



Malad Kandivli Education Society's

NAGINDAS KHANDWALA COLLEGE

OF COMMERCE, ARTS & MANAGEMENT STUDIES
AND SHANTABEN NAGINDAS KHANDWALA COLLEGE OF SCIENCE

(Re-accredited (3rd cycle) by NAAC with 'A' Grade)
ISO 9001 : 2015 Certified

Autonomous (2016-17)

Educational Excellence Award By Indus Foundation, U.S.A.
IMC Ramkrishna Bajaj National Quality Commendation Certificate

Providing Syllabus copy of the courses highlighting the focus on employability/
entrepreneurship/ skill development along with their course outcomes.

Sr. No.	Courses	2016-17	2017-18	2018-19	2019-20	2020-21	Total
1	Bachelor of Commerce (B.COM)	✓	✓	✓	✓	✓	5
2	Bachelor of Arts (B.A)	✓	✓	✓	✓	✓	5
3	Bachelor in Management Studies- (BMS)	✓	✓	✓	✓	✓	5
4	Bachelor of Commerce (Accounts and Finance)- BAF	✓	✓	✓	✓	✓	5
5	Bachelor of Commerce (Banking and Insurance)-BBI	✓	✓	✓	✓	✓	5
6	Bachelor of Commerce (Financial Markets)- BFM	✓	✓	✓	✓	✓	5
7	Bachelor of Science - Information Technology (B.Sc IT)	✓	✓	✓	✓	✓	5
8	Bachelor of Science- Computer Science(B.Sc CS)	✓	✓	✓	✓	✓	5
9	Bachelor of Arts- Multimedia and Mass Communication (B.A.MMC)	✓	✓	✓	✓	✓	5
10	Bachelor of Management Studies- Sports Management (BMS-SM)	X	X	✓	✓	✓	3
11	B. Com. Honours in Actuarial Studies	X	X	X	✓	✓	2
12	B.A. Honours in Apparel Design and Construction	X	X	X	✓	✓	2
13	B. Com. Honours in International Accounting	X	X	X	✓	✓	2
14	Bachelor of Management Studies- E commerce operations	X	X	X	X	✓	1
15	B.Sc. (Honours) in Integrative Nutrition & Dietetics	X	X	X	X	✓	1
16	BBA in Tourism and Travel Management	X	X	X	X	✓	1
17	B.Sc. in Interior Design	X	X	X	X	✓	1
18	Master Of Commerce-(M.COM)- Accountancy	✓	✓	✓	✓	✓	5
19	Master Of Commerce-(M.COM)- Management	✓	✓	✓	✓	✓	5
20	Master of Arts (Economics)	✓	✓	✓	✓	✓	5
21	Master of Arts (Geography)	✓	✓	✓	✓	✓	5
22	Master of Arts (Psychology)	X	X	X	✓	✓	2
23	Master of Science (Information Technology) (M.Sc IT)	✓	✓	✓	✓	✓	5
24	Master's Degree - Sports Management (MSM)	X	X	✓	✓	✓	3
25	Master of Science (Geo-informatics) (M.Sc GeoInformatics)	X	X	X	X	✓	1
							84

Matta

Prof. (Dr.) Moushumi Datta
I/c. Principal

Nagindas Khandwala College

(Autonomous)



Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme

First Year

Semester I

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 054

Detailed Syllabus:

Sr. No	Modules / Units	No of Lectures
1	<p>(Skill development)</p> <p>The Seven Cs of Effective Communication: Completeness, Conciseness, Consideration, Concreteness, Clarity, Courtesy, Correctness Understanding Communication: Nature and Scope of Communication, Methods of communication, Cross-cultural communication, Technology-enabled Business Communication</p>	6
2	<p>Emotional Intelligence: Meaning and definition, Need for imotional intelligence, Intelligence Quotient versus Emotional Intelligence Quotient, Components of Emotional Intelligence, Competencies of Emotional Intelligence, and Skills to develop Emotional Intelligence. Etiquette and Mannerism: Introduction, Professional Etiquette, Technology Etiquette. Writing Business Messages and Documents: Business Correspondence: Letter of inquiry, letter of order, letter of complaints, sales letter, business reports, resume writing</p>	6
3	<p>Resume writing: Introduction, Resume, Curriculum Vitae, Job Application or Cover Letter Professional Presentation: Planning a Presentation, Preparing the Presentation, Delivering the Presentation Job Interviews: Types of job Interviews, Preparatory Steps for Job Interviews, Interview Skill Tips, FAQ During Interviews Group Discussion: Difference between Group Discussion, Panel Discussion and Debate, Importance of Group Discussions, Traits, Types of Group Discussions, Individual Traits</p>	6
4	<p>Leadership and Team Building: Leader and Leadership, Leadership Traits, Culture and Leadership, Leadership Styles and Trends, Team Building, Types of Teams, Decision Making and Negotiation: Introduction to Decision Making, Steps for Decision Making, Decision Making Techniques, Negotiation Fundamentals, Negotiation Styles, Major Negotiation Concepts</p>	6
5	<p>Business ethics: Importance of business ethics, personal integrity at work place, computer ethics, corporate social responsibility Stress and Time Management: Stress, Sources of Stress, Ways to Cope with Stress, time management, prioritising and procrastination</p>	6



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)

MALAD (W), MUMBAI - 400 064

Reference Books

1. Meenakshi Raman and Prakash Singh, Business Communication, Oxford University Press, 2nd Ed.
2. Aruna Koneru, Professional Communication, Tata McGraw Hill
3. M. S. Rao, Strategies for Improving Your Business Communication, Shroff Publishers and Distributors
4. Soft Skills: an Integrated Approach to Maximise Personality, Gajendra S. Chauhan, Sangeeta Sharma, Wiley India



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

Nagindas Khandwala College

(Autonomous)



Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme

First Year

Semester I

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

WEB PROGRAMMING I

(Implemented during Academic Year 2019-20)

(wef 2019-20)

Modules at a Glance

Sr. No.	Topics	No. of lectures
1	Internet and world wide web, HTML5	9
2	HTML5 Components, Style sheets	9
3	JavaScript	9
4	Document and its associated objects	9
5	JQuery and Bootstrap	9
	Total	45

Course Objectives: By the end of the course, learners will be able to:

1. Identify and learn the Internet World with working of a website using HTML.
2. Identify the creation of dynamic websites using different components of HTML.
3. Define and describe the javascript usage.
4. State and Explain the different document object models.
5. Explain jQuery and bootstrap components.

Course Outcome: After completing this course learners will be able to:

CO1: Apply a structured approach to identifying needs, interests, and functionality of a website. (Apply)

CO2: Design dynamic websites that meet specified needs and interests.(Create)

CO3: Design appropriate HTML, CSS, and JavaScript code from public repositories of open-source and free scripts that enhances the experience of site visitors.(Create)

CO4: Analyze the existing HTML, CSS, and JavaScript code to extend and alter its functionality, and to correct errors and cases of poor practice. (Analyse)

CO5: Create a website which is functional with all the basics and advanced HTML, CSS, Javascript alongwith jQuery and Bootstrap.(Apply)

PRINCIPAL

Detailed Syllabus:

Modules	Topics	No of Lectures
1	<p>(Skill development)</p> <p>Internet and world wide web: What is Internet? Introduction to internet and its applications, E-mail, telnet, FTP, e-commerce, video conferencing, e-business. Internet service providers, domain name server, internet address,</p> <p>World Wide Web (WWW): World Wide Web and its evolution, uniform resource locator (URL),</p> <p>Browsers – internet explorer, Netscape navigator, opera, Firefox, chrome, Mozilla. Search engine, HTTP protocol</p> <p>HTML5: Introduction, Why HTML5? Formatting text by using tags, using lists and backgrounds, Creating hyperlinks and anchors. Style sheets, CSS formatting text using style sheets, formatting paragraphs using style sheets</p>	9
2	<p>HTML5 Page layout and navigation: Creating navigational aids: planning site organization, creating text based navigation bar, creating graphics based navigation bar, creating graphical navigation bar, creating image map, redirecting to another URL, creating division based layouts: HTML5 semantic tags, creating divisions, creating HTML5 semantic layout, positioning and formatting divisions.</p> <p>HTML5 Tables, Forms and Media: Creating tables: creating simple table, specifying the size of the table, specifying the width of the column, merging table cells, using tables for page layout, formatting tables: applying table borders, applying background and foreground fills, changing cell padding, spacing and alignment, creating user forms: creating basic form, using check boxes and option buttons, creating lists, additional input types in HTML5, Incorporating sound and video: audio and video in HTML5, HTML multimedia basics, embedding video clips, incorporating audio on web page. HTML web storage.</p> <p>Style Sheets : What are style sheets?, Why are style sheets valuable?, Different approaches to style sheets, Using Multiple approaches, Linking to style information in separate file, ,Setting up style information, Using the tag, Embedded style information.</p>	9



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
 ARTS & MANAGEMENT STUDIES AND SHANTABEN
 NAGINDAS KHANDWALA COLLEGE OF SCIENCE
 (AUTONOMOUS)
 MALAD (W), MUMBAI - 400 084

3	Java Script: Introduction, Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, JavaScript Security, Operators: Assignment Operators, Comparison Operators, Arithmetic Operators, % (Modulus), ++(Increment), --(Decrement), -(Unary Negation), Logical Operators, Short-Circuit Evaluation, String Operators, Special Operators, ?: (Conditional operator), , (Comma operator), delete, new, this, void Statements: Break, comment, continue, delete, do...while, export, for, for...in, function, if...else, import, labelled, return, switch, var, while, with. Core JavaScript (Properties and Methods of Each) : Array, Boolean, Date, Function, Math, Number, Object, String, regExp	9
4	Document and its associated objects: document, Link, Area, Anchor, Image, Applet, Layer Events and Event Handlers : General Information about Events, Defining Event Handlers, event, onAbort, onBlur, onChange, onClick, onDbIcClick, onDragDrop, onError, onFocus, onKeyDown, onKeyPress, onKeyUp, onLoad, onMouseDown, onMouseMove, onMouseOut, onMouseOver, onMouseUp, onMove, onReset, onResize, onSelect, onSubmit, onUnload	9
5	JQUERY: Introduction of jquery, syntax, selectors, events, effects, jquery html and css methods. Bootstrap: Introduction of basic bootstrap, installation, using bootstrap grid, using base css	9

References:

1. HTML5 Black Book: Covers CSS3, JAVASCRIPT, XML,XHTML, AJAX, PHP and JQUERY DreamTech Press.
2. Learning bootstrap : Aravind Shenoy,Ulrich Sossou, Packt publishing
3. Learning JQuery: Jonathan Chaffer, Karl Swedberg, Packt publishing
4. JavaScript 2.0: The Complete Reference, Thomas Powell and Fritz Schneider, Tata Mcgraw Hill
5. HTML5 Step by Step, Faithe Wempen, Microsoft Press

Practical: (Skill development)

1. Use of Basic Tag
 - a. Design a webpage using different text formatting tags.



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 054

- b. Design a webpage with links to different pages and allow navigation between webpages.
 - c. Design a webpage demonstrating all Style sheet type
2. **Imagemaps, Tables, Forms and Media**
 - a. Design a webpage with Imagemaps.
 - b. Design a webpage demonstrating different semantics
 - c. Design a webpage with different tables. Design a webpages using table so that the content appears well placed.
 - d. Design a webpage with a form that uses all types of controls.
 - e. Design a webpage embedding with multimedia features.
3. **JavaScript**
 - a. Using JavaScript design, a webpage that prints factorial / Fibonacci series / any given series.
 - b. Design a form and validate all the controls placed on the form using Java Script.
 - c. Write a JavaScript program to display all the prime numbers between 1 and 100.
 - d. Write a JavaScript program to accept a number from the user and display the sum of its digits.
 - e. Write a program in JavaScript to accept a sentence from the user and display the number of words in it. (Do not use split () function).
 - f. Write a java script program to design simple calculator.
 - g. Write a java script program to validate the form.
4. **Control and looping statements and Java Script references**
 - a. Design a web page demonstrating different conditional statements
 - b. Design a web page demonstrating different looping statements.
5. **Design a web page demonstrating different Core JavaScript references (Array, Boolean, Date, Function, Math, Number, Object, String, regExp).+**
6. **Design a web page demonstrating different Events.**
7. **Design a web page demonstrating jquery events and effects.**
8. **Design a web page demonstrating jquery html and css methods**
9. **Design a web page demonstrating bootstrap**
10. **Demonstrate program on HTML web storage.**



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALD (W), MUMBAI - 400 084

Nagindas Khandwala College

(Autonomous)



Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme

First Year

Semester II

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

A handwritten signature in blue ink, likely of the Principal, is positioned above the printed name.

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

WEB PROGRAMMING II
at Semester II
(Implemented during Academic Year 2019-20)
(wef 2019-20)

Modules at a Glance

Sr. No.	Modules	No. of lectures
1	XML	9
2	PHP Basics	9
3	PHP- Working with Files	9
4	Advanced PHP and MySQL	9
5	Networking and XML Parsing	9
Total		45

Course Objectives: By the end of the course, learners will be able to:

1. Analyze and evaluate the working of XML.
2. Apply how server-side programming works on the web.
3. Understand the working of web application with php as a server side scripting language.
4. Develop web applications using MySQL database
5. Apply the maintenance of MySQL database.

Course Outcome: After completing this course learners will be able to:

- CO1: Design a structured approach to identify needs, interests, and functionality of a website. (Apply)
- CO2: Describe POST and GET in form submission using PHP(Understand)
- CO3: Design website with php sessions and cookies. (Create)
- CO4: Design and develop a full-fledged website using php with MySQL database. (Create)



CO5: Apply and Analyze the working of website with Php and MySql. (Analyse)

Detailed Syllabus

Sr. No.	Modules/Units	No of lectures
1.	(Skill development) XML : Introduction to XML, Anatomy of an XML document, Creating XML Documents, Creating XML DTDs, XML Schemas, XSL	9
2.	PHP: Introduction of PHP, Server-side scripting. PHP BASICS: PHP syntax and variables, comments, types, constants, control structures, branching, looping, termination, functions, arrays, passing information with PHP, GET, POST	9
3.	PHP: formatting form variables, superglobal arrays, strings and string functions, regular expressions, arrays, number handling, basic PHP errors/problems, working with files and operating systems.	9
4.	Advanced PHP and MySQL : MYSQL basics, PHP/MySQL Functions, Integrating web forms and databases, authenticating your users, Displaying queries in tables.	9
5.	Building Forms from queries, String and Regular Expressions, Sessions, Cookies and HTTP, handling file uploads networking-E-Mail, securing your website, XML parsing	9

References:

1. XML: The Complete Reference –Heather Williamson, Mcgrawhill India,2001
2. Beginning php and mysql from novice to professional 4th edition 2010
3. MySQL-PHP Database Applications-Jay Greenspan and Brad Bulger,M&T Books
4. Practical PHP and MySQL, Jono Bacon, Prentice Hall,2007


PRINCIPAL

NAGINDAS KHANOWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANOWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 084

Practical: (Skill development)

1. XML

- a. Design a DTD, corresponding XML document and display it in browser using CSS.
- b. Design an XML document and display it in browser using XSL.
- c. Design XML Schema and corresponding XML document.

2. PHP Basics-II

- a. Write a PHP Program to accept a number from the user and print it factorial.
- b. Write a PHP program to accept a number from the user and print whether it is prime or not.

3. PHP Basics- II

- a. Write a PHP code to find the greater of 2 numbers. Accept the no. from the user.
- b. Write a PHP program to display the following Binary Pyramid:

```
1
0 1
1 0 1
0 1 0 1.
```

4. String Functions and arrays

- a. Write a PHP program to demonstrate different string functions.
- b. Write a PHP program to create one dimensional array.

5. PHP and Database

- a. Write a PHP code to create: (i) Create a database College (ii) Create a table Department (Dname, Dno, Number_Of_faculty)
- b. Write a PHP program to create a database named "College". Create a table named "Student" with following fields (sno, sname, percentage). Insert 3 records of your choice. Display the names of the students whose percentage is between 35 to 75 in a tabular format.
- c. Design a PHP page for authenticating a user.
- d. Write a program to send email with attachment

6. Write a program to demonstrate use of sessions and cookies.

7. Create a shopping cart using php and Mysql.

8. Write a program to demonstrate XML parsing with php.

9. Design a web page demonstrating Platform as a service (PAAS) with google cloud.

10. Demonstrate json with php.



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)

MALAD (WEST), MUMBAI - 400 064

Nagindas Khandwala College

(Autonomous)



Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme

Second Year

Semester III

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)

MALAD (W), MUMBAI - 400 064

ADVANCED WEB PROGRAMMING - I

at Semester III

(Implemented during Academic Year 2020-21)

(wef 2020-21)

Modules at a Glance

Sr. No.	Topics	No. of Lectures
1	Object Oriented Javascript	9
2	Advanced bootstrap	9
3	AJAX	9
4	Advanced jQuery	9
5	Introduction to JSON	9
	Total	45

Course Objective:

By the end of the course, learners will be able to:

1. Recall the JavaScript, bootstrap, jquery and learn the advanced technologies.
2. Define and describe Ajax working with partial refreshes.
3. Study the concept of json to store data.
4. Learn designing with bootstrap and jQuery
5. Develop a website with the latest ajax,bootstrap and jQuery and store data in json.

Course Outcome:

After completing this course learners will be able to:

CO1: Discuss the concepts of object oriented concepts with JavaScript.(Understand)

CO2: Develop websites with bootstrap, Ajax technologies and jquery.(create)


PRINCIPAL
NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
117, MUMBAI - 400 084

CO3: Discuss json in web applications.(Understand)

CO4: Define and discuss major concepts, tools, techniques, and methods of web application development.(Create)

CO5: Apply the technologies learned in creation of websites.(Apply)

Detailed Syllabus

Module	Topics	No. of Lectures
1	(Skill development) Object Oriented Javascript: Javascript - Error Handling, Javascript – Validations, Javascript – Animation, Javascript – Multimedia, Javascript – Debugging, Javascript - Image Map, Javascript – Browsers, JS form validation, JS email validation, JavaScript OOPs, JS Class, JS Objec,, JS Prototype, JS constructor Method, JS static Method, JS Encapsulation, JS Inheritance, JS Polymorphism, JS Abstraction, JS Cookies, Cookie Attributes, Cookie with multiple Name, Deleting Cookies, JavaScript Events, JS this Keyword, JS Debugging, JS Hoisting, JS Strict Mode, JS TypedArray	9
2	Advanced bootstrap: Introduction, Grid Basic, Typography, Colors, Tables, Images, Jumbotron, Alerts, Buttons, Button Groups, Badges, Progress Bars, Spinners, Pagination, List Groups, Cards, Dropdowns, Collapse, Navs, Navbar, Forms, Inputs, Input Groups, Custom Forms, Carousel, Modal, Tooltip, Popover, Toast, Scrollspy, Utilities, Flex, Icons, Media Objects, Filters, Bootstrap 4 Grid: Grid System, Stacked/Horizontal, Grid XSmall, Grid Small, Grid Medium, Grid Large, Grid XLarge	9
3	What is AJAX? Asynchronous Ajax Technologies, AJAX - Browser Support, AJAX - XMLHttpRequest, How AJAX Works?, Java AJAX, AJAX with Database, Email Finder Comment Form, AJAX - Security, AJAX – Issues, AJAX with PHP, AJAX Applications	9
4	Advanced jquery jQuery Introduction, jQuery Syntax, jQuery Selectors, jQuery Events, jQuery in HTML, jQuery Get, jQuery Set, jQuery Add, jQuery Remove , jQuery CSS Classes, jQuery css(), jQuery	9

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
WATERLOO, MUMBAI - 400 024

	Dimensions, jQuery Traversing, jQuery Ancestors, jQuery Descendants, jQuery Siblings, jQuery Filtering, jQuery AJAX, jQuery AJAX IntrojQuery LoadjQuery Get/Post,jQuery Selectors, jQuery DOM	
5	Introduction to JSON, What is JSON, JSON - Syntax,JSON - DataTypes,JSON - Objects, JSON - Schema,JSON vs XML, JSON Parse, JSON Stringify,JSON Object,JSON Array,JSON Comments,JSON with PHP, JSON with Python, JSON with Ajax,JSON with Java	9

References:

1. Javascript2.0: The Complete reference, Thomas Powell and Fritz Schneider,2nd Edition
2. Learning Bootstrap: Aravind Shenoy, Ulrich Sossou, Packt Publishing,2014
3. Learning Jquery: Jonathan Chaffer, Karl Swedberg, Packt Publishing, 2013
4. Ajax for dummies, Steve Holzner

Websites: www.w3schools.com

Practicals: (Skill development)

1. Write a program on basic object oriented javascript.
2. Write a program to
 - a) Demonstrate Form validation
 - b) Demonstrate Encapsulation, Inheritance, polymorphism, abstraction.
3. Write a program to demonstrate cookies and events.
4. Write a program to demonstrate bootstrap components.
5. Write a program to demonstrate bootstrap grid
6. Write a program to demonstrate simple Ajax and Ajax with php
- 7 Write a program to demonstrate advanced jquery.
8. Write a program to demonstrate jquery with ajax,jquery DOM
9. Write a program to demonstrate JSON
10. Write a program to demonstrate JSON with PHP and JSON with Ajax



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

Nagindas Khandwala College
(Autonomous)



Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme

Second Year

Semester III

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

COMPUTER GRAPHICS AND ANIMATION
at Semester III

(Implemented during Academic Year 2020-21)
(wef 2020-21)

Modules at a Glance

Sr. No.	Topics	No. of Lectures
1	Introduction and Scan Conversions Algorithms	9
2	2D and 3D Transformation	9
3	Viewing in 3D and Object Rendering	9
4	Visible-Surface Determination and Curves	9
5	Animation	9
	Total	45

Course Objectives –

By the end of the course, learners will be able to:

- Introduce the different graphics systems and become familiar with the working of graphics system components.
- Understand the working of different scan conversion algorithms.
- Learn the basic principles of 2- dimensional and 3- dimensional computer graphics.
- Transform the object using various transformation techniques.
- Provide an understanding of mapping from world coordinates to device coordinates, clipping, and projections.
- Understand the concept of illumination, shading and Visible Surface determination and different techniques involved in it.
- Have a basic understanding of Animation and its principles.



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 084

Course Outcome –

After completing this course learner will be able to:

CO1: Understand different scan conversion algorithms, apply it using programming language and define their applications.(Apply)

CO2: Discuss 2D and 3D transformations and different transformation matrix used. (Understand)

CO3: Apply various 2D transformations on a 2D object. (Apply)

CO4: Discuss different shading models and Visible-Surface Determination techniques. (Understand)

CO5: Define Animations and apply the basic principles of animation. (Remember, Apply)

CO6: Create basic 2D animation using programming language. (Create)

Detailed Syllabus

Module	Topics	No. of Lec
1	(Skill development) Introduction and Scan Conversions Algorithms Introduction to computer graphics: Introduction to computer Graphics, Computer Graphics Application, Description of some graphics devices, Hard Copy devices, display technologies, Raster-Scan Graphics Displays, CRT Raster Scan Basics, Random-Scan Display Processor, LCD displays. Scan conversion – Digital Differential Analyser (DDA) algorithm, Bresenhams' Line drawing algorithm. Bresenhams' method of Circle drawing, Problems of Aliasing, end-point ordering and clipping lines, Scan Converting Circles, Clipping Lines algorithms: Cohen-Sutherland, Clipping Polygons.	9
2	2D and 3D Transformation 2D Transformations: Basic transformation , Matrix representation and	9

PRINCIPAL

	<p>Homogeneous co-ordinates, Rotation, Reflection, Scaling, Transformation of Points, Transformation of The Unit Square, Combined transformation, Rotation About an Arbitrary Point, Reflection through an Arbitrary Line.</p> <p>3D Transformations: translation, rotation, scaling, composite-shears and reflections, Three dimensional viewing, Rotation about an Arbitrary Axis in Space, Reflection through an Arbitrary Plane, Matrix Representation of 3D Transformations, Composition of 3D Transformations, Projection and its types.</p>	
3	<p>Viewing in 3D and Object Rendering</p> <p>Stages in 3D viewing, Canonical View Volume (CVV), specifying an Arbitrary 3D View, Examples of 3D Viewing, the Mathematics of Planar Geometric Projections, Combined transformation matrices for projections and viewing, Coordinate Systems and matrices, camera model and viewing pyramid.</p> <p>Object Rendering: Introduction Object-Rendering, Light Modelling Techniques, Illumination Model, Shading, Flat Shading, Polygon Mesh Shading, Gourand Shading Model, Phong Shading, Transparency Effect, Shadows, Texture and Object Representation, Ray Tracing, Ray Casting, Radiosity, Color Models.</p>	9
4	<p>Visible-Surface Determination and Curves</p> <p>Visible-Surface Determination: Techniques for efficient Visible-Surface Algorithms, Categories of algorithms, Back face removal, The z-Buffer Algorithm, Scan-line method, Painter's algorithms (depth sorting), Area sub-division method, BSP trees, Visible-Surface Ray Tracing, comparison of the methods.</p> <p>Plane Curves and Surfaces: Curve Representation, Nonparametric Curves, Parametric Curves, Parametric Representation of a Circle, Ellipse, Parabola, Hyperbola, Representation of Space Curves, Cubic Splines, Bezier Curves, B-spline Curves, Parametric Cubic Curves, Quadric Surfaces. Bezier Surfaces</p>	9
5	<p>Animation</p> <p>Principles of Animation, about motion graphics, Principles of animation, Key framing, Deformations, Character Animation, physics-Based Animation, Procedural Techniques, Groups of Objects, Animation by computer, Animation file formats, Display of animated content, Introduction to Morphing, Three-Dimensional Morphing, Motion Tweening and Motion Editor, Classic tweening and Shape tweening.</p>	9


PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 034

References:

1. Computer Graphics, R. K. Maurya, John Wiley.
2. Mathematical elements of Computer Graphics, David F. Rogers, J. Alan Adams, TataMcGraw-Hill.
3. Procedural eteinem« of Computer Graphics, David F. Rogers, Tata McGraw-Hill.
4. Multimedia BASICS by Suzanne (Suzanne Weixel) Weixel, Jennifer Fulton, Karl Barksdale and CherylBeck Morse (Mar 14, 2003)

Practical : (Skill development)

1. Solve the following:
 - a) Draw a co-ordinate axis at the center of the screen.
 - b) Divide your screen into four region, draw circle, rectangle, ellipse and half ellipse in eachregion with appropriate message.
2. Draw a simple hut on the screen.
3. Write a program to implement DDA line drawing algorithm.
4. Write a program to implement Bresenham's line drawing algorithm.
5. Write a program to implement mid-point circle drawing algorithm.
6. Write a program to clip a line using Cohen and Sutherland line clipping algorithm.
7. Write a program to clip a polygon using Sutherland Hodgeman algorithm.
8. Write a program to apply various 2D transformations on a 2D object (use homogenous coordinates).
9. Write a program to demonstrate 2D animation such as clock simulation or rising sun.
10. Write a program to implement the bouncing ball inside a defined rectangular window.



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 084

Nagindas Khandwala College
(Autonomous)



Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme

Second Year

Semester III

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

**NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 084**

EMBEDDED SYSTEMS

at Semester III

*(Implemented during Academic Year 2020-21)
(wef 2020-21)*

Modules at a Glance

Sr. No.	Topics	No. of Lectures
1	Introduction and Core Components	9
2	Embedded Hardware	9
3	Introduction to 8051 Microcontroller	9
4	Programming in C	9
5	RTOS and Trends	9
	Total	45

Course Objectives:

By the end of the course, learners will be able to:

1. Understand the meaning, components of a basic embedded systems
2. Study the characteristics and quality attribute of an embedded systems
3. Understand the memory structure of embedded systems and its peripheral devices
4. Differentiate aspects of programming for developing embedded systems
5. Understand the EDLC

Course Outcomes:

After completing this course, learners will be able to:

CO1: Describe the components of an embedded system (Understand)

CO2: Explain the memory structure and peripherals required for embedded systems (Understand)

CO3: Illustrate the pin diagram of 8051 Microcontroller with its structure (Analyse)

CO4: Write programs for embedded systems (Apply)

CO5: Create basic Embedded Products for the market (Create)


PRINCIPAL

Detailed Syllabus

Module	Topics	No. of Lectures
1	<p>(Skill development)</p> <p>Introduction: Embedded Systems and general purpose computer systems, history, classifications, applications and purpose of embedded systems</p> <p>Core of embedded systems: microprocessors and microcontrollers, RISC and CISC controllers, Big endian and Little endian processors, Application specific ICs, Programmable logic devices, COTS, sensors and actuators, communication interface, embedded firmware, other system components.</p>	9
2	<p>Characteristics and quality attributes of embedded systems: Characteristics, operational and non-operational quality attributes.</p> <p>Embedded Hardware: Memory map, i/o map, interrupt map, processor family, external peripherals, memory – RAM, ROM, types of RAM and ROM, memory testing, CRC, Flash memory.</p> <p>Peripherals: Control and Status Registers, Device Driver, Timer Driver - Watchdog Timers.</p>	9
3	<p>The 8051 Microcontrollers: Microcontrollers and Embedded processors, Overview of 8051 family. 8051 Microcontroller hardware, Input/output pins, Ports, and Circuits, External Memory.</p> <p>Designing Embedded System with 8051 Microcontroller: Factors to be considered in selecting a controller, why 8051 Microcontroller, Designing with 8051.</p>	9
4	<p>8051 Programming in C: Variables, Declaring a variable, Data Types and time delay in 8051 C, I/O Programming, Logic operations, Data conversion Programs, structure of embedded program, infinite loop, compiling, linking and debugging, functions.</p>	9
5	<p>Real Time Operating System (RTOS): Operating system basics, types of operating systems, Real-Time Characteristics, Selection Process of an RTOS.</p> <p>Design and Development: Embedded system development Environment –IDE, types of file generated on cross compilation, disassembler/ de-compiler, simulator, emulator and debugging, embedded product development life- cycle, trends in embedded</p>	9



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MACHINDRA, MUMBAI - 400 064

industry.

References:

1. Shibu K.V, —Introduction to Embedded SystemsI, McGraw Hill.2014
2. Jonathan W.Valvano, —Embedded Microcomputer Systems Real Time InterfacingI, Third Edition Cengage Learning, 2012
3. Raj Kamal, —Embedded Systems-Architecture, Programming and DesignI, 3 edition, TMH.2015
4. Lyla, —Embedded SystemsI, Pearson , 2013
5. David E. Simon, —An Embedded Software PrimerI, Pearson Education, 2000.

Practical: (Skill development)

1. A. To interface 8 LEDs at Input-output port and create different patterns.
B. To demonstrate timer working in timer mode and blink LED without using any loop delay routine.
2. Configure timer control registers of 8051 and develop a program to generate given time delay.
3. To demonstrate use of general purpose port i.e. Input/ output port of two controllers for data transfer between them.
4. Serial I / O: Configure 8051 serial port for asynchronous serial communication with serial port of PC exchange text messages to PC and display on PC screen.
5. To demonstrate interfacing of seven-segment LED display and generate counting from 0 to 9 with fixed time delay.
6. A. Interface 8051 with D/A converter and generate square wave of given frequency on oscilloscope.
B. Interface 8051 with D/A converter and generate triangular wave of given frequency on oscilloscope.
C. Using D/A converter generate sine wave on oscilloscope with the help of lookup table stored in data area of 8051.
7. Interface stepper motor with 8051 and write a program to move the motor through a given angle in clock wise or counter clock wise direction
8. Generate traffic signal
9. Implement Temperature controller
10. Implement Elevator control


PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

Nagindas Khandwala College

(Autonomous)



Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme

Second Year

Semester III

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

HYBRID MOBILE APPLICATION DEVELOPMENT - I

at Semester III

(Implemented during Academic Year 2020-21)

(wef 2020-21)

Modules at a Glance

Sr. No.	Topics	No. of Lectures
1	AngularJS Introduction	9
2	AngularJS Components	9
3	Introduction to Ionic Software setup	9
4	Ionic Components	9
5	JS Components	9
	Total	45

Course Objective:

By the end of the course, learners will be able to:

1. Focus in this course is on the basic understanding of web frameworks and
2. Develop API's for user interface design by Angular JS and Ionic Framework for Mobile Application Development.
3. On the completion of the course, students will be able to develop Hybrid mobile applications.

Learning Outcome:

On completion of the course, learners will be able to:

CO1: Create a fully functional HTML5 app for any of the three OSES (Create)

CO2: Use PhoneGap to package HTML5 apps into native apps. (Apply)

CO3: Understand mobile application development and deployment process. (Understand)

CO4: Understand jQuery and jQuery Mobile architecture. (Understand)

CO5: Learn how to build apps with the Ionic framework. (Create)



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

Detailed Syllabus

Module	Topics	No. of Leecs
1	(Skill development) AngularJS Introduction, AngularJS Expressions, AngularJS Modules, AngularJS Directives, AngularJS Model, AngularJS Data Binding, AngularJS Controllers, AngularJS Scopes, AngularJS Filters, AngularJS Services, AngularJS Http, AngularJS DOM, AngularJS Events, AngularJS Forms, AngularJS Validation	9
2	AngularJS Tables, AngularJS Select, AngularJS SQL, AngularJS API, AngularJS Includes, AngularJS Animations, AngularJS Routing, AngularJS Application, AngularJS AJAX, AngularJS Views, AngularJS Scopes, AngularJS Services, AngularJS Dependency Injection, AngularJS Custom Directives, AngularJS Internationalization	9
3	Introduction to Ionic: Mobile Hybrid Architecture, What is Apache Cordova?, What is Ionic?, Features of Framework, Framework Advantages, Framework Limitation, Software setup: Install Node.js, Install Git, Install Bower, Install Gulp, Install Sublime Text, Install Cordova and Ionic CLI, The platform guide, Creating First Ionic App, The browser developer tools setup, The Ionic project structure, The config.xml file, The www folder, Scaffolding the tabs template, Scaffolding the side menu template, generator-ionic, Installing generator-ionic	9
4	Ionic Colors, Content, Header, Footer, Buttons, Lists, Cards, Forms, Toggle, Checkbox, Radio Button, Range, Select, Tabs, Grid, Icons, Padding	9
5	JS ActionSheet, JS Backdrop, JS Content, JS Form, JS Events, JS Header, JS Footer, JS Keyboard, JS List, JS Loading, JS Modal, JS Navigation, JS Popover, JS Popup, JS Scroll, JS Side Menu, JS Slide Box, JS Tabs, Cordova Integration, Admob, Camera, Facebook, In App Browser, Native Audio, GeoLocation, Media, Splashscreen	9

References:

1. Pro AngularJS – Adam Freeman
2. AngularJS Programming by example - AgusKurniawan
3. AngularJS UI Development – Amit Ghart, Matthias Nehlsen.
4. Learning Ionic - Build Hybrid Mobile Applications with HTML5 - Arvind Ravulavaru
5. Ionic Framework by Example - Sani Yusuf
6. Full Stack Mobile App with Ionic Framework - Hoc Phan
7. Ionic Framework - Building Mobile Apps with Ionic Framework - Michael Rohner

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(G. J. COLONY)
MUMBAI - 400 054

Practical: (Skill development)

1. Ionic 4-Create and build first project or application (Android and iOS)
2. Ionic 2/Ionic 4-Adding Cordova Android Platform
3. Ionic 2/Ionic 4-Create, Generate and Add Pages
4. Ionic CLI v3-start command templates and options
5. Ionic 4/Ionic 2 Modals and Understanding Ionic 2 Navigation
6. Learn Ionic 4-what is a component and page? and how to use them?
7. Ionic 4-Lazy Loading Modules
8. Theming and Styling Ionic 2 Apps
9. Developing Ionic Apps Entirely in The Browser-Mocking SQLite Native Plugin
10. Playing videos with Ionic 2/Ionic 4 and Cordova Video Player plugin
11. Using PouchDB and SQLite with Ionic 4: A CRUD Example
12. Ionic 4-Create a Nearby Restaurants App with Geolocation Plugin, Google Maps and Places API



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

Nagindas Khandwala College

(Autonomous)



Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme

Second Year

Semester IV

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

**NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064**

ADVANCED JAVA

at Semester IV
(Implemented during Academic Year 2020-21)
(wef 2020-21)

Modules at a Glance

Sr. No.	Modules	No. of lectures
1	Networking and Servlets	6
2	JDBC and Cookies	6
3	JSP and MVC	6
4	Enterprise JavaBeans	6
5	Java Persistence API and Web Services	6
Total		30

Pre-Requisite: To study Advanced Java basic knowledge of core java is needed..

Course Objectives – By the end of the course, learners will be able to:

- Learn to perform socket programming in java.
- Get an understanding on Enterprise Java and the servlet technology.
- Explain the database connection using JDBC.
- Understand the concept of cookies and session tracking in java.
- Work with JSP, EJB and implement it.

Course Outcome – After completing this course learner will be able to:

CO1: Develop networking concept using Socket Programming. (Create)

CO2: Understand Enterprise Application and Java EE architecture. (Understand)

CO3: Explain the concept of servlet, JDBC and apply it through coding. (Understand, Apply)

CO4: Learn and analyse the concept of cookies and session tracking in Java. (Analyse)

CO5: Create applications using servlet, JSP, EJB along with implementation of database. (Create)

CO6: Basic understanding of JavaBean, Web services and their applications. (Understand)

Detailed syllabus:

Sr. No	Modules (Skill development)	No. of Lectures
1	<p>UNIT 1</p> <p>Networking (Socket Programming): The java.net package, Connection oriented transmission – Stream Socket Class. Creating a Socket to a remote host on a port (creating TCP client and server) Simple Socket Program Example.</p> <p>Introduction to Java EE: What is an Enterprise Application? What is java enterprise edition? Java EE Technologies, Java EE evolution, Glassfish server.</p> <p>Java EE Architecture, Server and Containers: Types of System Architecture, Java EE Server, Java EE Containers.</p> <p>Server side programming with Java Servlet: Introduction, The need for Dynamic content, Java Servlet Technology, Lifecycle of a Servlet, a simple welcome servlet, Servlet API, Handling get and post request (HTTP), Handling data from HTML to servlet, Retrieving data from database to servlet(Servlet-JDBC).</p>	6
2	<p>UNIT 2</p> <p>Database Programming with JDBC: Introduction, JDBC Architecture, Types of Drivers, Basic JDBC program Concept, Making database Connection, Standard Statement, PreparedStatement, Callable statement ResultSet, Executing SQL commands, Executing queries, Metadata and Transaction.</p> <p>Cookies: Kinds Of Cookies, Where Cookies Are Used? Creating Cookies Using Servlet, Dynamically Changing The Colors Of A Page.</p> <p>Session tracking: Introduction, Lifecycle of HTTP Session, Methods of session tracking- User Authorization, URL rewriting, Hidden form fields.</p>	6
3	<p>UNIT 3</p> <p>JSP: Why use Java Server Pages? JSP v\vs Servlets, Life Cycle of a JSP Page, How does a JSP function? How does JSP execute? Simple first JSP program, JSP architecture. Implicit Objects, Scripting elements – Declarations, Expressions, and Scriptlets, Comments, JSP Directives, Action elements- forward, include, use bean, get and set property. JSP with database.</p> <p>Java Beans: Introduction, Components of JavaBean, JavaBeans Properties. Examples.</p> <p>MVC: What is MVC? History of MVC, Features of MVC, MVC architecture, Components of MVC, Examples- A simple implementation of MVC using Java, Advantages and Disadvantages.</p>	6




PRINCIPAL
 NAGINDAS KHANDWALA COLLEGE OF COMMERCE
 ARTS & MANAGEMENT STUDIES AND SHANTABEN
 NAGINDAS KHANDWALA COLLEGE OF SCIENCE
 (AUTONOMOUS)
 PALAD (W), MUMBAI - 400 064

4	UNIT 4	
	<p>Introduction To Enterprise JavaBeans: What is EJB? Benefits of EJB, When to use EJB? Enterprise bean architecture, types of enterprise bean.</p> <p>Working With Session Beans: Introduction, When to use Session Beans? Types of Session Beans, Remote and Local Interfaces, Accessing Interfaces, Lifecycle of Enterprise Beans, Packaging Enterprise Beans, Example of Stateful Session Bean, Example of Stateless Session Bean, Example of Singleton Session Beans.</p> <p>Working with Message Driven Beans: Lifecycle of a Message Driven Bean, Uses of Message Driven Beans, The Message Driven Beans Example.</p> <p>Java Naming and Directory Interface: Introduction to naming and directory services, What is JNDI? Basic lookup.</p>	6
5	UNIT 5	
	<p>Persistence, Object/Relational Mapping And JPA: What is Persistence? Persistence in Java, Object/Relational Mapping,</p> <p>Introduction to Java Persistence API: The Java Persistence API, JPA, ORM, Database and Application, Architecture of JPA, How JPA Works and its specification.</p> <p>Introduction to Hibernate: What is Hibernate? Why Hibernate? Hibernate, Database and the application, Component of hibernate application, Architecture of hibernate</p> <p>Writing Hibernate Application: Creating Hibernate Configuration File, Adding a Mapping Class, Creating JSPs, Running the hibernate Application</p> <p>Web services: Introduction, Web service components, SOAP, RESTful, SOAP v/s REST, Java Web services API. Building a web services using JAX-WS.</p>	6

Reference books

1. The Complete Reference Java- Herbert Schildt 7th edition, McGraw Hill.
2. Java EE 7 For Beginners :Sharanam Shah, Vaishali Shah : SPD : First : 2017
3. Java EE 8 Cookbook : Build reliable applications with the most or robust and mature technology for enterprise development : Elder Moraes : Packt : First : 2018
4. Advanced Java Programming :Uttam Kumar Roy : Oxford Press : 2015
5. Core Java for Beginners by Sharanam Shah


PRINCIPAL
 NAGINDAS KHANDWALA COLLEGE OF COMMERCE
 ARTS & MANAGEMENT STUDIES AND SHANTABEN
 NAGINDAS KHANDWALA COLLEGE OF SCIENCE
 (AUTONOMOUS)
 MALAD (W), MUMBAI - 400 064

Practicals (Skill development)

1. Implement a program on Socket Programming.

2. Implement the following Simple Servlet applications.

- a. Create a simple calculator application using servlet.
- b. Create a servlet for a login page. If the username and password are correct then it says message "Hello <username>" else a message "login failed".
- c. Create a registration servlet in Java using JDBC. Accept the details such as Username, Password, Email, and Country from the user using HTML Form and store the registration details in the database.

3. Implement the following Servlet applications.

- a. Design database for student administration. Develop servlet(s) to perform CRUD operations. The program should do the following:-
 - i. Insert details for a new student.
 - ii. View all the details of the students.
 - iii. Update details of existing student.
 - iv. Delete details of a student.
- b. Develop Simple Servlet Question Answer Application using Database.

4. Programs on cookies and session in servlet.

- a. Create a servlet that uses Cookies to store the number of times a user has visited servlet.
- b. Create a servlet demonstrating the use of session creation and destruction. Also check whether the user has visited this page first time or has visited earlier also using sessions.

5. Demonstrate following JSP programs.

- a. Create Customer table in CUST database. Perform select, insert and delete operations on Customer table using JSP.
- b. Create a registration and login JSP application to register and authenticate the user based on username and password using JDBC.
- c. Develop a simple JSP application to display values obtained from the use of intrinsic objects of various types.

6. Implement following JSP applications

- a. Develop a simple JSP application to pass values from one page to another with validations. (Name-txt, age-txt, hobbies-checkbox, email-txt, gender-radio button).


PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & HUMAN DEVELOPMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

- b. Create an html page with fields, eno, name, age, desg, salary. Now on submit this data to a JSP page which will update the employee table of database with matching eno.

7. Javabean program

- a. Write a Student class with three properties. The useBean action declares a JavaBean for use in a JSP. Write Java application to access JavaBeans Properties.

8. Demonstrate following EJB applications.

- a. Create a Currency Converter application using EJB.
- b. Develop a Simple Room Reservation System Application Using EJB.
- c. Develop simple shopping cart application using EJB [Stateful Session Bean].

9. Implement the following EJB applications with different types of Beans.

- a. Develop simple EJB application to demonstrate Servlet Hit count using Singleton Session Beans.
- b. Develop simple visitor Statistics application using Message Driven Bean [Stateless Session Bean].
- c. Develop simple Marks Entry Application to demonstrate accessing Database using EJB.

10. Implement following Hibernate applications.

- a. Develop a Hibernate application to store Feedback of Website Visitor in MySQL Database.
- b. Develop a Hibernate application to store and retrieve employee details in MySQL Database.

11. Programs on web services.

- a. Develop a simple "Hello World" Web Service with SOAP in Java.
- b. Develop a Simple Web Service and Client with JAX-WS.



PRINCIPAL

Nagindas Khandwala College

(Autonomous)



Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme

Second Year

Semester IV

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

**NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 054**

ADVANCED WEB PROGRAMMING - II

at Semester IV
(Implemented during Academic Year 2020-21)
(wef 2020-21)

Modules at a Glance

Sr. No.	Modules	No. of lectures
1	AngularJS Introduction	9
2	AngularJS Components	9
3	Node.js Introduction	9
4	Node.js Components	9
5	Node.js with MongoDB	9
	Total	45

Pre-requisite: Student must have completed ADVANCED WEB PROGRAMMING – I course in Semester III.

Course Objectives:

By the end of the course, learners will be able to:

1. Understand and learn Angular JS concepts and develop web applications with its components.
2. Understand and learn Node JS environment and develop web applications with MongoDB database.
3. Explain and implement the components of AngularJS.
4. Develop web applications with Node JS
5. Implement MongoDB with Node JS



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AFTONDIUS)
MALAD (W), MUMBAI - 400 064

Course Outcome:

After completing this course learners will be able to:

CO1: Understand the concept of Angular JS (Understand)

CO2: Describe the working of Angular JS with its components.(Understand)

CO3: Recognize the concept of Node JS usage in web application.(Analyse)

CO4: Ability to develop web application with Angular JS and Node JS.(Apply)

CO5: Create and develop node JS applications with MongoDB.(Create)

Detailed syllabus:

Module	Topics (Skill development)	No. of Leccs
1	AngularJS Introduction, AngularJS - MVC Architecture, AngularJS Expressions, AngularJS Modules, AngularJS Directives, AngularJS Model, AngularJS Data Binding, AngularJS Controllers, AngularJS Scopes, AngularJS Filters, AngularJS Services, AngularJS Http, AngularJS DOM, AngularJS Events, AngularJS Forms, AngularJS Validation	9
2	AngularJS Tables, AngularJS Select, AngularJS SQL, AngularJS API, AngularJS Includes, AngularJS Animations, AngularJS Routing, AngularJS Application, AngularJS AJAX, AngularJS Views, AngularJS Scopes, AngularJS Services, AngularJS Dependency Injection, AngularJS Custom Directives, AngularJS Internationalization	9
3	Node.js Introduction, Node.js - Introduction, Node.js - Environment Setup, Node.js Modules, Node.js HTTP Module, Node.js File System, Node.js URL Module, Node.js REPL Terminal, Node.js Package Manager (NPM), Node.js Callbacks Concept, Node.js NPM, Node.js Event Loop, Node.js Event Emitter	9
4	Node.js Buffers, Node.js Streams, Node.js File System, Node.js Global Objects, Node.js Utility Modules, Node.js Upload Files, Node.js Email, Node.js Web Module, Node.js Express Framework, Node.js RESTful API, Node.js Scaling Application, Node.js Packaging	9
5	Node.js with MongoDB: MongoDB introduction, MongoDB Create	9

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 084

Database, MongoDB Create Collection, MongoDBInsert, MongoDBFind, MongoDBQuery, MongoDBSort, MongoDBDelete, MongoDB Drop Collection, MongoDBUpdate, MongoDBLimit, MongoDBJoin
--

References:

1. Pro AngularJS – Adam Freeman,APress,2014
2. AngularJS Programming by example - AgusKurniawan,PE Press
3. AngularJS UI Development – Amit Ghart, Matthias Nehlsen,Packt Publishing
4. Beginning Node.js – Basarat Ali Syed,APress, 2014
5. Node.js Web Development – David Herron,Packt Publishing,2018
6. Getting MEAN with Mongo, Express, Angular and Node – Simon Holmes,Manning Publications,2018.

Practical: (Skill development)

1. Write a program on basic Angular JS
2. Write a program to demonstrate AngularJS form and validation.
3. Write a program to demonstrate AngularJS Ajax and AngularJS views
4. Write a program to demonstrate Node.js Package Manager.
5. Write a program to demonstrate Node.js Event Emitter.
6. Write a program to demonstrate Node.js Buffer
- 7 Write a program to demonstrate Node.js email
8. Write a program to demonstrate Node.js with json
9. Write a program to demonstrate Node.js with MongoDB with its operations.
10. Write a program to demonstrate Node.js with MongoDBLimit and MongoDBJoin



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 084

Nagindas Khandwala College
(Autonomous)



Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme

Second Year

Semester IV

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

**NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)**

MALAD (W), MUMBAI - 400 064

HYBRID MOBILE APPLICATION DEVELOPMENT – II

at Semester IV
(Implemented during Academic Year 2020-21)
(wef 2020-21)

Modules at a Glance

Sr. No.	Modules	No. of lectures
1	Introduction to React	9
2	Templating using JSX	9
3	Working with state and Props	9
4	React Components	9
5	React Modules	9
Total		45

Pre-requisite: Student must have completed HYBRID MOBILE APPLICATION DEVELOPMENT - I course in Semester III.

Course Objective:

By the end of the course learner will be able to:

1. Focus in this course is on the basic understanding of web frameworks and API's for user interface design by Angular JS and Ionic Framework for Mobile Application Development.
2. On the completion of the course, students will be able to develop Hybrid mobile applications.

Learning Outcome:

On completion of the course learner will be able to:

- CO1: Learn how to build single page applications with React JS (Understand)
CO2: Use and Install React-Native dependencies for MAC and Windows Run Android and IOS simulator (Apply)
CO3: Understand and Learn the key concepts of the NodeJS (Understand)
CO4: Understand Nodejs, learn rapidly growing web server technology, Nodejs & understand how NodeJS works with Node course! (Understand)
CO5: Learn how to Style with React-Native and flex-box rules (Analyse)

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

Detailed syllabus

Module	Topics	No. of Lec
1	(skill development) Introduction to React: What is React?, Why React?, React version history, React 16 vs React 15, Just React - Hello World, Using create-react-app, Anatomy of react project, Running the app, Debugging first react app	9
2	Templating using JSX: Working with React. createElement, Expressions, Using logical operators, Specifying attributes, Specifying children, Fragments, Component: Significance of component architecture, Types of components, Functional, Class based, Pure, Component Composition	9
3	Working with state and Props: What is state and its significance, Read state and set state, Passing data to component using props, Validating props using propTypes, Supplying default values to props using default-Props	9
4	Rendering Lists, Event Handling, Understanding component lifecycle and handling errors. Working with Forms, Context, Code Splitting, Hooks, Routing with react route, Redux, Immutable.js, React Redux, Redux Middleware	9
5	Unit Testing, Webpack Primer, Isomorphic React	9

References:

1. Learning React: Functional Web Development with React and Redux - Book by Alex Banks and Eve Porcello
2. The Road to Learn React: Your Journey to Master Plain Yet Pragmatic React. Js - Book by Robin Wieruch
3. ReactJS by Example - Building Modern Web Applications with React - Book by Prathamesh Sonpatki



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 084

Practical: (Skill development)

1. Install create-react-app and create a new react project.
2. Create JSX expressions with different javascript expression, apply css via className and styles, use conditionals.
3. Create a stateful component and stateless component. Pass data from parent component to child component using props. Implement child to parent communication using callbacks.
4. Create component which renders lists iteratively using map function of array.
5. Handle different synthetic events.
6. Create a stateful component and implement lifecycle methods. Implement try catch mechanism using error boundaries.
7. Create a component that uses different form controls.
8. Create components that get applied with multiple themed styles using context to store theme info globally and apply to all components
9. Create react application that implements code splitting and lazy load components using React, lazy and suspense features.
10. Create a functional component that uses the ability of state and life cycle features
11. Install and setup router, configure routing rules, implement declarative and imperative navigation.
12. Create actions, reducer and store. Dispatch actions and subscribe to store changes
13. Create immutable List, map and set. Perform CRUD operations.



PRINCIPAL

NAGINDAS KHANDIWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDIWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

Nagindas Khandwala College

(Autonomous)



**Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme**

Second Year

Semester IV

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)


PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

INTERNET OF THINGS

at Semester IV
(Implemented during Academic Year 2020-21)
(wef 2020-21)

Modules at a Glance

Sr. No.	Modules	No. of lectures
1	SoC and Raspberry Pi.	9
2	ARM 8 Architecture and Programming Raspberry Pi	9
3	Programing interfaces	9
4	Useful Implementations and Introduction to IoT	9
5	IoT Security and IoT Service as a Platform	9
Total		45

Pre-requisite: Student must have completed EMBEDDED SYSTEMS course in Sem III.

Course Objective:

1. To assess the vision and introduction of IoT.
2. To Understand IoT Market perspective.
3. To Implement Data and Knowledge Management and use of Devices in IoT Technology.
4. To Understand State of the Art - IoT Architecture.
5. To classify Real World IoT Design Constraints, Industrial Automation in IoT

Course Outcome:

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

- CO1: Describe the meaning and different components of Internet of Things, also the principles of Internet (Understand)
- CO2: Explain and prototype an embedded product. (Analyse)
- CO3: Illustrate the physical design of the system and work with online components API for security, polling, etc. (Apply)



PRINCIPAL

CO4: Describe the memory management of an embedded system and write the codes for embedded product (Understand)

CO5: To create a small model representing the automation in IoT. (Create)

Detailed syllabus:

Module	Topics	No. of Lectures
1	(Skill development) SoC and Raspberry Pi. System on Chip: What is System on chip? Structure of SoC. SoC products: FPGA, GPU, APU, Compute Units.	9
2	ARM 8 Architecture: SoC on ARM 8. ARM 8 Architecture Introduction Introduction to Raspberry Pi: Introduction to Raspberry Pi, Raspberry Pi Hardware, Preparing your raspberry Pi. Raspberry Pi Boot: Learn how this small SoC boots without BIOS. Configuring boot sequences and hardware. Programming Raspberry Pi Raspberry Pi and Linux: About Raspbian, Linux Commands, Configuring Raspberry Pi with Linux Commands	9
3	Programing interfaces: Introduction to Node.js, Python, NodeRed Raspberry Pi Interfaces: UART, GPIO, I2C, SPI	9
4	Useful Implementations: Cross Compilation, Pulse Width Modulation, SPI for Camera. Introduction to IoT: What is IoT? IoT examples, Simple IoT LED Program. IoT and Protocols	9
5	IoT Security: HTTP, UPnp, CoAP, MQTT, XMPP. IoT Service as a Platform: Clayster, Thinger.io, SenseIoT, carriots and Node RED. IoT Security and Interoperability: Risks, Modes of Attacks, Tools for Security and Interoperability.	9

References:

1) Learning Internet of Things, Peter Waher, Packt Publishing(2015) 2) Mastering the Raspberry Pi, Warren Gay, Apress(2014)

Additional Reference(s): Abusing the Internet of Things, Nitesh Dhanjani, O'Reilly



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MU:MBAI - 400 084

Practical: (Skill development)

1. Preparing Raspberry Pi: Hardware preparation and Installation
2. Linux Commands: Exploring the Raspbian
3. GPIO: Light the LED with Python
4. GPIO: LED Grid Module: Program the 8X8 Grid with Different Formulas
5. SPI: Camera Connection and capturing Images using SPI
6. Real Time Clock display using PWM.
7. Stepper Motor Control: PWM to manage stepper motor speed.
8. Node RED: Connect LED to Internet of Things
9. Stack of Raspberry Pi for better Computing and analysis
10. Create a simple Web server using Raspberry Pi



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(WOMEN'S CAMPUS)
MUMBAI (W), MUMBAI-400 064

Nagindas Khandwala College

(Autonomous)



**Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme**

Second Year

Semester IV

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT COURSES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

MULTIMEDIA SYSTEMS

at Semester IV
(Implemented during Academic Year 2020-21)
(wef 2020-21)

Modules at a Glance

Sr. No.	Modules	No. of lectures
1	Introduction, Hardware and Software	9
2	Compression and Multimedia Objects	9
3	Audio and Video Compression	9
4	Multimedia with Internet and Animation	9
5	Multimedia-looking towards Future	9
Total		45

Pre-requisite: Student must have completed COMPUTER GRAPHICS AND ANIMATION course in Semester III.

Course Objectives –

By the end of the course, learners will be able to:

- Become multimedia/graphics designers and engineers in their areas of expertise.
- Understand the basic components of multimedia and different compression techniques used.
- Get an understanding of Animation and Virtual Reality.
- Implement different techniques for creating animated videos and edit different images using softwares.
- Apply different effects and color coding on various objects.


PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

Course Outcome –

After completing this course learner will be able to:

CO1: Use different compression techniques of text, audio, video and apply basics of animation. (Apply)

CO2: Understand different file formats used for text, image, audio and video and compare between them. (Understand, Analyze)

CO3: Apply different animation on character, object, etc. Apply text effects, color variations on objects. (Apply)

CO4: Use different software for animation purposes and create a small animation clip and enhance graphics images using different software's. (Create)

CO5: Create different logos, cards and websites using multimedia software. (Create)

CO6: Discuss the concept of Virtual reality and its applications. (Understand)

Detailed syllabus:

Module	Topics	No. of Lectures
1	<p>(Skill development)</p> <p>Introduction, Hardware and Software</p> <p>Introduction to Multimedia: Definition, History of Multimedia, characteristics of multimedia, multimedia building blocks/components, Multimedia elements, Multimedia architecture, analog and digital representations, evolving technologies for multimedia, Multimedia applications.</p> <p>Multimedia-Hardware and Software: Multimedia Hardware – Macintosh and Windows production, Platforms, Hardware peripherals – Connections, Memory and storage devices, Media software – Basic tools, making instant multimedia, Multimedia</p>	9

PRINCIPAL
NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 084

	software and Authoring tools, Production Standards.	
2	<p>Compression and Multimedia Objects</p> <p>Compression and coding: Definitions, need of data compression, types of compression, basic compression techniques- run length, Huffman's coding. Text, Graphics and Image data representation: Text, using text in multimedia, text file formats(txt,doc, rtf, pdf), text compression techniques. Basic Image fundamentals, image File formats - (BMP, TIFF, JPEG, GIF), image acquisition, graphics/image data types, color models in images, image processing and software, Image enhancement, image compression techniques.</p>	9
3	<p>Audio and Video Compression</p> <p>Audio and Audio compression: Introduction, Acoustics, Sound Waves, Types and Properties of Sounds, Psycho-Acoustics, Components of an Audio Systems, Digitization of audio, synthesizers, MIDI, digital audio processing, Quantization and Transmission of audio, Audio File Formats, audio compression techniques, audio processing software. Video and video compression: Introduction, types of video signal, television system, video color spaces, digital video, digital video processing, video file formats, video compression techniques, video recording and storage formats, video processing software</p>	9
4	<p>Multimedia with Internet and Animation:</p> <p>Multimedia and the Internet: History, Internet working, Connections, Internet Services, The World Wide Web, Tools for the WWW – Web Servers, Web Browsers, Web page makers and editors, Plug-Ins and Delivery Vehicles, HTML, VRML, Designing for the WWW – Working on the Web, Multimedia Applications – Media Communication, Media Consumption, Media Entertainment, Media games.</p> <p>Animation: Basics of animation, types of animation, principles of animation, use of animation, traditional animation, computer based animation, OpenGL overview</p>	9
5	<p>Multimedia-looking towards Future</p> <p>Multimedia-looking towards Future: Digital Communication and New Media, Interactive Television, Digital Broadcasting, Digital Radio, Multimedia Conferencing, Assembling and delivering a project-planning and costing, Designing and Producing, content and talent, Delivering, CD-ROM technology.</p> <p>Virtual Reality: Concept, Forms of VR, VR applications, VR devices: Hand Gloves, Head mounted tracking system, VR chair, VCR, 3D Sound system, Head mounted display.</p>	9


PRINCIPAL
 NAGINDAS KHANDWALA COLLEGE OF COMMERCE
 ARTS & MANAGEMENT STUDIES AND SHANTABEN
 NAGINDAS KHANDWALA COLLEGE OF SCIENCE
 DORNIGUMUSTI
 WARD 10, MUMBAI - 400 064

References:

1. Ranjan Parekh, "Principles of Multimedia", 2/E, Tata McGraw-Hill, ISBN: 1259006506
2. Ze-Nian Li, Marks S. Drew, "Fundamentals of Multimedia", Pearson Education
3. Keyes, "Multimedia Handbook", TMH, 2000.
4. R. Steinmetz and K. Naharstedt, 2001, Multimedia: Computing, Communications & Applications, Pearson, Delhi.
5. S. Rimmer, 2000, Advanced Multimedia Programming, PHI, New Delhi..

Practical: (Skill development)

(Flash (1-5), Photoshop (6-8), Dreamviewer (9-10))

1. To Move an object, to move an object in the path
2. Text flip, Text color change,
3. Creating a link using texts and objects, change the color of the object.
4. Shape Tweening and Using shape hints, Motion tweening, hybrid tweening.
5. Character Animation, Object Animation, Drawing Images
6. To create a greeting card, Create background picture
7. Text and Photo effects, editing images.
8. Designing Logos
9. Creating menu bar
10. Creating Pages and sites


PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 034

Nagindas Khandwala College

(Autonomous)



**Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme**

Second Year

Semester IV

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

**NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT SCIENCES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064**

SOFTWARE ENGINEERING

at Semester IV
(Implemented during Academic Year 2020-21)
(wef 2020-21)

Modules at a Glance

Sr. No.	Topics	No. of Lectures
1	Introduction to Software Engineering and SDLC	9
2	Introduction to Software Requirements Specifications	9
3	System Design and Object-oriented design using UML	9
4	Software Measurement and Metrics and Testing	9
5	Project management and Software Maintenance and Risk Analysis	9
	Total	45

Course Objective:

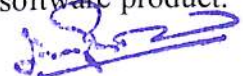
By the end of the course, learners will be able to:

- Understand the basic theory of software engineering,
- Understand the software development life cycle
- Understand and apply the basic project management practices in real life projects.
(Skill development)
- Understanding of approaches to verification and validation including static analysis, and reviews.
- Describe software measurement and software risks.

Course Outcome:

After completing this course, learners will be able to:

- CO1: Decompose the given project in various phases of a lifecycle. (Analyse)
CO2: Choose appropriate process model depending on the user requirements. (Evaluate)
CO3: Perform various life cycle activities like Analysis, Design, Implementation, Testing and Maintenance.(Apply)
CO4: Know various processes used in all the phases of the product. (Understand)
CO5: Apply the knowledge, techniques, and skills in the development of a software product. (Apply)



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MUMBAI (W.) MIDC-31 - 400 064

Detailed Syllabus:

Module	Topics	No. of Lectures
1	<p>(Skill development)</p> <p>Introduction to Software Engineering: Introduction to Software, Types of Software, Classes of Software, Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Software Myths, Software Applications, Software-Engineering Processes, Programs Versus Software Products.</p> <p>Software-Development Life-Cycle Models Software-Development Life-Cycle, Waterfall Model, Prototyping Model, Spiral Model, Evolutionary Development Model, Iterative-Enhancement Model, RAD Model, Agile Model.</p>	9
2	<p>Introduction to Software Requirements Specifications Requirement Engineering, Process of Requirements Engineering, Information Modeling, Data-Flow Diagrams, Decision Tables, SRS Document, IEEE Standards for SRS Documents, SRS Validation, Components of SRS, Characteristics of SRS.</p> <p>Software Reliability and Quality Assurance Verification and Validation, Software Quality Assurance, Software Quality, International Standard Organization (ISO), Comparison of ISO-9000 Certification and the SEI-CMM, Reliability Issues, Reliability Metrics, Reliability Growth Modeling, Reliability Assessment.</p>	9
3	<p>System Design: System/Software Design, Architectural Design, Low-Level Design Coupling and Cohesion, Functional-Oriented Versus, object-Oriented Approach, Design Specifications, Verification for Design, Monitoring and Control for Design.</p> <p>Object-oriented design using UML - Class diagram, Object diagram, Use case diagram, Sequence diagram, Collaboration diagram, State chart diagram, Activity diagram, Component diagram, Deployment diagram.</p>	9
4	<p>Software Measurement and Metrics: Software Metrics, Halstead's Software Science, Function-Point Based Measures, Cyclomatic Complexity</p> <p>Software Testing: Introduction to Testing, Testing Principles, Testing Objectives, Test Oracles, Levels of Testing, White-Box Testing/Structural Testing, Functional/Black-Box Testing, Test Plan, Test Case Design.</p>	9
5	<p>Project management: Revision of Project Management Process, Role of Project Manager, Project Management Knowledge Areas, Managing Changes in requirements, Software-Project Estimation,</p>	9

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & SCIENCES, STURZENEGGER AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 054

	<p>Constructive Cost Model (COCOMO), Software Maintenance and Risk Analysis: Software as an Evolution Entity, Software-Configuration Management Activities, Change- Control Process, Software-Version Control, Software-Configuration Management, Need for Maintenance, Categories of Maintenance, Maintenance Costs, Software-Risk Analysis and Management.</p>	
--	---	--

References:

1. R.S. Pressman, Software Engineering: A Practitioner's Approach (7th Edition), McGrawHill, 2009.
2. P. Jalote, An Integrated Approach to Software Engineering (2nd Edition), Narosa Publishing House, 2003.
3. K.K. Aggarwal and Y. Singh, Software Engineering (revised 2nd Edition), New Age International Publishers, 2008.
4. I. Sommerville, Software Engineering (8th edition), Addison Wesle, 2006.
5. Software Engineering & Testing , B.B.Agarwal, S.P.Tayal, M.Gupta.

Practical: (Skill development)

1. Problem Statement on Case Study/Mini Project
2. Requirement Analysis through various techniques
3. Use Case Diagram
4. Class Diagram
5. Activity Diagram
6. Sequence Diagram
7. State Machine Diagram
8. Component Diagram
9. Project Management
 - Computing FP
 - Gantt chart
 - Estimation Effort and schedule
10. Basic Testing



PRINCIPAL

NAGINDAS KHARDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHARDWALA COLLEGE OF SCIENCE
(PART OF DRUSI)
MALAD (W), MUMBAI - 400 064

Nagindas Khandwala College

(Autonomous)



**Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme**

Second Year

Semester IV

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

SYSTEM PROGRAMMING

at Semester IV

(Implemented during Academic Year 2020-21)

(wef 2020-21)

Modules at a Glance

Sr. No.	Modules	No. of lectures
1	Linux Utilities	9
2	Files and Directories	9
3	Process and signal	9
4	Inter Process Communications, message queues, semaphores	9
5	Shared Memory and sockets	9
Total		45

Course Objectives:

By the end of the course, learners will be able to:

1. Understand the basics of OS concepts efficient scripts and utilities are to be used.
2. Learn the concept of files and directories.
3. Describe the working of process and signals.
4. Describe the concept of IPC, semaphores, memory and sockets.
5. Design and implement code generators using C and gdb

Course Outcome:

After the completion of the course, the students would be able to

CO1: Understand and make effective use of Linux utilities and Shell scripting language (bash) to solve problems.(Apply)

CO2: Develop the skills necessary for systems programming including file system programming, process and signal management and inter-process communication.(Analyse)

CO3: Develop the basic skills required to write network programs using sockets.(Apply)

CO4: Design and implement system utility programs.(Create)

CO5: Describe UNIX file systems and process control.(Understand)



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(ARTS/COMMERCE)
MALAD (W), MUMBAI - 400 064

Detailed Syllabus

Module	Topics	No. of Lectures
1	<p>(Skill development)</p> <p>Linux Utilities: File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text Processing utilities and backup utilities.</p> <p>sed- scripts, operation, address, commands, applications, awk-execution, fields and records, scripts, operations, patterns, actions, associative arrays, string and mathematical functions, system commands in awk, applications.</p> <p>Shell programming with the Bourne again shell(bash): Introduction, shell responsibilities, pipes and Redirection, Here documents, Running a shell scripts, The shell as a programming language, Shell meta characters, File name substitution, Shell variables, Command substitution, Shell commands, The environment, Quoting, Test command, control structures, arithmetic in shell, shell script examples, interrupt processing, functions, debugging shell scripts</p>	9
2	<p>Files and Directories: File Concept, File types ,File system Structure, File meta data – Inodes, Kernel support for files, System calls for I/O operations – open, create, read, write, lseek, dup2. File status information – stat family, file and record locking, fcntl function, Links – Soft links & hard links – symlink, link, unlink.</p> <p>Directories – creating, removing, changing directories – mkdir, rmdir, chdir, obtaining current working directory – getcwd, directory contents, scanning directories – opendir, readdir, closedir, rewinddir functions.</p>	9
3	<p>Process : Process concepts, layout of C program image in main memory, process environment –environment list, environment variables, getenv, setenv, Kernel support for process, process identification, process control- process creation. Replacing a process image, Waiting for a process, process termination, zombie process, orphan process, system call interface form process management – fork, vfork, exit, wait, waitpid, exec family, process groups, session and controlling terminal, difference between threads and processes.</p> <p>Signal- Introduction to signals, Signal generation and handling, Kernel support for signal, Signal function, unreliable signals, reliable signals, Kill, raise, alarm, pause, abort, sleep functions.</p>	9
4	<p>Inter Process Communications:- Introduction to IPC, IPC between</p>	9

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 084

	<p>processes on a single computer, IPC between processes on different systems, pipes – creating, IPC between related processes using Unnamed Pipes, FIFOs – creation, IPC between unrelated processes using FIFO (named pipes), difference between named and unnamed pipes, popen and pclose library functions.</p> <p>Message Queues – kernel support for messages, APIs for Message Queues, client/server examples.</p> <p>Semaphores – Kernel support for semaphores, APIs for semaphores, FILE locking with semaphores.</p>	
5	<p>Shared Memory:- Kernel support for Shared memory, APIs for shared memory, shared memory examples.</p> <p>Sockets:- Introduction to Berkeley Sockets, IPC over a network, client/server model, Sockets Address Structure (UNIX Domain & Internet Domain), Socket System calls for connection oriented Protocol and connectionless protocol, Example client/server programs – single server-client connection, multiple simultaneous clients, socket options – setsockopt and fcntl system calls, comparison of IPC mechanisms.</p>	9

References:

1. Unix concepts and Applications, 4th Edition, Sumitabha Das, TMH.
2. Beginning Linux Programming, 4th Edition, N. Matthew, R. Stones, Wrox, Willey India Edition.

Practical: (Skill development)

1. Installation of Unix/Linux operating system
2. Basic Commands
3. Write a shell script program to display list of user currently logged in
4. Shell script program to check whether given file is a directory or not.
5. Write a program using sed command to print duplicated lines of Input.
6. Write a grep/egrep script to find the number of character, words and lines in a file.
7. Write an awk script to develop a Fibonacci series.
8. Write a shell script to change the priority of processes.
9. Write a shell script program to check variable attributes of file and processes.
10. To execute programs using gdb to utilize its various features like breakpoints, conditional breakpoints etc.


PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 084

Nagindas Khandwala College

(Autonomous)



**Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme**

Third Year

Semester V

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & HUMANITIES STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE

MAHARASHTRA UNIVERSITY - 400 064

Project Dissertation Semester V and Project Implementation Semester VI

(Skill development & Employability)

Chapter 1 to 4 should be submitted in Semester V in spiral binding. These chapter have also to be included in Semester VI report. Semester VI report has to be hard bound with golden embossing. Students will be evaluated based on the dissertation in semester V and dissertation and viva voce in Semester VI.

I. OBJECTIVES

- Describe the Systems Development Life Cycle (SDLC).
- Evaluate systems requirements.
- Complete a problem definition.
- Evaluate a problem definition.
- Determine how to collect information to determine requirements.
- Perform and evaluate feasibility studies like cost-benefit analysis, technical feasibility, time feasibility and Operational feasibility for the project.
- Work on data collection methods for fact finding.
- Construct and evaluate data flow diagrams.
- Construct and evaluate data dictionaries.
- Evaluate methods of process description to include structured English, decision tables and decision trees.
- Evaluate alternative tools for the analysis process.
- Create and evaluate such alternative graphical tools as systems flow charts and state transition diagrams.
- Decide the S/W requirement specifications and H/W requirement specifications.
- Plan the systems design phase of the SDLC.
- Distinguish between logical and physical design requirements.
- Design and evaluate system outputs.
- Design and evaluate systems inputs.
- Design and evaluate validity checks for input data.
- Design and evaluate user interfaces for input.
- Design and evaluate file structures to include the use of indexes.

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS AND MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE

MAHARASHTRA UNIVERSITY - 400 004

- Estimate storage requirements.
- Explain the various file update processes based on the standard file organizations.
- Decide various data structures.
- Construct and evaluate entity-relationship (ER) diagrams for RDBMS related projects.
- Perform normalization for the unnormalized tables for RDBMS related projects
- Decide the various processing systems to include distributed, client/server, online and others.
- Perform project cost estimates using various techniques.
- Schedule projects using both GANTT and PERT charts.
- Perform coding for the project.
- Documentation requirements and prepare and evaluate systems documentation.
- Perform various systems testing techniques/strategies to include the phases of testing.
- Systems implementation and its key problems.
- Generate various reports.
- Be able to prepare and evaluate a final report.
- Brief the maintenance procedures and the role of configuration management in operations.
- To decide the future scope and further enhancement of the system.
- Plan for several appendices to be placed in support with the project report documentation.
- Decide the various processing systems to include distributed, client/server, online and others.
- Perform project cost estimates using various techniques.
- Schedule projects using both GANTT and PERT charts.
- Perform coding for the project.
- Documentation requirements and prepare and evaluate systems documentation.
- Perform various systems testing techniques/strategies to include the phases of testing.
- Systems implementation and its key problems.
- Generate various reports.
- Be able to prepare and evaluate a final report.



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE.
(AT THORNBURGH)
MALAD (E), MUMBAI - 400 064

- Brief the maintenance procedures and the role of configuration management in operations.
- To decide the future scope and further enhancement of the system.
- Plan for several appendices to be placed in support with the project report documentation.
- Work effectively as an individual or as a team member to produce correct, efficient, well-organized and documented programs in a reasonable time.
- Recognize problems that are amenable to computer solutions, and knowledge of the tool necessary for solving such problems.
- Develop of the ability to assess the implications of work performed.
- Get good exposure and command in one or more application areas and on the software
- Develop quality software using the software engineering principles
- Develop of the ability to communicate effectively.

II . SOFTWARE AND BROAD AREAS OF APPLICATION

FRONT END / GUI Tools	.Net Technologies,Java
DBMS/BACK END	Oracle, SQL Plus, MY SQL, SQL Server,
LANGUAGES	C, C++, Java, VC++, C#, R,Python
SCRIPTING LANGUAGES	PHP,JSP, SHELL Scripts (Unix), Tcl/TK,
.NET Platform	F#,C#. Net, Visual C#. Net, ASP.Net
MIDDLE WARE (COMPONENT) TECHNOLOGIES	COM/DCOM, Active-X, EJB
UNIX INTERNALS	Device Drivers, RPC, Threads, Socket programming
NETWORK/WIRELESS TECHNOLOGIES	-
REALTIME OPERATING SYSTEM/ EMBEDDED SKILLS	LINUX, Raspberry Pi, Arduino, 8051
APPLICATION AREAS	Financial / Insurance / Manufacturing / Multimedia / Computer Graphics / Instructional Design/ Database Management System/ Internet / Intranet / Computer Networking-Communication


PRINCIPAL

	development/ E-Commerce/ ERP/ MRP/ TCP-IP programming / Routing protocols programming/ Socket programming
--	---

III. Project Report

PROJECT REPORT:

Title Page

Original Copy of the Approved Proforma of the Project Proposal

Certificate of Authenticated work

Role and Responsibility Form

Abstract

Acknowledgement

Table of Contents

Table of Figures

CHAPTER 1: INTRODUCTION

1.1 Background

1.2 Objectives

1.3 Purpose, Scope, and Applicability

1.3.1 Purpose

1.3.2 Scope

1.3.3 Applicability

1.4 Achievements

1.5 Organisation of Report

CHAPTER 2: SURVEY OF TECHNOLOGIES

CHAPTER 3: REQUIREMENTS AND ANALYSIS

3.1 Problem Definition

3.2 Requirements Specification

3.3 Planning and Scheduling

3.4 Software and Hardware Requirements

3.5 Preliminary Product Description



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

3.6 Conceptual Models

CHAPTER 4: SYSTEM DESIGN

4.1 Basic Modules

4.2 Data Design

4.2.1 Schema Design

4.2.2 Data Integrity and Constraints

4.3 Procedural Design

4.3.1 Logic Diagrams

4.3.2 Data Structures

4.3.3 Algorithms Design

4.4 User interface design

4.5 Security Issues

4.6 Test Cases Design

CHAPTER 5: IMPLEMENTATION AND TESTING

5.1 Implementation Approaches

5.2 Coding Details and Code Efficiency

5.2.1 Code Efficiency

5.3 Testing Approach

5.3.1 Unit Testing

5.3.2 Integrated Testing

5.3.3 Beta Testing

5.4 Modifications and Improvements

5.5 Test Cases

CHAPTER 6: RESULTS AND DISCUSSION

6.1 Test Reports

6.2 User Documentation

CHAPTER 7: CONCLUSIONS

7.1 Conclusion

7.1.1 Significance of the System

7.2 Limitations of the System



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

7.3 Future Scope of the Project



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

**Nagindas Khandwala College
(Autonomous)**



**Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme**

Third Year

Semester V

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

**NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 054**

ADVANCED WEB PROGRAMMING

at Semester V
(Implemented during Academic Year 2020-21)
(wef 2018-19)

Modules at a Glance

Sr. No.	Modules	No. of lectures
1	Introducing .NET, C# Language, Types, Objects, and Namespaces	9
2	Web Form Fundamentals and Controls	9
3	Error Handling, Logging, and Tracing, State Management, Styles, Themes, and Master Pages	9
4	ADO.NET Fundamentals, Data Binding, Data Controls	9
5	XML, Security Fundamentals, ASP.NET AJAX	9
	Total	45

Course Objective:

By the end of the course, learners will be able to:

1. Understand basic building blocks of Dot Net.
2. Assimilate C# Fundamentals, Exception handling, Design Interfaces and Collections in C#.
3. Defines and discuss major concepts, tool, techniques, and methods of web application development.
4. Create web application using ASP.NET.
5. Implement the database connectivity with ASP.NET.

Course outcome:

After completing this course learners will be able to:

- CO1: Implement the basics of C#.(Apply)
- CO2: Develop simple file test assembly.(Create)
- CO3: Apply the different tools to create web applications.(Apply)
- CO4: Design Web pages with ADO.NET.(Create)
- CO5: Develop partial refreshes of web pages using ajax(Create)



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

Detailed Syllabus:

Module	Topics	No. of Lectures
1	<p>(Skill development & Employability) Introducing .NET: The .NET Framework, C#, VB, and the .NET Languages, The Common Language Runtime, The .NET Class Library. The C# Language, C# Language Basics, Variables and Data Types, Variable Operations, Object-Based Manipulation, Conditional Logic, Loops, Methods. Types, Objects, and Namespaces: The Basics About Classes, Building a Basic Class, Value Types and Reference Types, Understanding Namespaces and Assemblies, Advanced Class Programming.</p>	9
2	<p>Web Form Fundamentals: Writing Code, Using the Code-Behind Class, Adding Event Handlers, Understanding the Anatomy of an ASP.NET Application, Introducing Server Controls, Using the Page Class, Using Application Events, Configuring an ASP.NET Application. Form Controls, Stepping Up to Web Controls, Web Control Classes, List Controls, Table Controls, Web Control Events and AutoPostBack, Validation, Understanding Validation, Using the Validation Controls, Rich Controls, The Calendar, The AdRotator, Pages with Multiple Views, User Controls and Graphics, User Controls, Dynamic Graphics, The Chart Control, Website Navigation, Site Maps, URL Mapping and Routing, The SiteMapPath Control, The TreeView Control, The Menu Control.</p>	9
3	<p>Error Handling, Logging, and Tracing : Avoiding Common Errors, Understanding Exception Handling, Handling Exceptions, Throwing Your Own Exceptions, Using Page Tracing State Management, Understanding the Problem of State, Using View State, Transferring Information Between Pages, Using Cookies, Managing Session State, Configuring Session State, Using Application State, Comparing State Management Options Styles, Themes, and Master Pages: Styles, Themes, Master Page Basics, Advanced Master Pages.</p>	9
4	<p>ADO.NET Fundamentals: Understanding Databases, Configuring Your Database, Understanding SQL Basics, Understanding the Data Provider Model, Using Direct Data Access, Using Disconnected Data Access. Data Binding: Introducing DataBinding, Using Single-Value Data Binding, Using Repeated-Value Data Binding, Working with Data Source Controls. The Data Controls: The GridView, Formatting the GridView, Selecting a GridView Row, Editing with the GridView, Sorting and Paging the GridView, Using GridView Templates, The DetailsView and FormView</p>	9
5	<p>XML: XML Explained, The XML Classes, XML Validation, XML Display and Transforms.</p>	9



PRINCIPAL

NAGINDAS KHANDIWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDIWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

<p>Security Fundamentals: Understanding Security Requirements, Authentication and Authorization, Forms Authentication, Windows Authentication. ASP.NET AJAX: Understanding Ajax, Using Partial Refreshes, Using Progress Notification, Implementing Timed Refreshes, Working with the ASP.NET AJAX Control Toolkit.</p>

References:

1. Beginning ASP.NET 4.5 in C#, Matthew MacDonald , Apress , 2012
2. C# 2015, Anne Bohem and Joel Murach , Murach , Third , 2016
3. Murach's ASP.NET 4.6 Web Programming in C#2015 , Mary Delamater and Anne Bohem , SPD , Sixth , 2016
4. ASP.NET 4.0 Programming, J.Kanjilal , Tata McGraw-Hill , 2011
5. Programming ASP.NET, D.Esposito , Micosoft Press (Dreamtech) , 2011
6. Beginning Visual C# 2010 , K. Watson , C. Nagel, J.H Padderson , J.D. Ried, M Skinner , Wrox (Wiley) ,2010

Practical: (Skill development & Employability)

1. Working with basic C# and ASP.NET

- a) Create an application that obtains four int values from the user and displays the product.
- b) Create an application to demonstrate string operations.
- c) Create an application that receives the (Student Id, Student Name, Course Name, Date of Birth) information from a set of students. The application should also display the information of all the students once the data entered.
- d) Create an application to demonstrate following operations
 - i. Generate Fibonacci series.
 - ii. Test for prime numbers.
 - iii. Test for vowels.
 - iv. Use of foreach loop with arrays
 - v. Reverse a number and find sum of digits of a number.

2. Working with Object Oriented C# and ASP .NET

- a) Create simple application to perform following operations
 - i. Finding factorial Value
 - ii. Money Conversion
 - iii. Quadratic Equation
 - iv. Temperature Conversion
- b) Create simple application to demonstrate use of following concepts
 - i. Function Overloading
 - ii. Inheritance (all types)
 - iii. Constructor overloading
 - iv. Interfaces\
- c) Create simple application to demonstrate use of following concepts
 - i. Using Delegates and events
 - ii. Exception handling

3. Working with Web Forms and Controls

- a) Create a simple web page with various sever controls to demonstrate setting and use of their properties.(Example,AutoPostBack)
- b)Demonstrate the use of Calendar control to perform following operations.
 - i) Display messages in a calendar control
 - ii) Display vacation in a calendar control
 - iii) Selected day in a calendar control using style
 - iv) Difference between two calendar date


PRINCIPAL
 NAGINDAS KHANDWALA COLLEGE OF COMMERCE
 ARTS & MANAGEMENT STUDIES AND SHANTABEN
 NAGINDAS KHANDWALA COLLEGE OF SCIENCE
 (AUTONOMOUS)
 MALAD (W), MUMBAI - 400 064

- c) Demonstrate the use of Treeview control perform following operations.
i) Treeview Control and datalist ii) Exception handling
- 4. Working with Form Controls**
- a) Create a Registration form to demonstrate use of various Validation controls.
b) Create Web Form to Demonstrate use of Adrotator Control.
c) Create Web Form to demonstrate use User Controls
- 5. Working with Navigation , Beautification and Master page.**
- a) Create Web Form to demonstrate use of Website Navigation controls and Site map.
b) Create a web application to demonstrate use of Master Page with applying Styles and Themes for page beaufication
c) Create a web application to demonstrate various states of ASP.NET Pages.
- 6. Working with Database**
- a) Create a web application bind data in a multiline textbox by querying in another textbox
b) Create a web application to display records by using database.
c) Demonstrate the use of Datalist link control.
- 7. Working with Database**
- a) Create a web application to display Databinding using dropdownlist control.
b) Create a web application for to display the phone no of an author using database.
c) Create a web application for inserting and deleting record from a database. (Using Execute-Non Query).
- 8. Working with data controls**
- a) Create a web application to demonstrate various uses and properties of SqlDataSource
b) Create a web application to demonstrate data binding using DetailsView and FormView Controls.
c) Create a web application to display Using Disconnected Data Access and Databinding using GridView.
- 9. Working with GridView control**
- a) Create a web application to demonstrate use of GridView control template and GridView hyperlink.
b) Create a web application to demonstrate use of GridView button column and GridView Evens.
c) Create a web application to demonstrate GridView paging and Creating own table format using GridView
- 10. Working with AJAX and XML**
- a) Create a web application to demonstrate reading and writing operation with XML.
b) Create a web application to demonstrate Form Security and Windows Security with proper Authentication and Authorization Properties.
c) Create a web application to demonstrate use of various Ajax controls.
- 11. Programs to create and use DLL .**



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

Nagindas Khandwala College
(Autonomous)



**Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme**

Third Year

Semester V

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

ARTIFICIAL INTELLIGENCE

at Semester V
(Implemented during Academic Year 2020-21)
(wef 2018-19)

Modules at a Glance

Sr. No.	Topics	No. of lectures
1	Introduction and Intelligent Agent	9
2	Solving problems by searching, beyond classical search	9
3	Adversarial search and logical agents	9
4	FOL and Inference in FOL	9
5	Planning and Knowledge Representation	9
	Total	45

Course Objective:

To create appreciation and understanding of both the achievements of AI Students will able to:

- Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents and the theory underlying those achievements.
- To introduce the concepts of a Rational Intelligent Agent and the different types of Agents that can be designed to solve problems
- To impart basic proficiency in representing difficult real life problems in a state space representation so as to solve them using AI techniques like searching and game playing.
- To create an understanding of the basic issues of knowledge representation and Logic and blind and heuristic search, as well as an understanding of other topics such as minimal, resolution, etc. that play an important role in AI programs.

Learning Outcome:

- CO1: Demonstrate knowledge of the building blocks of AI as presented in terms of intelligent agents.(Level:Apply)
- CO2: Analyze and formalize the problem as a state space, graph, design heuristics and select amongst different search or game based techniques to solve them. (Level:Analyze)
- CO3: Develop intelligent algorithms for constraint satisfaction problems and also design intelligent systems for Game Playing(Level:Apply)
- CO4: Compare different AI algorithms in terms of design issues, computational complexity, and assumptions (Level:Understand)
- CO5: Differentiate various learning approaches, and to interpret the concepts of supervised learning(Level:Understand)



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

Detailed Syllabus

Module	Topics	No. of Lectures
1	<p>Introduction: What is Artificial Intelligence? Foundations of AI, history, the state of art AI today.</p> <p>Intelligent Agents, agents and environment, good behavior, nature of environment, the structure of agents.</p>	9
2	<p>Solving Problems by Searching: Problem solving agents, examples problems, searching for solutions, uninformed search, informed search strategies, heuristic functions.</p> <p>Beyond Classical Search: local search algorithms, searching with non-deterministic action, searching with partial observations, online search agents and unknown environments.</p>	9
3	<p>Adversarial Search: Games, optimal decisions in games, alpha-beta pruning, stochastic games, partially observable games, state-of-the-art game programs.</p> <p>Logical Agents: Knowledgebase agents, The Wumpus world, logic, Propositional logic, propositional theorem proving, effective propositional model checking, agents based on propositional logic.</p>	9
4	<p>First Order Logic: Syntax and semantics, using First Order Logic, Knowledge engineering in First Order Logic.</p> <p>Inference in First Order Logic: propositional vs. First Order, unification and lifting, forward and backward chaining, resolution.</p>	9
5	<p>Planning: Definition of Classical Planning, Algorithms for planning as state space search, planning graphs, other classical planning approaches, analysis of planning approaches, Time, Schedules and resources, hierarchical planning, Planning and Acting in Nondeterministic Domains, multiagent planning,</p> <p>Knowledge Representation: Categories and Objects, events, mental events and objects, reasoning systems for categories, reasoning with default information, Internet shopping world</p>	9

References:

1. Artificial Intelligence, A modern Approach, Stuart Russel and Peter Norving , Pearson , 3rd , 2015
2. A First Course in Artificial Intelligence, Deepak Khemani , TMH , First ,2017
3. Artificial Intelligence, A Rational Approach, Rahul Deva, Shroff Publishers , 1st ,2018
4. Artificial Intelligence, Elaine Rich, Kevin Knight and Shivashankar Nair , TMH , 3rd , 2009
5. Artificial Intelligence & Soft Computing for Beginners ,Anandita Das Bhattacharjee , SPD , 1st , 2013



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

Practical: (Skill development & employability)

- 1 a) Write a program to implement depth first search algorithm.
b) Write a program to implement breadth first search algorithm.
- 2 a) Write a program to simulate 4-Queen / N-Queen problem.
b) Write a program to solve tower of Hanoi problem.
- 3 a) Write a program to implement alpha beta search.
b) Write a program for Hill climbing problem.
- 4 a) Write a program to implement A* algorithm.
b) Write a program to implement AO* algorithm.
- 5 a) Write a program to solve water jug problem.
b) Design the simulation of tic – tac – toe game using min-max algorithm.
- 6 a) Write a program to solve Missionaries and Cannibals problem.
b) Design an application to simulate number puzzle problem.
- 7 a) Write a program to shuffle Deck of cards.
b) Solve traveling salesman problem using artificial intelligence technique.
- 8 a) Solve the block of World problem.
b) Solve constraint satisfaction problem
- 9 a) Derive the expressions based on Associative law
b) Derive the expressions based on Distributive law
- 10 a) Write a program to derive the predicate.
(for e.g., Sachin is batsman , batsman is cricketer) - > Sachin is Cricketer.
b) Write a program which contains three predicates, male, female, parent. Make rules for following family relations, father, mother, grandfather, grandmother, brother, sister, uncle, aunt, nephew and niece, cousin.

Question,

i. Draw Family Tree.

ii. Define, Clauses, Facts, Predicates and Rules with conjunction and disjunction



PRINCIPAL

NAGINDAS KHANAWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANAWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

**Nagindas Khandwala College
(Autonomous)**



**Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme**

Third Year

Semester V

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)


PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

ENTERPRISE JAVA

at Semester V
(Implemented during Academic Year 2020-21)
(wef 2018-19)

Modules at a Glance

Sr. No.	Modules	No. of lectures
1	Java EE, Servlet and Database	9
2	Cookies and Working with Files	9
3	JSP	9
4	Enterprise JavaBeans	9
5	JPA and Hibernate	9
	Total	45

Course objectives –

By the end of the course, learners will be able to:

- Understand how to develop applications using Java.
- Get an understanding on Enterprise Java and the servlet technology.
- Explain the database connection using JDBC.
- Understand the concept of cookies and session tracking in java.
- Work with JSP, EJB, JPA, Hibernate and implement it.

Course Outcome –

After completing this course learner will be able to:

- CO1: Understand Enterprise Application and Java EE architecture. (Understand)
CO2: Explain the concept of servlet, JDBC and apply it through coding. (Understand)
CO3: Learn and analyse the concept of cookies and session tracking in Java. (Analyze)
CO4: Create applications using servlet, JSP, EJB along with implementation of database.
(Create)
CO5: Basic understanding of JavaBean and their applications. (Understand)
CO6: Explain the concept of and create applications using JPA, Hibernate. (Understand)

Detailed Syllabus:


PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
NAGINDAS (W), MUMBAI - 400 064

	<p>Lifecycle of Enterprise Beans, Packaging Enterprise Beans, Example of Stateful Session Bean, Example of Stateless Session Bean, Example of Singleton Session Beans.</p> <p>Working with Message Driven Beans: Lifecycle of a Message Driven Bean, Uses of Message Driven Beans, The Message Driven Beans Example.</p> <p>Interceptors, Request And Interceptor, Defining An Interceptor, Around Invoke Method, Applying Interceptor, Adding An Interceptor To An Enterprise Bean, Build and Run the Web Application.</p> <p>Java Naming and Directory Interface: What is Naming Service? What is Directory Service? What is Java Naming and Directory interface? Basic Lookup, JNDI Namespace in Java EE, Resources and JNDI, Data source Resource Definition in Java EE</p>	
5	<p>Persistence, Object/Relational Mapping And JPA: What is Persistence? Persistence in Java, Current Persistence Standards in Java, Why another Persistence Standards? Object/Relational Mapping,</p> <p>Introduction to Java Persistence API: The Java Persistence API, JPA, ORM, Database and the Application, Architecture of JPA, How JPA Works? JPA Specifications.</p> <p>Writing JPA Application: Application Requirement Specifications, Software Requirements, The Application Development Approach, Creating Database And Tables in Mysql, Creating a Web Application, Adding the Required Library Files, Creating a Javabeen Class, Creating Persistence Unit [Persistence. Xml], Creating JSPS, The JPA Application Structure, Running The JPA Application.</p> <p>Introduction to Hibernate: What is Hibernate? Why Hibernate? Hibernate, Database and The Application, Components of Hibernate, Architecture of Hibernate, How Hibernate Works?</p> <p>Writing Hibernate Application: Application Requirement Specifications, Software Requirements, The Application Development Approach, Creating Database and Tables in Mysql, Creating a Web Application, Adding The Required Library Files, Creating a Javabeen Class, Creating Hibernate Configuration File, Adding a Mapping Class, Creating JSPS, Running The Hibernate Application.</p>	9

References:

1. Java EE 7 For Beginners ,Sharanam Shah, Vaishali Shah , SPD , First , 2017
2. Java EE 8 Cookbook , Build reliable applications with the most or robust and mature technology for enterprise development , Elder Moraes , Packt , First , 2018
3. Advanced Java Programming ,Uttam Kumar Roy , Oxfrod Press , 2015

Practical: (Skill development & Employability)

1. Implement the following Simple Servlet applications.



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

- a. Create a simple calculator application using servlet.
- b. Create a servlet for a login page. If the username and password are correct then it says message "Hello <username>" else a message "login failed"
- c. Create a registration servlet in Java using JDBC. Accept the details such as Username, Password, Email, and Country from the user using HTML Form and store the registration details in the database.

2. Implement the following Servlet applications with Cookies and Sessions.

- a. Using Request Dispatcher Interface create a Servlet which will validate the password entered by the user, if the user has entered "Servlet" as password, then he will be forwarded to Welcome Servlet else the user will stay on the index.html page and an error message will be displayed.
- b. Create a servlet that uses Cookies to store the number of times a user has visited servlet.
- c. Create a servlet demonstrating the use of session creation and destruction. Also check whether the user has visited this page first time or has visited earlier also using sessions.

3. Implement the Servlet IO and File applications.

- a. Create a Servlet application to upload and download a file.
- b. Develop Simple Servlet Question Answer Application using Database.
- c. Create simple Servlet application to demonstrate Non-Blocking Read Operation.

4. Implement the following JSP applications.

- a. Develop a simple JSP application to display values obtained from the use of intrinsic objects of various types.
- b. Develop a simple JSP application to pass values from one page to another with validations. (Name-txt, age-txt, hobbies-checkbox, email-txt, gender-radio button).
- c. Create a registration and login JSP application to register and authenticate the user based on username and password using JDBC

5. Implement the following JSP JSTL and EL Applications.

- a. Create an html page with fields, eno, name, age, desg, salary. Now on submit this
 - i. data to a JSP page which will update the employee table of database with matching
 - ii. eno.
- b. Create a JSP page to demonstrate the use of Expression language.
- c. Create a JSP application to demonstrate the use of JSTL.

6. Implement the following EJB Applications.

- a. Create a Currency Converter application using EJB.
- b. Develop a Simple Room Reservation System Application Using EJB.
- c. Develop simple shopping cart application using EJB [Stateful Session Bean].

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

- 7. Implement the following EJB applications with different types of Beans.**
- Develop simple EJB application to demonstrate Servlet Hit count using Singleton Session Beans.
 - Develop simple visitor Statistics application using Message Driven Bean [Stateless Session Bean].
 - Develop simple Marks Entry Application to demonstrate accessing Database using EJB.
- 8. Implement the following JPA applications.**
- Develop a simple Inventory Application Using JPA.
 - Develop a Guestbook Application Using JPA.
 - Create simple JPA application to store and retrieve Book details.
- 9. Implement the following JPA applications with ORM and Hibernate.**
- Develop a JPA Application to demonstrate use of ORM associations.
 - Develop a Hibernate application to store Feedback of Website Visitor in MySQL Database.
 - Develop a Hibernate application to store and retrieve employee details in MySQL Database.
- 10. Implement the following Hibernate applications.**
- Develop an application to demonstrate Hibernate One- To -One Mapping Using
 - Annotation.
 - Develop Hibernate application to enter and retrieve course details with ORM Mapping.
- Develop a five page web application site using any two or three Java EE Technologies



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

**Nagindas Khandwala College
(Autonomous)**



**Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme**

Third Year

Semester V

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

**NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 054**

INTERNET OF THINGS

at Semester V
(Implemented during Academic Year 2020-21)
(wef 2018-19)

Modules at a Glance

Sr. No.	Topics	No. of lectures
1	Internet of Things, Design Principles for Connected Devices, Internet Principles	9
2	Thinking About Prototyping, Prototyping Embedded Devices	9
3	Prototyping the Physical Design, Prototyping Online Components	9
4	Techniques for Writing Embedded Code, Business Models	9
5	Moving to Manufacture, Ethics	9
	Total	45

Course Objective:

1. To assess the vision and introduction of IoT.
2. To Understand IoT Market perspective.
3. To Implement Data and Knowledge Management and use of Devices in IoT Technology.
4. To Understand State of the Art - IoT Architecture.
5. To classify Real World IoT Design Constraints, Industrial Automation in IoT

Course Outcome:

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

CO1: Describe the meaning and different components of Internet of Things, also the principles of Internet (Understand)

CO2: Explain and prototype an embedded product. (Understand)

CO3: Illustrate the physical design of the system and work with online components API for security, polling, etc. (Analyse and Apply)

CO4: Describe the the memory management of an embedded system and write the codes for embedded product (Understand)

CO5: To create a small model representing the automation in IoT. (Create)


PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
WATKINS
MUMBAI (W), MUMBAI - 400 074

Detailed Syllabus

Module	Topics	No. of Lectures
1	<p>(Skill development & Employability)</p> <p>The Internet of Things: An Overview: The Flavour of the Internet of Things, The “Internet” of “Things”, The Technology of the Internet of Things, Enchanted Objects, Who is Making the Internet of Things?</p> <p>Design Principles for Connected Devices: Calm and Ambient Technology, Magic as Metaphor, Privacy, Keeping Secrets, Whose Data Is It Anyway? Web Thinking for Connected Devices, Small Pieces, Loosely Joined, First-Class Citizens On The Internet, Graceful Degradation, Affordances.</p> <p>Internet Principles: Internet Communications: An Overview, IP, TCP, The IP Protocol Suite(TCP/IP), UDP, IP Addresses, DNS, Static IP Address Assignment, Dynamic IP Address Assignment, IPv6, MAC Addresses, TCP and UDP Ports, An Example: HTTP Ports, Other Common Ports, Application Layer Protocols, HTTP, HTTPS: Encrypted HTTP, Other Application Layer Protocols.</p>	9
2	<p>Thinking About Prototyping: Sketching, Familiarity, Costs versus Ease of Prototyping, Prototypes and Production, Changing Embedded Platform, Physical Prototypes and Mass Personalisation, Climbing into the Cloud, Open Source versus Closed Source, Why Closed? Why Open? Mixing Open and Closed Source, Closed Source for Mass Market Projects, Tapping into the Community.</p> <p>Prototyping Embedded Devices: Electronics, Sensors, Actuators, Scaling Up the Electronics, Embedded Computing Basics, Microcontrollers, System-on-Chips, Choosing Your Platform, Arduino, Developing on the Arduino, Some Notes on the Hardware, Openness, Raspberry Pi, Cases and Extension Boards, Developing on the Raspberry Pi, Some Notes on the Hardware, Openness.</p>	9
3	<p>Prototyping the Physical Design: Preparation, Sketch, Iterate, and Explore, Non digital Methods, Laser Cutting, Choosing a Laser Cutter, Software, Hinges and Joints, 3D Printing, Types of 3D Printing, Software, CNC Milling, Repurposing/Recycling.</p> <p>Prototyping Online Components: Getting Started with an API, Mashing Up APIs, Scraping, Legalities, Writing a New API, Clockodillo, Security, Implementing the API, Using Curl to Test, Going Further, Real-Time Reactions, Polling, Comet, Other Protocols, MQ Telemetry Transport, Extensible Messaging and Presence Protocol, Constrained Application Protocol.</p>	9
4	<p>Techniques for Writing Embedded Code: Memory Management, Types of Memory, Making the Most of Your RAM, Performance and Battery Life, Libraries, Debugging,</p> <p>Business Models: A Short History of Business Models, Space and Time, From Craft to Mass Production, The Long Tail of the Internet,</p>	9


PRINCIPAL

	Learning from History, The Business Model Canvas, Who Is the Business Model For? Models, Make Thing, Sell Thing, Subscriptions, Customization, Be a Key Resource, Provide Infrastructure: Sensor Networks, Take a Percentage, Funding an Internet of Things Startup, Hobby Projects and Open Source, Venture Capital, Government Funding, Crowd funding, Lean Startups.	
5	Moving to Manufacture: What Are You Producing? Designing Kits, Designing Printed circuit boards, Software Choices, The Design Process, Manufacturing Printed Circuit Boards, Etching Boards, Milling Boards. Assembly, Testing, Mass-Producing the Case and Other Fixtures, Certification, Costs, Scaling Up Software, Deployment, Correctness and Maintainability, Security, Performance, User Community. Ethics: Characterizing the Internet of Things, Privacy, Control, Disrupting Control, Crowdsourcing, Environment, Physical Thing, Electronics, Internet Service, Solutions, The Internet of Things as Part of the Solution, Cautious Optimism, The Open Internet of Things Definition.	9


References:

1. Designing the Internet of Things , Adrian McEwen, Hakim Cassimally, WILEY, First, 2014
2. Internet of Things – Architecture And Design , Raj Kamal , McGraw Hill , First , 2017
3. Getting Started with the Internet of Things ,Cuno Pfister , O'Reilly , Sixth , 2018
4. Getting started with RaspberryPi , Matt Richardson and Shawn Wallace , SPD , Thir , 2016

Practical: (Skill development & Employability)

Starting Raspbian OS, Familiarising with Raspberry Pi Components and interface, Connecting to ethernet, Monitor, USB.

1. Displaying Different LED patterns with Raspberry Pi
2. Displaying Time over 4-Digit 7-Segment Display using Raspberry Pi.
3. Raspberry Pi Based Oscilloscope
4. Controlling Raspberry Pi with WhatsApp.
5. Setting up Wireless Access Point using Raspberry Pi
6. Fingerprint Sensor Interfacing with Raspberry Pi
7. Raspberry Pi GPS Module Interfacing
8. IoT based Web Controlled Home Automation using Raspberry Pi
9. Visitor Monitoring with Raspberry Pi and Pi Camera
10. Interfacing Raspberry Pi with RFID.
11. Building Google Assistant with Raspberry Pi.
12. Installing Windows 10 IoT Core on Raspberry Pi


PRINCIPAL
 NAGINDAS KHANDWALA COLLEGE OF COMMERCE
 ARTS & MANAGEMENT STUDIES AND SHANTABEN
 NAGINDAS KHANDWALA COLLEGE OF SCIENCE
 (AUTONOMOUS)
 MALAD (W), MUMBAI - 400 084

**Nagindas Khandwala College
(Autonomous)**



**Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme**

Third Year

Semester V

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

SOFTWARE PROJECT MANAGEMENT

at Semester V
(Implemented during Academic Year 2020-21)
(wef 2018-19)

Modules at a Glance

Sr. No.	Topics	No. of lectures
1	Introduction, Project Evaluation and Programme Management, An Overview of Project Planning	9
2	Selection of an Appropriate Project Approach, Software Effort Estimation	9
3	Activity Planning, Risk Management, Resource Allocation	9
4	Monitoring and Control, Managing Contracts, Managing People in Software Environments	9
5	Working in Teams, Software Quality, Project Closeout	9
	Total	45

Course Objectives :

By the end of the course, learners will be able to:

1. To understand the methods used to evaluate and select projects for investment of funds.
2. To gain knowledge on the principles and techniques of software project management.
3. To introduce organization behavior and general management techniques used for project management
4. Will be able to do the Project Scheduling, tracking, Risk analysis, Quality management and Project Cost estimation using different techniques.
5. Analyze the architecture of a model based software and the process flow.

Course Outcomes:

After completing this course learners will be able to:

CO1: Identify the different project contexts and suggest an appropriate management strategy.

(Remember)

CO2: Analyze and design the software architecture. (Analyze)



PRINCIPAL

- CO3: Have an exposure for organizing and managing a software project. (Create)
- CO4: Apply, analyze, design and develop the software project. (Apply, Analyze, Create)
- CO5: Design various estimation levels of cost and effort. (Create)

Detailed Syllabus

Module	Topics	Lectures
1	<p>(Skill development)</p> <p>Introduction to Software Project Management: Introduction, Why is Software Project Management Important? What is a Project? Software Project Management Important? What is a Project? Software Projects versus Other Types of Project, Contract Management and Technical Project Management, Activities Covered by Software Project Management, Plans, Methods and Methodologies, Some Ways of Categorizing Software Projects, Project Charter, Stakeholders, Setting Objectives, The Business Case, Project Success and Failure. What is Management? Management Control, Project Management Life Cycle, Traditional versus Modern Project Management Practices.</p> <p>Project Evaluation and Programme Management: Introduction, Business Case, Project Portfolio Management, Evaluation of Individual Projects, Cost-benefit Evaluation Techniques, Risk Evaluation, Programme Management, Managing the Allocation of Resources within Programmes, Strategic Programme Management, Creating a Programme, Aids to Programme Management, Some Reservations about Programme Management, Benefits Management.</p> <p>An Overview of Project Planning: Introduction to Step Wise Project Planning, Step 0: Select Project, Step 1: Identify Project Scope and Objectives, Step 2: Identify Project Infrastructure, Step 3: Analyse Project Characteristics, Step 4: Identify Project Products and Activities, Step 5: Estimate Effort for Each Activity, Step 6: Identify Activity Risks, Step 7: Allocate Resources, Step 8: Review/Publicize Plan, Steps 9 and 10: Execute Plan/Lower Levels of Planning</p>	9
2	<p>Selection of an Appropriate Project Approach: Introduction, Build or Buy? Choosing Methodologies and Technologies, Software Processes and Process Models, Choice of Process Models, Structure versus Speed of Delivery, The Waterfall Model, The Spiral Model, Software Prototyping, Other Ways of Categorizing Prototypes, Incremental Delivery, Atern/Dynamic Systems Development Method, Rapid Application Development, Agile Methods, Extreme Programming (XP), Scrum, Lean Software Development, Managing Iterative Processes, Selecting the Most Appropriate Process Model.</p> <p>Software Effort Estimation: Introduction, Where are the Estimates Done? Problems with Over- and Under-Estimates, The Basis for</p>	9



PRINCIPAL

	Software Estimating, Software Effort Estimation Techniques, Bottom-up Estimating, The Top-down Approach and Parametric Models, Expert Judgment, Estimating by Analogy, Albrecht Function Point Analysis, Function Points Mark II, COSMIC Full Function Points, COCOMO II: A Parametric Productivity Model, Cost Estimation, Staffing Pattern, Effect of Schedule Compression, Capers Jones Estimating Rules of Thumb.	
3	Activity Planning: Introduction, Objectives of Activity Planning, When to Plan, Project Schedules, Projects and Activities, Sequencing and Scheduling Activities, Network Planning Models, Formulating a Network Model, Adding the Time Dimension, The Forward Pass, Backward Pass, Identifying the Critical Path, Activity Float, Shortening the Project Duration, Identifying Critical Activities, Activity-on-Arrow Networks. Risk Management: Introduction, Risk, Categories of Risk, Risk Management Approaches, A Framework for Dealing with Risk, Risk Identification, Risk Assessment, Risk Planning, Risk Management, Evaluating Risks to the Schedule, Boehm's Top 10 Risks and Counter Measures, Applying the PERT Technique, Monte Carlo Simulation, Critical Chain Concepts. Resource Allocation: Introduction, Nature of Resources, Identifying Resource Requirements, Scheduling Resources, Creating Critical Paths, Counting the Cost, Being Specific, Publishing the Resource Schedule, Cost Schedules, Scheduling Sequence.	9
4	Monitoring and Control: Introduction, Creating the Framework, Collecting the Data, Review, Visualizing Progress, Cost Monitoring, Earned Value Analysis, Prioritizing Monitoring, Getting the Project Back to Target, Change Control, Software Configuration Management (SCM). Managing Contracts: Introduction, Types of Contract, Stages in Contract Placement, Typical Terms of a Contract, Contract Management, Acceptance. Managing People in Software Environments: Introduction, Understanding Behaviour, Organizational Behaviour: A Background, Selecting the Right Person for the Job, Instruction in the Best Methods, Motivation, The Oldham-Hackman Job Characteristics Model, Stress, Stress Management, Health and Safety, Some Ethical and Professional Concerns.	9
5	Working in Teams: Introduction, Becoming a Team, Decision Making, Organization and Team Structures, Coordination Dependencies, Dispersed and Virtual Teams, Communication Genres, Communication Plans, Leadership. Software Quality: Introduction, The Place of Software Quality in Project Planning, Importance of Software Quality, Defining Software Quality, Software Quality Models, ISO 9126, Product and Process Metrics, Product versus Process Quality Management, Quality Management Systems, Process Capability Models, Techniques to Help Enhance Software Quality, Testing, Software Reliability, Quality Plans. Project Closeout: Introduction, Reasons for Project Closure, Project Closure Process.	9

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(MUMBAI CAMPUS)
MALAD (W), MUMBAI - 400 084

References:

1. Software Project Management - Bob Hughes, Mike Cotterell , Rajib Mall – THM – 6th Edition 2018
2. Project Management and Tools & Technologies – An overview, Shailesh Mehta : SPD 1st edition : 2017
3. Software Project Management, Walker Royce, Pearson, 2005

Practical: Refer appendix 1



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AT PONDICHERRY)
MALAD (W), MUMBAI - 400 084

Nagindas Khandwala College (Autonomous)



Syllabus Of Course Of Bachelor of Science Information Technology (BSC IT) Programme

Third Year

Semester VI

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT, SYDNEY AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

Advanced Mobile Programming

Practical: (Employability)

1. Introduction to Android, Introduction to Android Studio IDE, Application

Fundamentals, Creating a Project, Android Components, Activities, Services, Content Providers, Broadcast Receivers, Interface overview, Creating Android Virtual device, USB debugging mode, Android Application Overview. Simple "Hello World" program.

2. Programming Resources

Android Resources, (Color, Theme, String, Drawable, Dimension, Image)

3. Programming Activities and fragments

Activity Life Cycle, Activity methods, Multiple Activities, Life Cycle of fragments and multiple fragments.

4. Programs related to different Layouts

Coordinate, Linear, Relative, Table, Absolute, Frame, List View, Grid View.

5. Programming UI elements

AppBar, Fragments, UI Components

6. Programming menus, dialog, dialog fragments

7. Programs on Intents, Events, Listeners and Adapters

The Android Intent Class, Using Events and Event Listeners

8. Programs on Services, notification and broadcast receivers

9. Database Programming with SQLite

10. Programming threads, handles and asynchronous programs

11. Programming Media API and Telephone API

12. Programming Security and permissions

13. Programming Network Communications and Services (JSON)



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

**Nagindas Khandwala College
(Autonomous)**



**Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme**

Third Year

Semester VI

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)


PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANA SEMELI, STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

BUSINESS INTELLIGENCE

at Semester VI
(Implemented during Academic Year 2020-21)
(w.e.f. 2018-19)

Modules at a Glance

Sr. No.	Modules	No. of lectures
1	Business intelligence, Decision support systems	9
2	Mathematical models for decision making, Data mining, Data preparation	9
3	Classification, Clustering	9
4	Business intelligence applications, Logistic and production models, Data envelopment analysis:	9
5	Knowledge Management, Artificial Intelligence and Expert Systems	9
Total		45

Course objectives –By the end of the course, learners will be able to:

- Create an understanding of the decision support systems
- Describe Business intelligence application models
- Understand and apply classification techniques
- Apply different operations on legacy data practically.
- Understand knowledge management.

Course Outcome –After completing this course learner will be able to:

CO1: Create an understanding of Decision support systems, Mathematical models for decision making, Data envelopment analysis, Knowledge Management and AI and Expert systems. (Create)

CO2: Analyse and describe Business intelligence application models. (Analyze, Understand)

CO3: Assess and identify the best model to solve a given business problem. (Evaluate)

CO4: Work with legacy data and perform various operations on it using Business Intelligence softwares. (Apply)

CO5: Apply different data mining algorithms to solve the given business problem. (Apply)

CO6: Create designs/solutions/algorithms to solve the given business problem. (Create)


PRINCIPAL

Detailed Syllabus:

Modules	Topics (Skill development and employability)	No of Lectures
1	<p>Business intelligence: Effective and timely decisions, Data, information and knowledge, The role of mathematical models, Business intelligence architectures, Ethics and business intelligence</p> <p>Decision support systems: Definition of system, Representation of the decision-making process, Evolution of information systems, Definition of decision support system, Development of a decision support system</p>	9
2	<p>Mathematical models for decision making: Structure of mathematical models, Development of a model, Classes of models</p> <p>Data mining: Definition of data mining, Representation of input data, Data mining process, Analysis methodologies.</p> <p>Data preparation: Data validation, Data transformation, Data reduction</p>	9
3	<p>Classification: Classification problems, Evaluation of Classification models, Bayesian methods, Logistic regression, Neural networks, Support vector machines</p> <p>Clustering: Clustering methods, Partition methods, Hierarchical methods, Evaluation of clustering models</p>	9
4	<p>Business intelligence applications: Marketing models: Relational marketing, Sales force management</p> <p>Logistic and production models: Supply chain optimization, Optimization models for logistics planning, Revenue management systems.</p> <p>Data envelopment analysis: Efficiency measures, Efficient frontier, The CCR model, Identification of good operating practices</p>	9
5	<p>Knowledge Management: Introduction to Knowledge Management, Organizational Learning and Transformation, Knowledge Management Activities, Approaches to Knowledge Management, Information Technology (IT) In Knowledge Management, Knowledge Management Systems Implementation, Roles of People in Knowledge Management</p> <p>Artificial Intelligence and Expert Systems: Concepts and Definitions of Artificial Intelligence, Artificial Intelligence versus Natural Intelligence, Basic Concepts of Expert Systems, Applications of Expert Systems, Structure of Expert Systems, Knowledge Engineering, Development of Expert Systems</p>	9



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 054

References:

1. Business Intelligence ,Data Mining and Optimization for Decision Making , Carlo Vercellis , Wiley , First edition , 2009
2. Decision support and Business Intelligence System, Efraim Turban, Ramesh Sharda, Dursun Delen , Pearson , 9th edition , 2011
3. Fundamental of Business Intelligence, Grossmann W, Rinderle-Ma, Springer, First Edition ,2015

Practical: (Skill development & Employability)

- 1 Import the legacy data from different sources such as (Excel, SqlServer, Oracle etc.) and load in the target system. (You can download sample database such as Adventureworks, Northwind, foodmart etc.)
- 2 Perform the Extraction Transformation and Loading (ETL) process to construct the database in the Sqlserver.
- 3 a. Create the Data staging area for the selected database.
b. Create the cube with suitable dimension and fact tables based on ROLAP, MOLAP and HOLAP model.
- 4 a. Create the ETL map and setup the schedule for execution.
b. Execute the MDX queries to extract the data from the datawarehouse.
- 5 a. Import the datawarehouse data in Microsoft Excel and create the Pivot table and Pivot Chart.
b. Import the cube in Microsoft Excel and create the Pivot table and Pivot Chart to perform data analysis.
- 6 Apply the what – if Analysis for data visualization. Design and generate necessary reports based on the data warehouse data.
- 7 Perform the data classification using classification algorithm.
- 8 Perform the data clustering using clustering algorithm.
- 9 Perform the Linear regression on the given data warehouse data.
- 10 Perform the logistic regression on the given data warehouse data.


PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

**Nagindas Khandwala College
(Autonomous)**



**Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme**

Third Year

Semester VI

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)


PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

CYBER LAWS

at Semester VI
(Implemented during Academic Year 2020-21)
(wef 2018-19)

Modules at a Glance

Sr. No.	Topics	No. of lectures
1	Power of Arrest Without Warrant Under the IT Act, 2000, Cyber Crime and Criminal Justice, Penalties, Adjudication and Appeals Under the IT Act, 2000	9
2	Contracts in the Infotech World, Jurisdiction in the Cyber World	9
3	Battling Cyber Squatters and Copyright Protection in the Cyber World, Battling Cyber Squatters and Copyright Protection in the Cyber World	9
4	E-Commerce Taxation, Real Problems in the Virtual World, Digital Signature, Certifying Authorities and E-Governance	9
5	The Indian Evidence Act of 1872 v. Information Technology Act, 2000, Protection of Cyber Consumers in India	9
	Total	45

Course objectives –

By the end of the course, learners will be able to:

1. Enable Learner To Understand, Explore, And Acquire A Critical Understanding Cyber Law.
2. Develop Competencies For Dealing With Frauds And Deceptions (Confidence Tricks, Scams) And Other Cyber Crimes For Example, Child Pornography Etc. That Are Taking Place Via The Internet.

Course Outcome –

After completing this course learner will be able to:

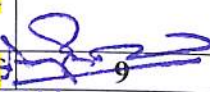
- CO1: Make Learner Conversant With The Social And Intellectual Property Issues Emerging From 'Cyberspace. (Understand)
- CO2: Explore The Legal And Policy Developments In Various Countries To Regulate Cyberspace (Analyze)
- CO3: Develop The Understanding Of Relationship Between Commerce And Cyberspace (Create)
- CO4: Give Learners In Depth Knowledge Of Information Technology Act And Legal Frame Work Of Right To Privacy, Data Security And Data Protection. (Remember)
- CO5: Make Study On Various Case Studies On Real Time Crimes. (Apply)

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 054

Detailed Syllabus:

Module	Modules / Units	No of Lectures
1	<p>(Employability) Power of Arrest Without Warrant Under the IT Act, 2000, A Critique, Crimes of this Millennium, Section 80 of the IT Act, 2000 – A Weapon or a Farce? Forgetting the Line Between Cognizable and Non- Cognizable Offences, Necessity of Arrest without Warrant from Any Place, Public or Otherwise, Check and Balances Against Arbitrary Arrests, Arrest for “About to Commit” an Offence Under the IT Act, A Tribute to Draco, Arrest, But NO Punishment!</p> <p>Cyber Crime and Criminal Justice, Penalties, Adjudication and Appeals Under the IT Act, 2000, Concept of “Cyber Crime “ and the IT Act , 2000, Hacking, Teenage Web Vandals, Cyber Cheating, Virus on the Internet, Defamation, Harassment and E- mail Abuse, Cyber Pornography, Other IT Act Offences, Monetary Penalties, Adjudication and Appeals Under IT Act , 2000, Network Service Providers, Jurisdiction and Cyber Crime, Nature of Cyber Criminality, Strategies to Tackle Cyber Crime and Trends, Criminal Justice in India and Implications on Cyber Crime.</p>	9
2	<p>Contracts in the Infotech World, Contracts in the Infotech World, Click-Wrap and Shrink-Wrap Contract, Status under the Indian Contract Act, 1872, Contract Formation Under the Indian Contract Act, 1872, Contract Formation on the Internet, Terms and Conditions of Contracts.</p> <p>Jurisdiction in the Cyber World, Questioning the Jurisdiction and Validity of the Present Law of Jurisdiction, Civil Law of Jurisdiction in India, Cause of Action, Jurisdiction and the Information Technology Act,2000, Foreign Judgements in India, Place of Cause of Action in Contractual and IPR Disputes, Exclusion Clauses in Contracts, Abuse of Exclusion Clauses, Objection of Lack of Jurisdiction, Misuse of the Law of Jurisdiction, Legal Principles on Jurisdiction in the United State of America, Jurisdiction Disputes w.r.t. the Internet in the United State of America.</p>	9
3	<p>Battling Cyber Squatters and Copyright Protection in the Cyber World, Concept of Domain Name and Reply to Cyber Squatters, Meta-Tagging, Legislative and Other Innovative Moves Against Cyber Squatting, The Battle Between Freedom and Control on the Internet, Works in Which Copyright Subsists and meaning of Copyright, Copyright Ownership and Assignment, License of Copyright, Copyright Terms and Respect for Foreign Works,Copyright</p> <p>Battling Cyber Squatters and Copyright Protection in the Cyber World, Concept of Domain Name and Reply to Cyber Squatters, Meta-Tagging, Legislative and Other Innovative Moves Against Cyber Squatting, The Battle Between Freedom and Control on the Internet, Works in Which Copyright Subsists and meaning of Copyright, Copyright Ownership and Assignment, License of Copyright, Copyright Terms</p>	9
4	E-Commerce Taxation, Real Problems in the Virtual World, A Tug of	9


PRINCIPAL
 NAGINDAS KHANDWAL COLLEGE OF COMMERCE
 ARTS & MANAGEMENT STUDIES AND SHANTABEN
 NAGINDAS KHANDWAL COLLEGE OF SCIENCE
 (AUTONOMOUS)
 MALAD (W), MUMBAI - 400 064

	<p>War on the Concept of 'Permanent Establishment', Finding the PE in Cross Border E-Commerce, The United Nations Model Tax Treaty, The Law of Double Taxation Avoidance Agreements and Taxable Jurisdiction Over Non-Residents, Under the Income Tax Act, 1961, Tax Agents of Non-Residents under the Income Tax Act, 1961 and the Relevance to E-Commerce, Source versus Residence and Classification between Business Income and Royalty, The Impact of the Internet on Customer Duties, Taxation Policies in India, At a Glance.</p> <p>Digital Signature, Certifying Authorities and E-Governance, Digital Signatures, Digital Signature Certificate, Certifying Authorities and Liability in the Event of Digital Signature Compromise, E-Governance in India, A Warning to Babudom!</p>	
5	<p>The Indian Evidence Act of 1872 v. Information Technology Act, 2000, Status of Electronic Records as Evidence, Proof and Management of Electronic Records; Relevancy, Admissibility and Probative Value of E-Evidence, Proving Digital Signatures, Proof of Electronic Agreements, Proving Electronic Messages, Other Amendments in the Indian Evidence Act by the IT Act, Amendments to the Bankers Books Evidence Act, 1891 and Reserve Bank of India Act, 1934.</p> <p>Protection of Cyber Consumers in India, Are Cyber Consumers Covered Under the Consumer Protection Act? Goods and Services, Consumer Complaint, Defect in Goods and Deficiency in Services, Restrictive and Unfair Trade Practices, Instances of Unfair Trade Practices, Reliefs Under CPA, Beware Consumers, Consumer Foras, Jurisdiction and Implications on cyber Consumers in India, Applicability of CPA to Manufacturers, Distributors, Retailers and Service Providers Based in Foreign Lands Whose Goods are Sold or Services Provided to a Consumer in India. Amendments in Indian IT Act 2000</p>	9

References:

1. Cyber Law Simplified, Vivek Sood , TMH Education , 2001
2. Cybersecurity Law , Jeff Kosseff , Wiley , 2017


PRINCIPAL
 NAGINDAS KHANDWALA COLLEGE OF COMMERCE
 ARTS & MANAGEMENT, NAGINDAS KHANDWALA COLLEGE OF SCIENCE
 NAGINDAS KHANDWALA COLLEGE OF SCIENCE
 MALAD (VT), MUMBAI - 400 064

**Nagindas Khandwala College
(Autonomous)**



**Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme**

Third Year

Semester VI

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MAJOR IN SCIENCE AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(Autonomous)
MALAD (W), MUMBAI - 400 064

ENTERPRISE NETWORKING

*at Semester VI
(Implemented during Academic Year 2019-20)
(wef 2018-19)*

Modules at a Glance

Sr. No.	Topics	No. of lectures
1	Network Design Models	9
2	Enterprise LAN Design, Data Center Design	9
3	Wireless LAN Design, WAN Technologies and the Enterprise Edge	9
4	Internet Protocol Version 4	9
5	Managing Security	9
	Total	45

Objective:

By the end of the course learner will be able to:

- Understand and apply the networking knowledge in the industrial applications

Outcome:

On completion of the course learner will be able to:

- CO1: Implementing the computer network.(Apply)
- CO2: Manage complicated networking problems. (Analyse)
- CO3: Apply the knowledge in building secure networks. (Apply)
- CO4: Understand WAN design. (Understand)



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT, SANTIPAL AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 084

Detailed Syllabus

Modules	Topics	No. of Lectures
1	<p>General Network Design: Network Design Methodology, Architectures for the Enterprise, Borderless Networks Architecture, Collaboration and Video Architecture, Data Center and Virtualization Architecture, Design Lifecycle: Plan, Build, Manage Plan Phase Build Phase Manage Phase Prepare, Plan, Design, Implement, Operate, and Optimize Phases Prepare Phase Plan Phase Design Phase Implement Phase Operate Phase Optimize Phase Summary of PPDIOO Phases Project Deliverables Design Methodology Identifying Customer Design Requirements Characterizing the Existing Network Steps in Gathering Information Network Audit Tools Network Checklist Designing the Network Topology and Solutions Top-Down Approach Pilot and Prototype Tests Design Document</p> <p>Network Design Models: Hierarchical Network Models Benefits of the Hierarchical Model, Hierarchical Network Design, Core Layer, Distribution Layer, Access Layer, Hierarchical Model Examples, Hub-and-Spoke, Design Collapsed Core, Design Enterprise Architecture model, Enterprise Campus Module, Enterprise Edge Area, E-Commerce Module, Internet Connectivity Module, VPN/Remote Access, Enterprise WAN, Service Provider Edge Module, Remote Modules, Enterprise Branch Module, Enterprise Data Center Module, Enterprise Teleworker Module, High Availability Network Services, Workstation-to-Router Redundancy and LAN, High Availability Protocols, ARP Explicit Configuration, RDP, RIP, HSRP, VRRP, GLBP, Server Redundancy, Route Redundancy, Load Balancing, Increasing Availability, Link Media Redundancy</p>	9
2	<p>Enterprise LAN Design: LAN Media, Ethernet Design Rules, 100Mbps Fast Ethernet Design Rules, Gigabit Ethernet Design Rules, 1000BASE-LX Long-Wavelength Gigabit Ethernet, 1000BASE-SX Short-Wavelength Gigabit Ethernet, 1000BASE-CX Gigabit Ethernet over Coaxial Cable, 1000BASE-T Gigabit Ethernet over UTP 86, 10 Gigabit Ethernet Design Rules, 10GE Media Types, EtherChannel, Comparison of Campus Media LAN Hardware, Repeaters, Hubs, Bridges, Switches, Routers, Layer 3 Switches, Campus LAN Design and Best Practices Best Practices for Hierarchical Layers, Access Layer Best Practices, Distribution Layer Best Practices, Core Layer Best Practices, STP Design Considerations, STP Toolkit, Port Fast, Uplink Fast, Backbone Fast, Loop Guard, Root Guard, BPDU Guard, BPDU Filter, VLAN and Trunk Considerations, Unidirectional Link Detection (UDLD) Protocol, Large-Building LANs, Enterprise Campus LANs.</p>	9

	<p>Edge Distribution, Medium-Size LANs, Small and Remote Site LANs, Server Farm Module, Server Connectivity Options, Enterprise Data Center Infrastructure, Campus LAN QoS Considerations, Multicast Traffic Considerations, CGMP, IGMP Snooping.</p> <p>Data Center Design: Enterprise DC Architecture, Data Center Foundation Components, Data Center Topology Components, Data Center Network Programmability, SDN, Controllers, APIs, ACI, Challenges in the DC, Data Center Facility Aspects, Data Center Space, Data Center Power, Data Center Cooling, Data Center Heat, Data Center Cabling, Enterprise DC Infrastructure, Data Center Storage, Data Center Reference Architecture, Defining the DC Access Layer, Defining the DC Aggregation Layer, Defining the DC Core Layer, Security in the DC, Fabric Extenders, Virtualization Overview, Challenges, Defining Virtualization and Benefits, Virtualization Risks, Types of Virtualization, Virtualization Technologies, VSS, VRF, vPC, Device Contexts, Server Virtualization, Server Scaling, Virtual Switching, Network Virtualization Design Considerations, Access Control, Path Isolation, Services Edge, Data Center Interconnect, DCI Use Cases, DCI Transport Options, DCI L2 Considerations, Load Balancing in the DC, Application Load Balancing, Network Load Balancing.</p>	
3	<p>Wireless LAN Design: Wireless LAN Technologies, WLAN Standards, ISM and UNII Frequencies, Summary of WLAN Standards, Service Set Identifier, WLAN Layer 2 Access Method, WLAN Security, Unauthorized Access, WLAN Security Design Approach, IEEE 802.1X-2001 Port-Based Authentication, Dynamic WEP Keys and LEAP, Controlling WLAN Access to Servers, WLAN Authentication, Authentication Options, WLAN Controller Components, WLC Interface Types, AP Controller Equipment Scaling, Roaming and Mobility Groups, Intracontroller Roaming, Layer 2 Intercontroller Roaming, Layer 3 Intercontroller Roaming, Mobility Groups, WLAN Design, Controller Redundancy Design: Deterministic 12 vs. Dynamic, N+1 WLC Redundancy, N+N WLC Redundancy, N+N+1 WLC Redundancy, Radio Management and Radio Groups, RF Groups, RF Site Survey, Using EoIP Tunnels for Guest Services, Wireless Mesh for Outdoor Wireless, Mesh Design Recommendations, Campus Design Considerations, Power over Ethernet (PoE), Wireless and Quality of Service (QoS), Branch Design Considerations, Local MAC, REAP, Hybrid REAP, Branch Office Controller Options.</p> <p>WAN Technologies and the Enterprise Edge: WAN and Enterprise Edge Overview, Definition of WAN, WAN Edge Module, Enterprise Edge Modules, WAN Transport Technologies, ISDN, ISDN BRI Service, ISDN PRI Service, Digital Subscriber Line, Cable, Wireless, Frame Relay, Time-Division Multiplexing, Metro Ethernet, SONET/SDH, Multiprotocol Label Switching (MPLS), Dark Fiber, Dense Wavelength-Division Multiplexing, Ordering WAN Technology and Contracts, WAN and Edge Design Methodologies, Response Time, Throughput, Reliability, Bandwidth Considerations, WAN Link Categories, Optimizing Bandwidth Using QoS, Queuing, Traffic</p>	9


PRINCIPAL

	<p>Shaping and Policing, Classification, Congestion Management, Priority Queuing, Custom Queuing, Weighted Fair Queuing, Class-Based Weighted Fair Queuing, Low-Latency Queuing, Traffic Shaping and Policing, Link Efficiency, Window Size, DMZ Connectivity, Segmenting DMZs, DMZ Services, Internet Connectivity, Centralized Internet (Branch) vs. Direct Internet (Branch), High Availability for the Internet Edge, VPN Network Design.</p> <p>WAN Design</p> <p>Traditional WAN Technologies Hub-and-Spoke Topology Full-Mesh Topology Partial-Mesh Topology Point-to-Point Topology Remote Site Connectivity</p> <p>Enterprise VPN vs. Service Provider VPN Enterprise Managed VPN: IPsec IPsec Direct Encapsulation Generic Routing Encapsulation IPsec DMVPN IPsec Virtual Tunnel Interface Design GETVPN Service Provider-Managed Offerings, Metro Ethernet Service Provider VPNs: L2 vs. L3 ,Virtual Private Wire Services VPWS L2 VPN Considerations ,Virtual Private LAN Services VPLS L2 VPN Considerations ,MPLS, MPLS Layer 3 Design Overview MPLS L3 VPN Considerations ,VPN Benefits WAN Backup Design WAN Backup over the Internet Enterprise WAN Architecture Cisco Enterprise MAN/WAN Enterprise WAN/MAN Architecture Comparison ,Enterprise WAN Components Comparing Hardware and Software Enterprise Branch Architecture Branch Design Branch Connectivity Redundancy for Branches Single WAN Carrier vs. Dual WAN Carriers Single MPLS Carrier Site ,Dual MPLS Carriers Hybrid WAN: L3 VPN with IPsec VPN ,Internet for Branches Flat Layer 2 vs. Collapsed Core ,Enterprise Branch Profiles Small Branch Design Medium Branch Design Large Branch Design Enterprise Teleworker Design ,ISRs for Teleworkers</p>	
4	<p>Internet Protocol Version 4 Design, IPv4 Header ToS IPv4 Fragmentation IPv4 Addressing ,IPv4 Address Classes Class A Addresses Class B Addresses ,Class C Addresses Class D Addresses Class E Addresses ,IPv4 Address Types IPv4 Private Addresses NAT ,IPv4 Address Subnets Mask Nomenclature IP Address Subnet Design Example Determining the Network Portion of an IP Address Variable-Length Subnet Masks, Loopback Addresses IP Telephony Networks ,IPv4 Addressing Design Goal of IPv4 Address Design , Plan for Future Use of IPv4 Addresses , Performing Route Summarization , Plan for a Hierarchical IP Address Network , Private and Public IP Address and NAT Guidelines , Steps for Creating an IPv4 Address Plan Case Study: IP Address Subnet Allocation , Address Assignment and Name Resolution , Recommended Practices of IP Address Assignment ,BOOTP DHCP DNS , Internet Protocol Version 6 Design, IPv6 Header IPv6 Address Representation IPv4-Compatible IPv6 Addresses IPv6 Prefix Representation IPv6 Address Scope Types and Address Allocations IPv6 Address Allocations IPv6 Unicast Address Global Unicast Addresses Link-Local Addresses , Unique Local IPv6 Address Global Aggregatable IPv6 Address , IPv4-Compatible IPv6 Address IPv6 Anycast Addresses , IPv6 Multicast Addresses IPv6 Mechanisms ICMPv6 , IPv6 Neighbor Discovery Protocol IPv6 Name Resolution , Path MTU Discovery IPv6 Address-Assignment Strategies , Manual</p>	9



	<p>Configuration SLAAC of Link-Local Address , SLAAC of Globally Unique IPv6 Address DHCPv6 , DHCPv6 Lite IPv6 Security IPv6 Routing Protocols RIPng OSPFv3 , BGP4 Multiprotocol Extensions (MP-BGP) for IPv6, IPv6 Addressing Design , Planning for Addressing with IPv6 , Route Summarization with IPv6 IPv6 Private Addressing IPv6 for the Enterprise IPv6 Address Allocation , Partly Linked IPv4 Address into IPv6, Whole IPv4 Address Linked into IPv6 IPv6 Addresses Allocated Per Location and/or Type , IPv4-to-IPv6 Transition Mechanisms and Deployment Models , Dual-Stack Mechanism IPv6 over IPv4 Tunnels , Protocol Translation Mechanisms IPv6 Deployment Models , Dual-Stack Model Hybrid Model Service Block Model ,IPv6 Deployment Model Comparison IPv6 Comparison with IPv4 ,OSPF, BGP, Route Manipulation, and IP Multicast,OSPFv2 OSPFv2 Metric OSPFv2 Adjacencies and Hello Timers , OSPFv2 Areas OSPF Area Design Considerations OSPF Router Types OSPF DRs LSA Types Autonomous System External Path Types OSPF Stub Area Types Stub Areas Totally Stubby Areas , NSSAs Virtual Links OSPFv2 Router Authentication , OSPFv2 Summary OSPFv3 OSPFv3 Changes from OSPFv2, OSPFv3 Areas and Router Types OSPFv3 LSAs OSPFv3 Summary BGP BGP Neighbors eBGP iBGP Route Reflectors Confederations BGP Administrative Distance , BGP Attributes, Weight, and the BGP Decision Process BGP Path Attributes Next-Hop Attribute Local Preference Attribute Origin Attribute Autonomous System Path Attribute MED Attribute Community Attribute Atomic Aggregate and Aggregator Attributes Weight BGP Decision Process , BGP Summary , Route Manipulation PBR Route Summarization Route Redistribution Default Metric OSPF Redistribution Route Filtering Transit Traffic Routing Protocols on the Hierarchical Network Infrastructure IP Multicast Review , Multicast Addresses Layer 3 to Layer 2 Mapping IGMP , IGMPv1 IGMPv2 IGMPv3 CGMP IGMP Snooping , Sparse Versus Dense Multicast Multicast Source and Shared</p>	
5	<p>Managing Security Network Security Overview Security Legislation Security Threats Reconnaissance and Port Scanning Vulnerability Scanners Unauthorized Access Security Risks Targets Loss of Availability Integrity Violations and Confidentiality Breaches , Security Policy and Process Security Policy Defined , Basic Approach of a Security Policy Purpose of Security Policies, Security Policy Components Risk Assessment , Risk Index Continuous Security Integrating Security Mechanisms into Network Design Trust and Identity Management , Trust Domains of Trust Identity Passwords Tokens Certificates , Network Access Control Secure Services Encryption Fundamentals Encryption Keys VPN Protocols , Transmission Confidentiality Data Integrity Threat Defense , Physical Security Infrastructure Protection Security Management Solutions Security Solution Network Security Platforms , Trust and Identity Technologies Firewall Fundamentals Types of Firewalls Next-Gen Firewalls NAT Placement , Firewall 12 Guidelines Firewall ACLs , Identity and Access Control Deployments Detecting and Mitigating Threats IPS/IDS Fundamentals IPS/IDS Guidelines , Threat Detection and Mitigation Technologies , Threat-</p>	9



<p>Detection and Threat-Mitigation Solutions , FirePOWER IPS Security Management Applications , Security Platform Solutions Security Management Network</p> <p>Integrating Security into Network Devices IOS Security , ISR G2 Security Hardware Options Securing the Enterprise , Implementing Security in the Campus Implementing Security in the Data Center Implementing Security in the Enterprise Edge</p> <p>Network Management Protocols, Simple Network Management Protocol SNMP Components , MIB SNMP Message Versions SNMPv1 SNMPv2 SNMPv3 , Other Network Management Technologies RMON , RMON2 NetFlow Compared to RMON and SNMP , CDP LLDP Syslog</p>	
--	--

References:

1. CCDA200-310 Official Cert Guide, ANTHONY BRUNO, CCIE No. 2738 STEVE JORDAN, CCIE No 11293, Cisco Press
2. Network Warrior, Gary A Donabue , O Reilly , 2nd ediion 2011

Practical: (Emplyability)

- 1 **Configuring OSPF – I**
 - a Single-Area OSPF Link Costs and Interface Priorities
 - b Multi-Area OSPF with Stub Areas and Authentication
- 2 **Configuring OSPF – II**
 - a OSPF Virtual Links and Area Summarization
 - b OSPF over Frame Relay
- 3 **Redistribution and Administrative Distances**
 - a Redistribution Between RIP and OSPF
 - b Manipulating Administrative Distances
- 4 **BGP**
 - a Configuring BGP with Default Routing
 - b Using the AS_PATH Attribute
 - c BGP Route Reflectors and Route Filters
- 5 **IPv6**
 - a Configuring OSPF for IPv6
 - b Configuring 6to4 Tunnels
- 6 **VLANs and EtherChannel**
 - a Static VLANs, VLAN Trunking, and VTP Domains and Modes
 - b Configuring EtherChannel
- 7 **Spanning Tree Protocol**
 - a Spanning Tree Protocol (STP) Default Behavior



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT, SURVEY AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

b Modifying Default Spanning Tree Behavior

8 VLAN and Spanning Tree

a Per-VLAN Spanning Tree Behavior

b Multiple Spanning Tree

9 Internal VLAN Routing

a Inter - VLAN Routing with an External Router

b Inter- VLAN Routing with an Internal Route Processor

10 Configure NAT services

PRINCIPAL

NAGINDAS KHIMJIWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHIMJIWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

**Nagindas Khandwala College
(Autonomous)**



**Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme**

Third Year

Semester VI

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)


PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 054

PRINCIPLES OF GEOGRAPHIC INFORMATION SYSTEMS

at Semester VI
(Implemented during Academic Year 2020-21)
(wef 2018-19)

Modules at a Glance

Sr. No.	Topics	No. of lectures
1	Gentle Introduction to GIS	9
2	Data Management and Processing Systems	9
3	Spatial Referencing and Positioning	9
4	Spatial Data Analysis	9
5	Data Visualization	9
	Total	45

Course Objective:

By the end of the course, learners will be able to:

1. To gain basic understanding of Geographic Information Systems
2. To understand the process and tools required for data management.
3. To perform the spatial georeferencing by understanding the positioning systems
4. To perform different analysis techniques on spatial data
5. To create a map.

Course Outcome:

After successfully completing this course, learners will be able to:

CO1: Describe the meaning and basic components of Geographic Information Systems.
(Understand)

CO2: Execute different tools which will be used for managing and processing the data.
(Analyse and Apply)

CO3: Perform Georeferencing (Analyse and Apply)

CO4: Write different queries or use different types of tools for spatial data analysis (Create)

CO5: Create Maps. (Create)


PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064

Detailed Syllabus

Module	Topics	No. of Lectures
1	<p>A Gentle Introduction to GIS</p> <p>The nature of GIS: Some fundamental observations, Defining GIS, GISystems, GIScience and GIApplications, Spatial data and Geoinformation.</p> <p>The real world and representations of it: Models and modelling, Maps, Databases, Spatial databases and spatial analysis</p> <p>Geographic Information and Spatial Database Models and Representations of the real world Geographic Phenomena: Defining geographic phenomena, types of geographic phenomena, Geographic fields, Geographic objects, Boundaries Computer Representations of Geographic Information: Regular tessellations, irregular tessellations, Vector representations, Topology and Spatial relationships, Scale and Resolution, Representation of Geographic fields, Representation of Geographic objects Organizing and Managing Spatial Data The Temporal Dimension</p>	9
2	<p>Data Management and Processing Systems</p> <p>Hardware and Software Trends</p> <p>Geographic Information Systems: GIS Software, GIS Architecture and functionality, Spatial Data Infrastructure (SDI)</p> <p>Stages of Spatial Data handling: Spatial data handling and preparation, Spatial Data Storage and maintenance, Spatial Query and Analysis, Spatial Data Presentation.</p> <p>Database management Systems: Reasons for using a DBMS, Alternatives for data management, The relational data model, Querying the relational database.</p> <p>GIS and Spatial Databases: Linking GIS and DBMS, Spatial database functionality.</p>	9
3	<p>Spatial Referencing and Positioning</p> <p>Spatial Referencing: Reference surfaces for mapping, Coordinate Systems, Map Projections, Coordinate Transformations</p> <p>Satellite-based Positioning: Absolute positioning, Errors in absolute positioning, Relative positioning, Network positioning, code versus phase measurements, Positioning technology</p> <p>Data Entry and Preparation</p> <p>Spatial Data Input: Direct spatial data capture, Indirect spatial data capture, Obtaining spatial data elsewhere</p> <p>Data Quality: Accuracy and Positioning, Positional accuracy, Attribute accuracy, Temporal accuracy, Lineage, Completeness, Logical consistency</p> <p>Data Preparation: Data checks and repairs, Combining data from multiple sources Point Data Transformation: Interpolating discrete data, Interpolating continuous data</p>	9
4	<p>Spatial Data Analysis</p> <p>Cassification of analytical GIS Capabilities</p> <p>Retrieval, classification and measurement: Measurement, Spatial</p>	9

PRINCIPAL

	<p>selection queries, Classification</p> <p>Overlay functions: Vector overlay operators, Raster overlay operators Neighborhood functions: Proximity computations, Computation of diffusion, Flow computation, Raster based surface analysis</p> <p>Analysis: Network analysis, interpolation, terrain modeling</p> <p>GIS and Application models: GPS, Open GIS Standards, GIS Applications and Advances</p> <p>Error Propagation in spatial data processing: How Errors propagate, Quantifying error propagation</p>	
5	<p>Data Visualization</p> <p>GIS and Maps, The Visualization Process</p> <p>Visualization Strategies: Present or explore?</p> <p>The cartographic toolbox: What kind of data do I have?, How can I map my data? How to map :How to map qualitative data, How to map quantitative data, how to map the terrain elevation, How to map time series Map Cosmetics, Map Dissemination</p>	9

References:

1. Principles of Geographic information Systems- An Introductory Text Book, Editors , Otto Huisman and Rofl A. , The International institute of Geoinformation Science and Earth Observation , 4th edition , 2009
2. Principles of Geographic Information Systems , P.A Burrough and R.A. McDonell , Oxford University Press ,Third , 1999
3. Fundamentals of Spatial Information Systems, R. Laurini and D.Thompson, Academic Press , 1994
4. Fundamentals of Geographic Information System, Michael N.Demers , Wiley publications , Fourth , 2009
5. Introduction to Geographic Information Systems, Chang Kang-tsung (Karl), McGrawHill , Any above 3rd edition , 2013
6. GIS Fundamentals, A First Text on Geographic Information Systems, Paul Bolsatd, XanEdu Publishing Inc, 5th edition

Practical: (Employability)

1. Familiarizing Quantum GIS: Installation of QGIS, datasets for both Vector And Raster data, Maps.
2. Creating and Managing Vector Data: Adding vector layers, setting properties, formatting, calculating line lengths and statistics
3. Exploring and Managing Raster data: Adding raster layers, raster styling and Analysis, raster mosaicking and clipping
4. Making a Map, Working with Attributes, Importing Spreadsheets or CSV files Using Plugins, Searching and Downloading Open StreetMap Data
5. Working with attributes, Terrain Data
6. Working with projection and WMS data

7. Georeferencing Topo Sheets and Scanned Maps, Georeferencing Aerial Imagery, Digitizing Map Data
8. Managing Data Tables and Spatial data Sets: Table joins, spatial joins, points in polygon analysis, performing spatial queries
9. Advanced GIS Operations 1: Nearest Neighbor Analysis, Sampling Raster Data using Points or Polygons, Interpolating Point Data
10. Advance GIS Operations 2: Batch Processing using Processing Framework. Automating Complex Workflows using Processing Modeler, Automating Map Creation with Print Composer Atlas
11. Validating Map data



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 084

**Nagindas Khandwala College
(Autonomous)**



**Syllabus Of
Course Of
Bachelor of Science Information Technology
(BSC IT) Programme**

Third Year

Semester VI

Under Academic Autonomy and Credit, Grading and Semester System

(To be implemented during Academic Year 2020-21)

PRINCIPAL

**NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064**

SECURITY IN COMPUTING

at Semester VI
(Implemented during Academic Year 2019-20)
(wef 2018-19)

Modules at a Glance

Sr. No.	Topics	No. of lectures
1	Risk Analysis	9
2	Authentication and Authorization, Database Security	9
3	Network design and security	9
4	Voice over IP (VoIP) and PBX Security	9
5	Virtual Machines and Cloud Computing	9
	Total	45

Course Objective:

By the end of the course, learners will be able to:

1. Define key terms and critical concepts of information
2. Define risk management, risk identification and risk control
3. Describe a security blueprint and identify its major components.
4. Understand Secure Design Principles.
5. Describe security technology and Identify Security tools.
6. Describe cryptographic tools and techniques and identify the major protocols used for secure communications.
7. Understand the relationship between information security and physical security.

Course Outcome:

After completing this course learners will be able to:

- CO1: Understands the basics of information security.(Understand)
- CO2: Study various aspects of risk management.(Analyze)
- CO3: Compare various Security Models.(Analyze)
- CO4: Understand Different Security Layers.(Understand)
- CO5: Design and Simulate different networks using Security protocols.(Apply)
- CO6: Correlate information security and physical security.(Analyze)
- CO7: Understand the importance of security in Virtualization. (Understand)




PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 084

Detailed Syllabus

Module	Topics	No. of Lectures
1	<p>(Skill development & Employability)</p> <p>Information Security Overview: The Importance of Information Protection, The Evolution of Information Security, Justifying Security Investment, Security Methodology, How to Build a Security Program, The Impossible Job, The Weakest Link, Strategy and Tactics, Business Processes vs. Technical Controls.</p> <p>Risk Analysis: Threat Definition, Types of Attacks, Risk Analysis. Secure Design Principles: The CIA Triad and Other Models, Defense Models, Zones of Trust, Best Practices for Network Defense.</p>	9
2	<p>Authentication and Authorization: Authentication, Authorization Encryption: A Brief History of Encryption, Symmetric-Key Cryptography, Public Key Cryptography, Public Key Infrastructure. Storage Security: Storage Security Evolution, Modern Storage Security, Risk Remediation, Best Practices.</p> <p>Data base Security: Understanding Database Security Layers, Understanding Database-Level Security, Using Application Security, Database Backup and Recovery, Keeping Your Servers Up to Date, Database Auditing and Monitoring.</p>	9
3	<p>Secure Network Design: Introduction to Secure Network Design, Performance, Availability, Security.</p> <p>Network Device Security: Switch and Router Basics, Network Hardening. Firewalls: Overview, The Evolution of Firewalls, Core Firewall Functions, Additional Firewall Capabilities, Firewall Design.</p> <p>Wireless Network Security: Radio Frequency Security Basics, Data-Link Layer Wireless Security Features, Flaws, and Threats, Wireless Vulnerabilities and Mitigations, Wireless Network Hardening Practices and Recommendations, Wireless Intrusion Detection and Prevention, Wireless Network Positioning and Secure Gateways.</p>	9
4	<p>Intrusion Detection and Prevention Systems: IDS Concepts, IDS Types and Detection Models, IDS Features, IDS Deployment Considerations, Security Information and Event Management (SIEM).</p> <p>Voice over IP (VoIP) and PBX Security: Background, VoIP Components, VoIP Vulnerabilities and Countermeasures, PBX, TEM Telecom Expense Management.</p> <p>Operating System Security Models: Operating System Models, Classic Security Models, Reference Monitor, Trustworthy Computing, International Standards for Operating System Security.</p>	9
5	<p>Virtual Machines and Cloud Computing: Virtual Machines, Cloud Computing.</p> <p>Secure Application Design: Secure Development Lifecycle, Application Security Practices, Web Application Security, Client</p>	9


PRINCIPAL
 NAGINDAS KHANDWALA COLLEGE OF COMMERCE
 ARTS & MANAGEMENT STUDIES AND SHANTABEN
 NAGINDAS KHANDWALA COLLEGE OF SCIENCE
 (AUTONOMOUS)
 MALAD (W), MUMBAI - 400 084

Application Security, Remote Administration Security. Physical Security: Classification of Assets, Physical Vulnerability Assessment, Choosing Site Location for Security, Securing Assets: Locks and Entry Controls, Physical Intrusion Detection.	
---	--

References:

1. The Complete Reference, Information Security, Mark Rhodes-Ousley, McGraw-Hill, 2nd edition, 2013
2. Essential Cybersecurity Science, Josiah Dykstra, O'Reilly, 5th Edition, 2017
3. Principles of Computer Security, CompTIA Security + and Beyond, Wm Arthur Conklin, Greg White, McGraw Hill Second 2010

Practical: (Skill development & Employability)

1 Configure Routers

- a) OSPF MD5 authentication.
- b) NTP.
- c) to log messages to the syslog server.
- d) to support SSH connections.

2 Configure AAA Authentication

- a) Configure a local user account on Router and configure authenticate on the console
- b) and verify lines using local AAA
- c) Verify local AAA authentication from the Router console and the PC-A client

3 Configuring Extended ACLs

- a) Configure, Apply and Verify an Extended Numbered ACL

4 Configure IP ACLs to Mitigate Attacks and IPV6 ACLs

- a) Verify connectivity among devices before firewall configuration.
- b) Use ACLs to ensure remote access to the routers is available only from
- c) management station PC-C.
- d) Configure ACLs on to mitigate attacks.
- e) Configuring IPv6 ACLs

5 Configuring a Zone-Based Policy Firewall

6 Configure IOS Intrusion Prevention System (IPS) Using the CLI

- a) Enable IOS IPS.
- b) Modify an IPS signature.

7 Layer 2 Security

- a) Assign the Central switch as the root bridge.
- b) Secure spanning-tree parameters to prevent STP manipulation attacks.
- c) Enable port security to prevent CAM table overflow attacks.

8 Layer 2 VLAN Security


PRINCIPAL
 NAGINDAS KHANDWALA COLLEGE OF COMMERCE
 ARTS & MANAGEMENT STUDIES AND SHANTABEN
 NAGINDAS KHANDWALA COLLEGE OF SCIENCE
 (AUTONOMOUS)
 MALAD (W), MUMBAI - 400 064

9 Configure and Verify a Site-to-Site IPsec VPN Using CLI

10 Configuring ASA Basic Settings and Firewall Using CLI

- a) Configure basic ASA settings and interface security levels using CLI
- b) Configure routing, address translation, and inspection policy using CLI
- c) Configure DHCP, AAA, and SSH
- d) Configure a DMZ, Static NAT, and ACLs



PRINCIPAL

NAGINDAS KHANDWALA COLLEGE OF COMMERCE
ARTS & MANAGEMENT STUDIES AND SHANTABEN
NAGINDAS KHANDWALA COLLEGE OF SCIENCE
(AUTONOMOUS)
MALAD (W), MUMBAI - 400 064