Annexure II

B. Voc. in Software Technologies

Syllabus (Semester – I)

Course Title: Fundamentals of Computers & Programming
Course Code: STG101
Marks: 75

Type: General Theory
Credits: 03
Hours: 45

Prerequisite Courses: None

Course objectives:

- To enhance the students' understanding of information technology
- To have a thorough understanding of the basic computer structure & Storage
- To have understanding of basic concepts of operating system.
- To introduce the basic concepts of programming

Learning Outcome:

After successful completion of this course, the student will

- Be aware of the components of IT System and Binary Number System
- Explain the basics of Computer architecture and Memory Subsystem.
- Explain basic operating system & storage management concepts
- Explain the basic concepts of programming

Syllabus

1.	**Information Technology Basics**	**05 Lectures**
	Information Technology : Definition and components; Data & Information- Definition, Types of data, Data Representation - Coding Schemes(ASCII and UNICODE); Software – Definition, Categories of Software, Applications of Information Technology in various sectors, Internet Applications and Emerging Technologies	
2.	**Introduction To Programming Concepts**	**15 Lectures**
	Basic Programming Concepts, Steps Involved in Computer Programming – Problem Definition – Outlining The Solution – Algorithms & Flowchart, Types of Errors in programming, Translators, Interpreter & compilers, Languages Types, Programming approaches, Features of good algorithm and programming Developing algorithm, flow charts and pseudo code of different types of problems.	

	Understanding variables, basic Operators, Understanding blocks, Data Types Declaring and using data types: int, float etc. Basic Input and Output	
3.	**Number Systems**	**08 Lectures**
	Number Systems: Decimal to binary conversion and vice versa Binary number representation (signed, 1's Complement and 2's complement), Binary Arithmetic - addition, subtraction, Multiplication, Division, Binary to octal, hexadecimal conversion and vice versa. Floating point representation.	
4.	**Computer Technology**	**07 Lectures**
	Basic elements of a computer system: Processor, Main Memory, I/O Modules, System Bus Function and structure of a computer, Interconnection of components, Performance of a computer. Overview of Princeton (Von Neumann) and Harvard architecture. Memory Subsystem: Characteristics of memory system, the memory hierarchy, Types of ROM & RAM, Cache memory unit - Concept of cache memory, Organization of a cache memory unit	
5.	**Introduction to Operating System & Storage Management**	**10 Lectures**
	Operating Systems: Definition & Functions, Operating system Structure, operating system operations, Relationship between Kernel, OS, and Hardware, Operating system services, System calls, Types of system calls. Storage Management: File System, Concepts, File Organization and Access Methods, Directory and Disk Structure. Secondary Storage Structure - Overview, disk structure, Disk attachment, Disk scheduling	

Recommended Text Books:

1. Pradeep K. Sinha and Priti Sinha, Computer Fundamentals, BPB Publications
2. A. Silberchatz, Galvin, Gagne, Operating System Concepts, Wiley publication, 8thEdition
3. V. Rajaraman, Computer Fundamentals, PHI Learning, 6th edition

Recommended Reference Books:

1. ITL Education Solutions Limited, Introduction to Information Technology, Pearson Education
2. M. Morris Mano, Computer System Architecture, Pearson Education, 3rd Edition, 2008
3. William Stallings, Operating Systems: Internals and Design Principles, Prentice Hall, 6th Edition
4. R.G. Dromey, How to solve it by Computers, Pearson Education

Course Title: Web Designing Concepts
Course Code: STG102
Marks: 75

Type: General Theory
Credits: 03
Hours: 45

Prerequisite Courses: None

Course objectives:

To acquire skills in developing web applications using latest tools and technology in web designing and good user interfaces covering important design principles such as learn ability, visibility, error prevention, efficiency and graphic design

Learning Outcomes:

On completion of the course the student will be able to

- To setup up and use a web server for testing and deploying web applications
- To be able to design simple static web pages using html tags
- To apply styling using standardized pure CSS
- To write client side scripts to validate and perform client side processing using a scripting language
- To use DOM concepts for client side scripting
- Implementation of user interfaces following design principles and using technologies such as HTML, CSS, JavaScript and JQuery.

Syllabus

1.	**Web Design Principles - Overview**	**06 Lectures**
	Basic principles involved in developing a web site, Planning process, rules of web designing, designing a navigation bar, Page design, Home Page Layout, Design Concept – learnability, visibility, error prevention, efficiency, graphic design. Design Patterns for GUI – View tree, Listener, Widget, and Model-View-Controller, Approaches to GUI programming – Procedural, Declarative, and Direct Manipulation. Web UI – HTML, JavaScript, JQuery. Brief History of Internet, what is World Wide Web, Why create a website, Web Standards	
2.	**Structure and Style with HTML and CSS** **A. HTML**	**5 Lectures**
	Introduction. The development process, basic HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, simple HTML forms, web site structure, Meta tags, Character entities, Unicode fonts.	
	B. HTML5	**5 Lectures**
	Introduction, New Elements, Canvas, SVG, Drag/Drop, Geolocation, Video, Audio, Input types, form elements, form attributes, semantic, web storage, app cache, web workers, SSE	
	C. CSS	**5 Lectures**

	Introduction – Syntax, inline, internal and external style, Id & Class, Backgrounds, Text, Fonts, Links, Lists, Tables. CSS Box Model – Border, Outline, Margin, Padding. Advanced - Grouping/Nesting, Dimension, Display, Positioning, Floating, Align, Pseudo-class, Pseudo-element, Navigation Bar, Image Gallery, Image Opacity, Image Sprites, Media Types, Attribute Selectors.	
	D. CSS3	**5 Lectures**
	Introduction, Borders, Backgrounds, Gradients, Text Effects, Fonts, 2D Transforms, 3D Transforms, Transitions, Animations, Multiple Columns.	
3.	**Javascript**	**10 Lectures**
	Introduction - What is JavaScript, Understanding Events, JavaScript Example, and External JavaScript. Basic Elements – Comment, Variable, Global Variable, Data Types, Operators, If Statement, Switch, Loop: for and while, Function. JavaScript Objects – objects, Array. Browser Object Model - Browser Objects, Window Object, Document Object – getElementById, getElementsByName, getElementsByTagName, innerHTML property, inner Text property. Validation- form validation, email validation.	
4.	**Introducing jQuery**	**05 Lectures**
	JQuery : Introduction - Syntax, Selectors, Events. Effects- Hide/Show, Fade, Slide, Animate, stop(), Callback, Chaining. HTML/CSS- Add, Remove, CSS Classes, css(), Dimensions, slider. Traversing, ancestors, descendants, siblings, filtering.	
5.	**Introducing XML**	**04 Lectures**
	Introduction to XML , Need , Features ,XML namespaces , XML DTD ,XML Schemas XML Sheets , Types of XML Packages	

Recommended Text Books:

1. Elisabeth Robson, Eric Freeman, —Head First HTML and CSS, O'Reilly
2. Kogent Learning Solutions Inc., —HTML5 Black Book: Covers CSS3, Javascript, XML, XHTML, Ajax, PHP and Jquery, Pearson Education.

Recommended Reference Books:

1. Steven M. Jacobs, Ben Shneiderman, —Designing the User Interface: Strategies for effective human-computer interaction, 5th Edition, Pearson Education
2. Kogent Learning Solutions Inc. HTML 5 in simple steps Dreamtech Press
3. Ivan Bayross, —HTML 5 and CSS 3 Made Simple, BPB publication

Course Title: Quantitative Techniques
Course Code: STG103
Marks: 50

Type: General Theory
Credits: 02
Hours: 30

Prerequisite Courses: None

Course objectives:
To build quantitative aptitude that are essential requirement in understanding various concepts and to solve problems effectively.

Learning Outcomes:
On successful completion of the course, the students will be able to

- Create, solve and interpret basic data and quantitative models.
- Make sound arguments based on quantitative aptitude and/or careful analysis of data.
- Exhibit critical thinking by developing and expressing sound arguments from given premises to related conclusions
- Effectively communicate the substance and meaning of mathematical problems and their solutions.

Syllabus:

1.	**Module I**	**10 Lectures**
	Number System, Progressions, Averages, Allegations, Percentage, ratio & proportion	
2.	**Module II**	**10 Lectures**
	Profit & loss, discount, simple and compound interest, Time and Work, Time and distance, population growth and depreciation of value of articles	
3.	**Module III**	**10 Lectures**
	Mensuration, Cartesian Coordinate System, functions, inequalities, quadratic equations	

Recommended Text Books:

1. Arun Sharma, How to Prepare for Quantitative Aptitude for the CAT, 8th edition**,** McGraw Hill Education (India) Private Ltd.
2. R S Aggarwal, Quantitative Aptitude for Competitive Examinations, S Chand Publishing; Revised edition (21 February 2017)

Course Title: Environmental Studies - I
Course Code: STG104
Marks: 50

Type: General Theory
Credits: 02
Hours: 30

Prerequisite Courses: None

Course objectives:

- To provide students with basic knowledge of environment and its aspects.
- To sensitize students about environmental issues.

Learning Outcomes:

On successful completion of the course, the students will be able to

- Explain the various aspects of Environment.
- Develop perspectives around environmental issues.
- Take practical steps to conserve the environment and ecosystem

Syllabus:

1.	**Environment and Natural Systems**	**18 Lectures**
	Environment: Meaning, Significance, natural resources and alternatives. Man-Nature relation and interaction with respect to Food, Clothing, Shelter and Occupation Ecosystem: Concept, Structure, Functions, Components (producers, consumers, decomposers), Energy flow in an ecosystem, Ecological succession; Ecological niche (concept); major ecosystems in brief Biodiversity: meaning, hotspots of biodiversity in India, threats to biodiversity; bio geographical classification of India; Conservation (Case studies); genetically modified foods Role of the individual in conservation of natural resources.	
2.	**Environmental Degradation and Environmental Pollution**	**12 Lectures**
	Environmental Degradation: Meaning; Degradation of Urban Land, Forest and Agricultural Land due to natural causes and human interference. Environmental pollution: Types of Environmental Pollution: Water, Air, Marine, Land, Noise, Thermal Pollution; for each type of pollution - meaning, Quality standards (where applicable), sources of pollution, pollutants, effects	

Recommended Text Books:

1. Mahua Basu, S. Xavier, Fundamental of Environmental Studies, Edition 2016 Cambridge University
2. N. Balsubramanya, Gurudeep, Chatwal , Environmental Studies , Himalaya Publication.
3. Singh, Anoop Kumar, Environmental Management in mining areas, Ishwar Books

Recommended References:

1. S.C. Santra, Environmental Science, New Book Agency Pvt Ltd. Kolkata.
2. Shinde, Pendse, Donge, Environmental Education, Sheth Publication.

3. Dr. Vijay Kumar, Environmental Studies Text Book, Himalaya Publication.
4. Kumari Veena, Environmental Pollution and Health Hazard, Ishwar Book
5. Singh Chandrama Prakash and Kuter, Sustainable Development and Environment

Course Title: Software Laboratory – I
Course Code: STP101
Marks: 50

Type: General Practical
Credits: 02
Hours: 60

Course objectives:

- To identify the various hardware and software components of a PC
- To trouble-shoot basic.
- To apply the concepts and understanding of algorithm, flowchart and pseudo code design
- To implement web designing concepts and principles such as HTML, CSS, JavaScript and JQuery and develop web pages

Learning Outcome:

After successful completion of this course, the student will be able to

- Identify the components of a PC
- Troubleshoot basic hardware and software problems
- Explain the basic commands of Windows and Linux
- Design efficient algorithm and pseudo-code
- Implement the concepts learnt in Web Designing course

List of suggested Practical:

*A student shall complete practical of minimum 20 Hours and 28 Hours duration from **Section A** and **Section B** respectively.*

Section A - Based on STG101

1. Exploring the Functions and Components of a PC [06 Lectures]
    a. Recognizing PC components
    b. Identifying BIOS ROM, Accessing BIOS via the CMOS Setup Program, Configuring and Clearing CMOS Setup Program Passwords, Configuring BIOS Setting
    c. Identifying Internal Expansion Slots, Installing Expansion Cards, Managing Hardware with Device Manager, Removing and Labeling Components and Cables, Removing a Motherboard, Identifying Motherboard Features.
    d. Troubleshooting Hard Drive Installations, Configuring Multiple Displays.
    e. Replacing and Upgrading RAM, Adjusting Power Management to Optimize Battery Life
    f. PC fault finding techniques
2. Exploring Linux / Windows Operating System [04 Lectures]
    a. Demo/Review of Installing, Partitioning and formatting disk, Installing applications device drivers, creating, modifying and deleting user accounts
    b. Study of basic OS commands.
    c. Writing algorithms & designing flowcharts of at least 08 different types of problems. [14 Lectures]

Section B - Based on STG102

1. Create a HTML page with the following : [04 Lectures]
    a. title heading paragraph emphasis strong and image elements
    b. complex HTML table
    c. simple HTML Form covering major form elements
    d. Embed Video in an HTML page
2. Using CSS do the following : [08 Lectures]
    a. Create a Navigation bar (with dropdown) with CSS
    b. Create a CSS Grid
    c. Create a CSS3 based button
    d. make an image rounded shape
    e. Create a CSS based sticky footer
    f. Create CSS3 Corner Ribbon
    g. Create CSS3 blurry text effect
    h. Create image cross fade with CSS3 transition
    i. Set style for link hover active and visited states of hyperlink
3. Write JavaScript functions to : [10 Lectures]
    a. accept a string as a parameter and converts the first letter of each word of the string in upper case
    b. Check whether a given credit card number is valid or not.
    c. Check whether a given value is a valid url or not.
    d. Check whether a given email addresses is valid or not.
    e. print an integer with commas as thousands separators
    f. Remove items from a dropdown list.
4. Use JQuery to : [08 Lectures]
    a. Disable buttons
    b. Make textbox read only
    c. Uncheck check boxes
    d. Confirm again
    e. Sort
    f. Switch rows and columns
5. Introduction to angular JS/reactjs, Json [06 Lectures]

A mini project combining all the technologies learnt using a front-end development framework such as bootstrap is recommended.

Recommended Text Books: *As mentioned in STG101 and STG102*

Course Title: SSC/Q0508 Junior Software Developer
Course Code: STS101
Marks: 600

Type: Skill (Theory, Practical, & OJT)
Credits: 18 (Theory-7, Practical & OJT-11)
Hours: 440

Prerequisite Courses: None

Course/Package objectives:
To enable students to:

- Demonstrate basic computer and internet, aptitude for analyzing information and making logical conclusions
- Design algorithms to solve problems and convert them into code using the appropriate programming language constructs
- Read and execute a test case and record the outcome in the appropriate format
- Provide complete, accurate and up-to-date data/information to the appropriate people in the required formats on time
- Understand various job roles and work activities of a "Junior Software Developer".
- Provide an opportunity to work on innovative, thought-provoking industry based projects
- Gain new technical and professional development skills, and give the student an opportunity to establish an interest in industrial/commercial activities.
- Develop constructive work habits
- Utilize and strengthen their communication skills and build healthy work relationships
- Determine what professional and personal competencies they need to develop and address in their transition to professional life
- Maintain a healthy, safe and secure working environment

Learning Outcomes:
Students will have competencies and skills as mentioned in the Model Curriculum of JUNIOR SOFTWARE DEVELOPER designed by NASSCOM (REFERENCE ID: SSC/Q0508, version 1.0)

Package Syllabus (Adopted Model Curriculum of Nasscom)

- *Lecture Hours and Marks Distribution as per Nasscom standard mentioned in Model Curriculum*
- *Unit Contents as mentioned in the courseware designed by Nasscom for* Junior Software Developer

1.	**Introduction**
	Unit 1.1 – Introduction to IT-ITeS Sector Unit 1.2 – Introduction to the Training Program
2.	**Core Skills**

	Unit 2.1 – Communication Skills Unit 2.2 – Team Work
3.	**Basic of IT (SSC/N0506)**
	Unit 3.1 – Basic Computer Skills Unit 3.2 – Internet
4.	**Assist in Performing Software Construction and Software Testing Entry-Level Tasks in the It Services Industry (SSC/N0506)**
	Unit 4.1 – C Programming Unit 4.2 – Analyze Various Concepts of PHP Unit 4.3 – Introduction to MYSQL Unit 4.4 – SQL using Oracle
5.	**Manage Work to Meet Requirements (SSC/N9001)**
	Unit 5.1 – Self and Work Management
6.	**Work Effectively with Colleagues (SSC/N9002)**
	Unit 6.1 – Team Work and Communication 211
7.	**Maintain a Healthy, Safe and Secure Working Environment (SSC/N9003)**
	Unit 7.1 – Hazards at Workplace Unit 7.2 – Dealing with Emergencies
8.	**Data and Information Management (SSC/N9004)**
	Unit 8.1 – Provide Data /information in Standard Formats
9.	**Develop your Knowledge, Skills and Competence (SSC/N9005)**
	Unit 9.1 – Learning and Self Development
10.	**Employability & Entrepreneurship Skills**
	Unit 10.1 – Personal Strengths & Value Systems Unit 10.2 – Digital Literacy: A Recap Unit 10.3 – Money Matters Unit 10.4 – Preparing for Employment & Self Employment Unit 10.5 – Understanding Entrepreneurship Unit 10.6 – Preparing to be an Entrepreneur

<u>On-Job-Training (OJT) Component</u> (Compulsory)

It is required by a student to carry-out and complete OJT in the relevant industry or working environment and in the relevant skill area (Junior Software Developer).

- **Duration of OJT:** Minimum 45 Hours

– A Student need to submit the detailed report of the OJT along with the 'Certificate of Completion'**.**

Recommended Text Books:

Nasscom courseware module for Junior Software Developer

Qualification Pack Hyperlink:

https://nsdcindia.org/sites/default/files/QP_SSC-Q0508_Junior-Software-Developer.pdf

Syllabus
B. Voc. in Software Technologies (Semester – II)

Course Title: Java Programming
Course Code: STG201
Marks: 75

Type: General Theory
Credits: 03
Hours: 45

Prerequisite Courses: None

Course Objective:

- To learn and implement the concepts of java and object oriented programming, exception & file handling, threading, applets, swing and jdbc.

Learning Outcomes:

On completion of the course students will

- Become acquainted with the concepts of java & objected orientation.
- Explain the concept of exception handling, multithreading, & interface design.
- Design and develop the Object Oriented working modules using AWT, Swing, multithreading, and Jdbc constructs

Syllabus

1.	**Introduction to Java & Object-Oriented Paradigm**	**07 Lectures**
	Introduction to Java: Features of Java, JDK Environment, Java and Internet. **Object Oriented Programming Concept:** Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between OOP & OOC **Java Programming Fundamental:** Structure of java program, Data types, Constants, Variables, Operators, Keywords, Naming Convention, Decision Making (if, switch), Looping(for, while),Type Casting	
2.	**Classes, Objects, and Packages in Java**	**12 Lectures**
	Classes and Objects: Creating Classes and objects, Memory allocation for objects, Constructor, Use of Inheritance, Use of Polymorphism, Method Overloading, Method Overriding, Nested and Inner classes **Arrays and Strings Classes:** Arrays, Creating an array, Types of Arrays, String class Methods, String Buffer methods. **Abstract Class, Interface and Packages:** Modifiers and Access Control, Abstract classes and methods, Interfaces, Interfaces versus Abstract Classes, Packages Concept, Creating user defined packages, Collections	

3.	**Exception & File Handling**	**07 Lectures**
	Exception Handling: Exception types, Using try catch and multiple catch, Nested try, throw-throws and finally, Creating User defined Exceptions. **File Handling:** Byte Stream, Character Stream, File IO Basics, File Operations, Creating file, Reading file, Writing File	
4.	**Multithreading & Applet Programming**	**07 Lectures**
	Multithreading: Thread - Synchronization - Messaging - Runnable Interface - Inter thread Communication - Deadlock - Suspending, Resuming and stopping threads **Applet Programming:** Introduction, Types Applet, Applet Life cycle, Creating Applet, Applet tag	
5.	**Introduction to AWT, Swing, and Jdbc**	**12 Lectures**
	AWT & Swing: What is AWT & Swing? Difference between AWT and Swing, The MVC Architecture and Swing, Layout Manager and Layouts. The JComponent Classes: - Components (JButton, JLabel, JText, JTextArea, JCheckBox and JRadioButton, JList, JComboBox, JMenu and JPopupMenu Class, JMenuItem and JCheckBoxMenuItem, JRadioButtonMenuItem , JScrollBar), Dialogs (Message, confirmation, input), JFileChooser, JColorChooser Event Handling: Event sources, Listeners, Mouse and Keyboard Event Handling, Adapters, Anonymous inner class **Basic Java Data Base Connectivity:** JDBC Fundamentals, Establishing Connectivity and working with connection interface, Working with statements, Creating and Executing SQL Statements, Working with Result Set Objects	

Recommended Text Books:

1. E Balagurusamy, Programming with JAVA, 4th Edition, TMH
2. Cay Horstmann, BIG Java, Wiley Publication, 3rd Edition, 2009

Recommended References:

1. Herbert Schildt, Java 7, The Complete Reference, 8th Edition, 2009.
2. Cay S Horstmann, Gary Cornell, Core Java Volume I- Fundamentals, Prentice Hall, 9th Edition
3. Cay S Horstmann, Gary Cornell, Core Java Volume II- Advanced Features, Prentice Hall, 9th Edition

Course Title: Graphics Designing
Course Code: STG202
Marks: 75

Type: General Theory
Credits: 03
Hours: 45

Prerequisite Courses: None

Course Objective:

- To understand the concepts of graphic designing.
- To make them understand electronic procedures of designing/producing and editing graphics using industry standard software (Adobe Creative Suite) and processes.
- To create, format, illustrate, design, and edit/revise the graphic design elements

Learning Outcomes:

Upon completion of this course, the student should be able to:

- Identify and use the Elements and Principles of Design in a decisive fashion
- Explain and use color to communicate ideas to others
- Explain the principles of graphic placement
- Utilize Software tools to edit images, and create artistic imagery

Syllabus

1.	**DESIGN ELEMENTS CONCEPTS**	**05 Lectures**
	• Elements of graphic design: Line, Shape, Forms, Space, Colour, Colour wheel, Colour Harmony, Colour meaning in various context such as culture, religion, gender and emotional factor, texture, Type	
2.	**DESIGN PRINCIPLES CONCEPTS**	**05 Lectures**
	• Basic principles of design: balance, proportion, rhythm, emphasis, unity etc. Laws of perception -Gestalt theory: similarity, proximity, continuity, closure etc. Scale and proportion in design • Graphic Visualization: visual composition and layout, Grids in graphics composition	
3.	**TYPOGRAPHY CONCEPTS**	**07 Lectures**
	Typography - Typeface, Typeface Family, Font, Anatomy Of Type, Typographic Measurement – Point And Pica, Text Type And Display Type, Classification Of Type - Old Style, Transitional Period, Modern, Slab Serif, Sans Serif, Script, Decorative Etc. Selection Of A Type Face In Design-Clarity: Readability And Legibility, Integration With Visuals, Concept And Theme Etc	

4.	**RASTER GRAPHIC CONCEPTS (DESIGNING & EDITING)**	**15 Lectures**
	• Raster Images – Image Resolution – RGB, CMYK, Lab & Other Colour Modes / Channels And Their Applications –Colour Palate And Swatches. Basic Drawing– Using Airbrush, Pencil, Paint Brush Tools. Concept Of Layers – Transparency And Blending Modes – Creative Use Of Layers And Blending Modes, Layer Mask. Selection Tools-Path Options And Selection-Alpha Channel, Type Tool And Its Properties. Concept Of GIF Animation, Image Compression: Lossy And Lossless Compression Formats • Photo Restoration Technique- Clone Tool, Patch Tool, Sponge Tool, Burn Tool, Dodge Tool Etc. Adjusting Hue Saturation And Value, Use Of Levels And Curves, Use Of Colour Histogram, Treatment Of RAW Files, HDR Toning.	
5.	**VECTOR GRAPHIC CONCEPTS (DESIGNING & EDITING)**	**13 Lectures**
	• Vector Graphic-What Is Vector, Properties of Vector Graphics - Stroke and Fill Tools – Basic Shapes, Bezier Drawing with the Pen Tool – Creative Use of Shapes – Using the Pathfinder – Boolean Operations Using Shapes. Vector Drawing Techniques – Node Editing – Tracing from Raster Images – Different Styles Of Vector Illustrations. Using Colour in Vector Graphics – Different Colour Palettes – Gradients And Gradient Mesh. • Using Type Tools And Type Controls – Type Along A Path –Concept Of Alignment And Text Flow Options, Filters And Effects.	

Recommended References:

1. Mark A. Thomas, Poppy Evans, Exploring the Elements of Design, Cengage Learning
2. Alexander W. White, The Elements of Graphic Design: Space, Unity, Page Architecture, and Type, Allworth Press
3. Ambrose, Harris, The Fundamentals Of Typography, Bloomsbury Publishing India Private Limited; 2nd Revised edition edition
4. Adobe Creative Team, Adobe Photoshop Classroom in a Book, Adobe Press
5. Adobe Creative Team, Adobe Illustrator Classroom In A Book, Adobe Press
6. Gary David Bouton, CorelDRAW X - Official Guide, TMH
7. Derek Lea, Beyond Photoshop, Focal Press
8. Dan Moughamian, Adobe Digital Imaging How-Tos, Adobe Press
9. Daniel James, Crafting Digital Media, Apress

Course Title: E-Commerce
Course Code: STG203
Marks: 50

Type: General Theory
Credits: 02
Hours: 30

Prerequisite Courses: None

Course Objectives:

This course aims to study the various background processes involved in E-Commerce website. As a part of the course the student will study the various activities associated with ecommerce, and will also be able to understand the various technologies and security mechanisms used in ecommerce websites

Learning Outcomes:

On Completion of this course the student will

- Explain the working of an E-Commerce website
- Be aware of the various E-Commerce Strategies.
- Evaluate and Apply appropriate Payment mechanisms to the e-commerce website

1.	**INTRODUCTION TO E-COMMERCE**	**10 Lectures**
	• E-Commerce: In the Beginning: what Is E-Commerce? – Advantages and Limitations of E-Commerce – The Role of Strategy in E-Commerce – Value chains in E-Commerce – Integrating E-Commerce – Managerial Implications - The Internet and the WWW : The Internet today – Unique benefits of the internet - Searching online – BBS and Pay services – The Language of the Internet .	
2.	**E-COMMERCE SITE DESIGNING & LAUNCHING**	**08 Lectures**
	• Launching a Business on the Internet : The life cycle approach – The business planning and strategizing Phase – Hardware, software, Security and the setup phase – Design phase – The marketing phase – The fulfillment phase – The maintenance and enhancement phase. • Designing Web sites: The life cycle of site building – Building a web site – Web navigation design - Design criteria – Hiring a web designer - Website evolution and usability testing : Anatomy of a site – Cookies – What makes a website useful – Website content and Traffic management.	
3.	**E-MARKETING & E-PAYMENT**	**12 Lectures**
	• Marketing on the internet : the pros and cons of online shopping – internet marketing	

	techniques – The E-cycle of internet marketing – Marketing your Presence – Attracting Customers – Tracking Customer – Customer service - Web based business to business Ecommerce : B2B Ecommerce – B2B Models – B2B tools –EDI. • Payment Systems: From barter to money – Requirements for the internet based payment – Electronic payment media – Issues and implications – E-security: Security in cyberspace – Designing for security – Kinds of threats (risk) – Virus – Security protection and recovery - Securing your system.

Recommended Text Books:

1. Elias M. Awad, Electronic Commerce, Prentice-Hall of India, 2008
2. Ravi Kalakota and Andrew B. Whinston, Electronic Commerce A Manager's Guide, Pearson Education.

Recommended References:

1. Kamlesh K Bajaj and Debjani Nag, E-Commerce The Cutting Edge of Business, Second Edition, Tata McGraw Hill
2. Gary P. Schneider, E-Commerce Strategy, Technology and Implementation, CENGAGE Learning INDIA Private Limited, Reprint 2008

Course Title: Environmental Studies - II
Course Code: STG204
Marks: 50

Type: General Theory
Credits: 02
Hours: 30

Prerequisite Courses: None

Course objectives:

- To provide students with basic knowledge of environment and its aspects.
- To sensitize students about environmental issues.

Learning Outcomes:

On successful completion of the course, the students will be able to

- Explain the various aspects of Environment.
- Develop perspectives around environmental issues.
- Take practical steps to conserve the environment and ecosystem

Syllabus:

1.	**Global Environmental Issues, Human Population and Environment**	**12 Lectures**
	Global Environmental Issues: Climate Change, Global Warming and Green House Effect, Acid Rain, Depletion of Ozone layer; ecological and carbon footprints; Role of the individual in the prevention of environmental degradation and pollution Population Growth, World and Indian scenario, Population explosion, Population and Environmental Degradation Urbanization: Urban population growth and Environmental problems, Food: Sources of food, Global and Indian food demand scenario, Limits of food production, Environmental effects of Agriculture. Environment and Human Health, Climate and Health, Infectious Diseases, Water-Related Diseases, Climate protection protocols	
2.	**Environmental Management**	**12 Lectures**
	Environmental Assessment – Environmental Impact Assessment (EIA), Environmental Auditing, Environmental accounting Environmental management: concept and significance; Emerging environment management strategies, Indian initiatives. Carbon Bank, carbon credits and carbon offsets Environmental Protection Movements and reputed NGOs in India. Sustainable development: meaning and significance; sustainable development goals (SDGs). Environmental Ethics: Environmental Ethics and Environmental values, Code of Ethics, Importance and limitations of ethics; Environmental Ethics in India.	

3.	**Environmental Legislation and Goa's Initiatives for Environmental Protection**	**06 Lectures**
	Environmental Acts and Regulations: Brief description and major provisions of • Water (Prevention and Control of Pollution) Act 1974, • Air (Prevention and Control of Pollution) Act 1981, • Environment Protection Act, 1986 • Coastal Regulation Zones Rules • E Waste (Management) Amendment Rules, 2018 Functions and Role of Goa State Pollution Control Board	

Recommended Text Books:

1. Mahua Basu, S. Xavier, Fundamental of Environmental Studies, Edition 2016 Cambridge University
2. N. Balsubramanya, Gurudeep, Chatwal , Environmental Studies , Himalaya Publication.
3. Singh, Anoop Kumar, Environmental Management in mining areas, Ishwar Books

Recommended References:

1. Kumar Rajesh Prakash Kutir, Mining and Environmental Sustainability
2. S.C. Santra, Environmental Science, New Book Agency Pvt Ltd. Kolkata.
3. Shinde, Pendse, Donge, Environmental Education, Sheth Publication.
4. Dr. Vijay Kumar, Environmental Studies Text Book, Himalaya Publication.
5. Kumari Veena, Environmental Pollution and Health Hazard, Ishwar Book
6. Singh Chandrama Prakash and Kuter, Sustainable Development and Environment
7. https://www.tutorialspoint.com/environmental_studies/environmental_studies_classification_of_ecosystem.htm

Course Title: Software Laboratory – II
Course Code: STP201
Marks: 50

Type: General Practical
Credits: 02
Hours: 60

Course objectives:

- To understand and implement the concepts of Object Oriented Programming and Java learnt in STG201
- To implement the graphic design concepts learnt in STG202 using appropriate tools

Learning Outcome:

After successful completion of this course, the student will be able to

- Implement the Object Oriented Concepts in solving real world problems
- Efficiently apply the concepts of AWT, Swing, multithreading, and Jdbc.
- Implement the understanding of principles of graphic placement
- Utilize Software tools to edit images, create artistic imagery, and create publications.

List of suggested Practical:

A student shall complete practical of minimum 24 Hours duration from each Section

Section A - Based on STG201

Use of any SDK and IDE like eclipse, Netbeans etc…

1. Simple java programs to understand different constructs [06 Lectures]
2. Java programs to understand Object Oriented Concepts (Objects, Inheritances, Polymorphism, Abstract Class, Interfaces, Overloading, Overriding, Object copying/cloning, static and final) [12 Lectures]
3. Java programs to understand Packages, exception handling, and file handling [06 Lectures]
4. Programs to understand Applet, threading, Swing and jdbc. [06 Lectures]
5. Mini-Project (As an Assignment)

Section B - Based on STG202

Software Recommended: Adobe Suite (Illustrator, Photoshop, CorelDraw, InDesign), GIMP, INKSCAPE

1. Design Basics and Tessellation of geometric shapes [06 Lectures]

2. Raster Graphics (Design, Image Restoration & Correction) [10 Lectures]
3. Vector Graphics (Design, Logo or corporate identity design) [08 Lectures]
4. Designs based on typography [03 Lectures]
5. Symbols or Icons Designs [03 Lectures]

Recommended Books:

For Section A: *As mentioned in STG201*

For Section B: *As mentioned in STG202 and*

1. Ambrose Harris, The Production Manual, AVA Publishing

2. Timothy Samara, Design Elements, a Graphic Style Manual, Rockport Publishers

Course Title: SSC/Q0503 Web Developer
Course Code: STS201
Marks: 700

Type: Skill (Theory, Practical, & OJT)
Credits: 18 (Theory-7, Practical & OJT-11)
Hours: 440

Prerequisite Courses: None

Course/Package objectives:
To enable students to:

- Apply their understanding of concepts in Analysis and Design of Web based Applications
- Apply their understanding of concepts in developing media content and graphic designs for software products and Applications
- Understand importance of policies, procedures and guidelines when contributing to the design of Web based applications as well as developing media content and graphic designs for software products and Applications
- Understand and Provide data/information in standard formats
- Gain new technical and professional development skills, and give the student an opportunity to establish an interest in industrial/commercial activities.
- Develop constructive work habits
- Utilize and strengthen their communication skills and build healthy work relationships
- Determine what professional and personal competencies they need to develop and address in their transition to professional life

Learning Outcomes:
Students will have competencies and skills as mentioned in the Model Curriculum of Web Developer designed by NASSCOM (REFERENCE ID: SSC/Q0503, version 1.0)

Package Syllabus (Adopted Model Curriculum of Nasscom)

- *Lecture Hours and Marks Distribution as per Nasscom standard mentioned in Model Curriculum*
- *Unit Contents as mentioned in the courseware designed by Nasscom for* Web Developer

1.	**Web Design Basics (SSC/N0501)**
	Unit 1.1 – Introduction to the Industry and the Job Role Unit 1.2 – Introduction to the basic of Web Development Unit 1.3 – SDLC Unit 1.4 – Principles of Web Design Unit 1.5 – Phases of Web Development
2.	**Planning and Design (SSC/N0501)**

	Unit 2.1 – Planning for Web Development Unit 2.1 – The Web Designing Process Unit 2.1 – Introduction to the Web Application Development
3.	**Web Development Process (SSC/N0503)**
	Unit 3.1 – The Web Development Process Unit 3.2 – Developing Reusable Content Unit 3.3 – Designing Accessible Web Content Unit 3.4 – Evaluating the Websites
4.	**Web Information Security (SSC/N0503)**
	Unit 4.1 – Web Information and Security
5.	**UAT and Deployment (SSC/N0503)**
	Unit 5.1 – The Web Deployment Process
6.	**Introduction to Java & JavaScript (SSC/N0501,SSC/N0503)**
	Unit 6.1 – Introduction to Java & JavaScript
7.	**Portfolios (SSC/N0501, SSC/N0503)**
	Unit 7.1 – Portfolio Design
8.	**Manage your Work to Meet Requirements (SSC/N9001)**
	Unit 8.1 – Understanding Scope of Work and Working within limits of Authority Unit 8.2 – Work and Work Environment Unit 8.3 – Maintaining Confidentiality
9.	**Working Effectively with Colleagues (SSC/N9002)**
	Unit 9.1 – Effective Communication Unit 9.2 – Working Effectively
10.	**Maintain a Healthy, Safe and Secure Working Environment (SSC/N9003)**
	Unit 10.1 – Need for Health and Safety at Work Unit 10.2 – Analyst Security Operations Centre's Role Unit 10.3 – Emergency Situations Unit 10.4 – Skills for Maintaining Health and Safety at Work
11.	**Provide Data/Information in Standards Formats (SSC/N9004)**
	Unit 11.1 – Information and Knowledge Management Unit 11.2 – How to Manage Data/Information Effectively Unit 11.3 – Skills Required to Manage Data and Information Effectively
12.	**Develop Knowledge, Skills & Competence (SSC/N9005)**
	Unit 12.1 – Importance of Self Development Unit 12.2 – Knowledge and Skills Required for the Job Unit 12.3 – Avenues for Self-Development Unit 12.4 – Planning for Self-Development

<u>On-Job-Training (OJT) / Project Component</u> (Compulsory)

It is required by a student to carry-out and complete

– **OJT** in the relevant industry or working environment and in the relevant skill area (Web Developer).

Duration of OJT: Minimum 45 Hours

A Student needs to submit the detailed report of the OJT along with the 'Certificate of Completion'**.**

OR

– **Project /Mini-Project** on Web Application Development

A Student needs to submit the project report along with the finished product and other artifacts (if any).

Recommended Text Books:

1. Nasscom courseware module for Web Developer

Qualification Pack Hyperlink:

https://nsdcindia.org/sites/default/files/QP_SSC-Q0503_Web-Developer.pdf