistry and Mathematics) marks along with the name of a student. The name and individual marks input shall be taken by textbox in the webpage.
- Write a JavaScript program to search the element 4 in the array [2, 6, 4, 10, 4, 0, -2] using any method.
- Create a webpage to take input of a string and check whether it is a palindrome or not.
- Write a program using JavaScript to take input of an array of numbers like [-4, 5, 6, -1, 10] and then sort it in descending order.
- Create a webpage to take input of a string and reverse that without using any user defined function.
- Write a JavaScript program to search 10 in the array [2, 6, -5, 10, 11, 0, -2] using a binary search method.
- Create a webpage to take input of a string and then slice it into three separate strings and display that.
- Create a webpage to take input of a string and check whether it is a palindrome or not.

MJ-6 (Th): Java Programming		
3 Credit	45 Class Hours	Semester IV.

Objective:

- Improve their programming skills in core Java
- Use the Java packages, applets for software development
- Use the knowledge of object-oriented programming through Java

Course Outcome:

- Elaborate the use of JDK of various versions for programming
- Identify the latest know-how related to the new developments in the field of Java
- Apply the knowledge gained for their project work as well as to develop some GUI applications.

Detailed Syllabus:

Unit 1 10 classes	Introduction of Java: History and Features of Java, Java Runtime Environment, Java Virtual Machine, Java Development Kit, Java Compiler And Interpreter. Tokens, Data Types, Strings, Variable declaration & initialization, Types of variables, Java Operators and Expressions, Type Conversion, Input/ Output in Java, Command Line Arguments. Decision construct, Looping construct, Arrays , Strings
Unit 2 10 classes	Classes, Objects and Methods : Defining a Class, Fields declaration, Method declaration, Creating object, Anonymous object in Java, Accessing class members, Access or Visibility Modifier, this keyword, Method overloading, Constructors, static members. Inheritance : Inheritance Basics, Super and Sub class, Types of Inheritance, Overriding methods, super keyword, final (variables, methods and classes), Static and Dynamic Binding, Abstract methods and classes.
Unit 3 10 classes	Packages, Multithreading and Exception Handling : Package: Introduction, Java API Packages, Using System Packages, Naming Conventions, Creating Packages, Accessing Packages, Using a Package, Adding a Class to a Package, Hiding Classes. Multithreading: Introduction, Creating Threads, Extending the Thread Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, and Synchronization. Exception Handling: Introduction, Types of Errors, Exceptions, Syntax of Exception Handling Code, Multiple Catch Statements, Using finally Statement.
Unit 4 10 classes	Database Connectivity: Connectivity using JDBC with MS-Access, Oracle and My-SQL, Threads in JAVA Collection Framework: Collection overview, Collection hierarchy, the collection interface-list interface, set interface, Collection classes-Array List class, linked list class, HashMap Class.
Unit 5 5 classes	Applet and JSP: Introduction to Applet, Life cycle of Applet, Introduction to JSP, advantages of JSP.

Text Books:

- Herbert Schildt– Java 2 the Complete Reference- TMH Publications-Fifth Edition.
- E Balaguruswamy -Programming with JAVA-TMH-Fourth Edition.

MJ-7 (Th): Operating System Concepts		
3 Credit	45 Class Hours	Semester IV

Objectives:

- Present the main components of OS and their working, Introduce the concepts of process and thread and their scheduling policies Handling synchronization of concurrent processes and deadlocks, analyze the different techniques for managing memory, I/O, disk and file

Course Outcome:

- Understand the general architecture of computer system.
- Gain proficiency needed to implementation of processes, scheduling, I/O and files systems.
- Get in-depth knowledge of memory management for operating systems

Detailed Syllabus:

Unit 1 9 classes	Introduction : Definition of Operating Systems, Functions of Operating Systems, Generations of Operating System, Types of Operating System (Batch Operating System, Mainframe Operating System, Time Sharing Operating System, Real-Time Operating System, Distributed Operating System, Operating System Services, System Calls, Types of System Calls, System Programs, Operating System Structure: Simple Structure, Layered Approach, System Boot.
Unit 2 8 classes	Processes: Process Concept (The Process, Process State, Process Control Block), Process Scheduling (Scheduling Queues, CPU Scheduling, Context Switch), Operations on Processes (Process Creation, Process Termination). Process Scheduling: Basic Concepts (CPU-I/O Burst Cycle, CPU Scheduler, Preemptive and Non-preemptive Scheduling, Dispatcher), Scheduling Criteria, Scheduling Algorithms (First-Come, First-Served Scheduling, Shortest-Job-First Scheduling, Priority Scheduling, Round-Robin Scheduling, Multilevel Queue Scheduling, Multilevel Feedback Queue Scheduling).
Unit 3 10 classes	Deadlock Handling: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.
Unit 4 10 classes	Memory Management Strategies: Introduction to Memory Management, Swapping, Memory Management Technique-{ Contiguous Memory Allocation (Fixed Size Partitioning, Variable Size Partitioning, Partitioning Algorithms, Fragmentation), Non-contiguous Memory Allocation (Paging, Segmentation, Segmentation with Paging) } File Management: File Concept, Access Methods, Directory & Disk Structure, File System Mounting, File Sharing, Protection, File System Structure, File System Implementation, Directory Implementation, Allocation Methods, Free Space Management.
Unit 5 8 classes	Case Study- The Linux System: Linux History, Design Principles, Kernel Modules, Process Management, Scheduling (except Symmetric Multiprocessing), Memory Management (except Virtual Memory), File Systems, Input & Output.

Text Books:

- SilberschatzA., GalvinP.B. & GagneG., “Operating System Concepts”, 8th Edition, Wiley India,2012.

Reference Books:

- DeitelH.M., “Operating Systems”, 3rd Edition, Prentice-Hall of India, 2006.
- TanenbaumA.S., “Modern Operating Systems”, 2nd Edition, Prentice-Hall of India, 2010.

MJ-8 (Th): Numerical Methods		
4 Credit	60 Class Hours	Semester IV.

Objective:

- This will help you to choose, develop and apply the appropriate numerical techniques for your problem.
- The goal is to provide a basic understanding of the derivation, analysis, and use of these numerical methods.

Course Outcomes:

At the end of the course, students will be able to:

- Perform interpolation, approximation, and integration of Functions
- Solve initial values problems governed by ordinary differential equations

Detailed Syllabus:

Unit 1 5 classes	Errors in Numerical Calculations Numbers and their accuracy, Errors and their Computations- Absolute, Relative and Percentage Error.
Unit 2 8 classes	Solution of Algebraic and Transcendental Equations Introduction, Bisection Method, Newton-Raphson Method, Method of False Position and Secant Method.
Unit 3 10 classes	Interpolation Introduction, Finite Differences-Forward, Backward Difference, Newton's Forward Difference Interpolation, Newton's Backward Difference Interpolation, Lagrange's Interpolation Formula.
Unit 4 12 classes	Unit IV: Numerical Differentiation and Integration Introduction, Numerical Differentiation, Numerical Integration – Trapezoidal Rule, Simpson's 1/3 Rule, Simpson's 3/8 Rule. Numerical Solution of Ordinary Differential Equations Solution by Taylor's Series, Euler's method
Unit 5 10 classes	Unit VI: Numerical Solution of Linear System of Equations Direct Methods- Matrix Inversion Method, Gauss-Jordan Method, Gaussian Elimination Method.

Text Books:

- S.S. Sastry , 'Introductory methods of Numerical Analysis', 5th Edition, Prentice Hall of India, New
- B.S. Grewal, 'Numerical Methods in Engineering & Science', Khanna Publishers, Delhi

MJ-4 (Pr): PRACTICAL For MJ-6 & MJ-7		
2 Credit	(60 Hours)	Semester IV

List of Programs as Assignments For MJ-4(Practical):

List of Programs as Assignments for MJ-6 & MJ-7:

- WAP to take input through command line argument and do the following:
 - Check whether the number is prime.
 - Generate the reverse a number.
- WAP to compute and display the count of occurrence of 4 in a number. E.g. 4564 will compute 2.
- WAP to sort a list of numbers in ascending order.
- Write a program in Java to take input of two 3×3 matrices through command line argument and then:
 - Add them up and display the result
 - Subtract them and display the result
 - Multiply them and display product
- WAP to count the number of words, characters in a sentence.
- WAP to handle the Exception using try and multiple catch block; the exceptions that you will handle are, number format error, array bound error and divide by zero.
- WAP to design a class called **Account** using the inheritance and static that show all function of bank (withdrawal, deposit) and generate account number dynamically.
- Develop an Applet that receives an integer in one text field & compute its factorial value & returns it in another text field when the button “Compute” is clicked.
- Write a program that creates a user interface to perform integer divisions. The user enters two numbers in the text fields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an Arithmetic Exception Display the exception in a message dialog box.
- Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
- Write a java program that connects to a database using JDBC and does add deletes, modify and retrieve operations.
- Write a java program to create an abstract class named Shape that contains two integers and an empty method named printArea(). Provide three classes named Rectangle, Triangle and Circle such that each one of the classes extends the class Shape. Each one of the classes contain only the method printArea() that prints the area of the given shape.

Basic Linux Commands

- Briefly explain the following basic Linux commands with examples:

man, history, pwd, who, finger, passwd, exit, logout, shutdown, mkdir, cd, ls, cat, cp, cmp, mv, paste, rm, rmdir, find, more, head, tail, echo, sed, grep, date, time, cal, diff, file, sort, chmod, chown, and

AEC-IV Language Through Literature - II

SEMESTER- IV (2 Credits 50 Marks)

Course Objective

- To use literature as a medium to teach/learn grammar, reading, spelling, vocabulary, writing mechanics, creative writing and thinking skills
- To strengthen contextual understanding of the language through texts relevant to specific disciplines and offer scope for imaginative involvement and self-expression
- To stimulate interest in acquiring twenty first century skills
- To engage in self-assessment activities for self-development
- To help absorb the values, ethics and attitudes of life and culture expressed in literature

Course Content

UNIT- I Poetry (1 Credit – 25 marks)

Leisure	<i>W. H. Davies</i>
The Secret of the Machines	<i>Rudyard Kipling</i>
Water	<i>Ralph Waldo Emerson</i>
Casey at the Bat	<i>Earnest Lawrence Thayer</i>
Very Indian Poem in Indian English	<i>Nissim Ezekiel</i>

UNIT- II Short Stories (1 Credit – 25 marks)

Witches' Loaves	<i>O. Henry</i>
The Country of the Blind	<i>H. G. Wells</i>
The Boy Who Broke the Bank	<i>Ruskin Bond</i>
The Squirrel	<i>Ambai</i>

Source Books:

Confluence, Edited by KN Sobha, Cambridge University Press

Semester Examination and distribution of marks:-

End Semester Examination (ESE): 50 Marks

Group A

1. **Ten** Objective Type Questions (1 x 10 = 10) [MCQs not to be set]

2. ***Two*** Short Answer Type Questions (**5 x 2 = 10**)

(Two questions to be answered out of a choice of Four)

Group B

Three Long Answer Type Questions (**10 x 3 = 30**)

(Three questions to be answered out of a choice of Six)

Semester-IV

VAC-2(Value Added Course-2)

Paper Name-GLOBAL CITIZENSHIP EDUCATION FOR SUSTAINABLE DEVELOPMENT

Credits-2

Full Marks-50

End Semester University Examination-50

Pass Marks-20

No Internal Examination

Objectives

That the undergraduate students imbibe the true qualities of a global citizen. Every student must be aware of the local and global problems and be able to solve them applying their competencies and true knowledge. Moreover, the course is designed to make students aware of multifarious problems, understand them and that they learn to adopt corrective measures to mitigate the problems. The objective of the course lies in inculcating broad perspectives of problem- solving ethos so that they become part of the epistemic community to mitigate local and global ills. As such the thrust is upon digital engagement with community participation of the young learners as ‘future-proofing’ tool. Hence, sensitized students should be able to grasp the true meaning of environmental- consciousness and sustainable development, within the broader perspective of transdisciplinary approach.

Learning Outcomes

- 1.Understanding and acquiring comprehensive knowledge of the global issues within the broader multidisciplinary approaches.
2. To develop wide-ranging practical skills and acquire the capacity to extrapolate from what one has learned to apply those competencies in the varied contexts to solve specific problems.
3. That the students acquire problem solving skills, critical thinking, creativity and enhance their communication skills to cooperate and coordinate as a team for common good.
4. Students pursue learning activities throughout their life that include learning out to learn skills.
5. That every student acquires multicultural competence that entail global perspective and honour diversity yet accomplish common group tasks and goals.

6. That students embrace universal human values, promote sustainable development and take effective measures to mitigate the effects of environmental degradation and is aware of climate change and its impact.

7. That every student promotes universal respect for and observance of human rights, promotes peace and non-violence and fosters community participation.

Unit-I: Introduction (i) The concept of Citizenship (ii) Citizenship Education in India. (iii) The Concept of Global Citizenship & Global Citizenship Education (iv) The notion of Global Citizenship embedded in Indian ethos. **(10 Hrs)**

Unit-II: (i) Attributes and Aims of Global Citizenship Education (ii) Importance of Problem solving skills, critical thinking and creativity to generate solutions (iii) Knowledge and multi-culturalism (iv) Value inculcation and accountability of knowledge **(10 Hrs)**

Unit-III: (i) Global governance systems and Human Rights education (ii) Equality and Non-discrimination, Dignity and Justice, Inclusion and Participation (iii) The importance of peace and non-violence in mediating and resolving conflicts (iv) Environmental awareness and sustainability. UN's Sustainable Development Goals for heralding peace and prosperity by the year 2030. **(10 Hrs)**

Readings:

1. Bakshi ,G.D, Constitution of India , Part 2, Articles 5-11 and part 4-A
2. Guha ,Ramchandra , Environmentalism : A global history.
3. Carlsen , Rachel , silent spring

4. www.undp.org
5. Hrdin, G. Living within limits: Ecology, Economics and population.
6. Hardin , G"Essays on Science and Society :Extensions of "The Tragedy of the Commons " " Science 280 (5364): 682-683.
7. Journal of Education for sustainable development, CEE, Centre for environment education, www.journals.sagepub.com/home/jsd
8. Das, Sujata. K Global Climate and sustainable development, Disha Books (Orient Longmen)
9. Ossewaarde , Martin J, Introduction to Sustainable Development ,sage
10. Devaki , N , Education for Sustainable Development , Shanlax
11. Chalkley,Brian, Martin Haigh,David Higgitt,Education for Sustainable Development, Routledge