



BANGLADESH TECHNICAL EDUCATION BOARD
Agargaon, Dhaka-1207

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM
SYLLABUS (PROBIDHAN-2016)

COMPUTER SCIENCE & TECHNOLOGY

TECHNOLOGY CODE: **685**

7th SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

COMPUTER SCIENCE & TECHNOLOGY 9685)

7th SEMESTER

| Sl. No | Subject Code | Name of the subject | T | P | C | Marks | | | | Total |
|--------------|--------------|--|-----------|-----------|-----------|--------------|------------|--------------|------------|------------|
| | | | | | | Theory | | Practical | | |
| | | | | | | Cont. assess | Final exam | Cont. assess | Final exam | |
| 1 | 68571 | Digital Marketing Techniques | 2 | 3 | 3 | 40 | 60 | 25 | 25 | 150 |
| 2 | 68572 | Information Management & Security System | 2 | 3 | 3 | 40 | 60 | 25 | 25 | 150 |
| 3 | 68573 | Scripting with Python | 2 | 3 | 3 | 40 | 60 | 25 | 25 | 150 |
| 4 | 68574 | Computer Science Project | 0 | 6 | 2 | 00 | 00 | 50 | 50 | 100 |
| 6 | 66671 | System Analysis and Design | 2 | 3 | 3 | 40 | 60 | 25 | 25 | 150 |
| 5 | 66673 | Apps Development Project | 0 | 6 | 2 | 00 | 00 | 50 | 50 | 100 |
| 7 | 66853 | Innovation & Entrepreneurship | 2 | 0 | 2 | 40 | 60 | 00 | 00 | 100 |
| Total | | | 10 | 24 | 18 | 200 | 300 | 200 | 200 | 900 |

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Digital Marketing Techniques

T P C
2 3 3

AIMS

- Assess the impact of digital technology on the practice of marketing.
- To be able to acquire the knowledge on SEO.
- To be able to acquire the knowledge on Web Site Analytics.
- To be able to acquire the knowledge of Social Media Marketing.
- To be able to acquire the knowledge of Mobile Marketing.
- To be able to acquire the knowledge and skills on the Strategy & Planning of Digital Marketing.
- To be able to acquire the knowledge and skills on Ad sense.
- To be able to acquire the knowledge and skills on Ecommerce and Payment Gateway.
- Develop a plan for marketing a product of business online.
- Grow your own online business from scratch.

SHORT DESCRIPTION

Digital Marketing, SEO, Web site Analytics, Social media marketing, Mobile marketing, Strategy & Planning of Digital Marketing, Ad sense, Ecommerce, Payment Gateway .

DETAIL DESCRIPTION

Theory:

1. Introduction to Digital Marketing.

- 1.1 Define digital marketing.
- 1.2 Define digital marketing and traditional marketing.
- 1.3 Elaborate the history of Digital Marketing.
- 1.4 Describe the types of digital marketing.
- 1.5 State about the digital marketing channels.

1.6 Benefit of the digital marketing

1.7 Describe the key elements of a digital marketing strategy

2. Understand Search Engine Optimization

- 2.1 Describe search engine optimization.
- 2.2 Define types of search engine.
- 2.3 Define SEO tools.
- 2.4 Explain Content Optimization and Submission
- 2.5 Explain website performance optimization index.
- 2.6 Explain expert link building techniques.

3. Understand Search Marketing (PPC)

- 3.1 Define Key PPC Concepts.
- 3.2 Describe Strengths of Pay Per Click.
- 3.3 Explain Google PPC.
- 3.4 Describe Research Tools & Search Campaign Process
- 3.5 Classify Conversion Metrics of CPA, CTR.

4. Understand Website Analytics.

- 4.1 Define analytics for a website.
- 4.2 Define analytics tools for website.
- 4.3 Describe the purpose of web analytics
- 4.4 State the important analytics data first.
- 4.5 Explain baseline creating and rank checking.
- 4.6 Explain the importance of keyword selection.

5. Understand the concept of Social Media Marketing.

- 5.1 Define social media marketing.
- 5.2 Define the functionality of LinkedIn, Facebook, and Twitter.
- 5.3 Explain the benefit of social media marketing.
- 5.4 Explain The Social Media Marketing Planning Cycle
- 5.5 Describe Target Market Identification
- 5.6 Describe Goal Setting and Strategy Development
- 5.7 Classify Marketing through Podcasts and Webinars
- 5.8 Describe Marketing through Video and Photo Sharing

6. Understand the basic concept of Email Marketing.

- 6.1 Define Email marketing.
- 6.2 Define types of Email marketing.
- 6.3 State the email marketing challenges & solutions.
- 6.4 Describe the complaints and dispute resolution.
- 6.5 Describe campaign creation.
- 6.6 Describe Email design and layout.
- 6.7 Describe Email segmentation
- 6.8 Describe Email performance metrics and measurement

7. Understand the Mobile Marketing.

- 7.1 Define about mobile marketing.
- 7.2 Describe Mobile Marketing Technology & Reach
- 7.3 Describe Mobile Marketing Strategy & Policies
- 7.4 Explain SMS Campaign.
- 7.5 Classification of mobile marketing.

8. Understand Display advertising.

- 8.1 Define Display Advertising.
- 8.2 Describe how Display Ads Works.
- 8.3 Discuss benefits of Display Advertising.
- 8.4 Describe planning process of Display Advertising.
- 8.5 List& uses of Display Planner Tools.
- 8.6 Describe Display campaign reporting.

9. Link building Techniques

- 9.1 Quality or Quantity?
- 9.2 The reasons behind to choose link of quality over quantity
- 9.3 Social signals and its importance in faster indexing
- 9.4 The way of creating social signals
- 9.5 Define blog
- 9.6 Introduction with Web 2.0 sites and link building Strategy using Web 2.0 sites

- 9.7 Define a forum.
- 9.8 Strategy to getting quality backlinks from forums.
- 9.9 Different Link building techniques

10. Understand the Ad sense.

- 10.1 Understand Affiliate Marketing
- 10.2 List of sources to Make Money Online.
- 10.3 Describe selection steps of Affiliate Program.
- 10.4 Define Applying step for an Affiliate.
- 10.5 Explain Building Assets for Affiliate.
- 10.6 Describe Google AdSense Account Setup process.
- 10.7 State Allowing and Blocking Ads.
- 10.8 Explain AdSense Administration.

11. Manipulate the Strategy & Planning of Digital Marketing.

- 11.1 Define digital strategy and planning.
- 11.2 Describe appropriate tools.
- 11.3 State the Targeting and segmentation.
- 11.4 Describe proposition and the marketing mix.
- 11.5 Explain Content and engagement strategy.
- 11.6 Classification of Iteration & Enhancement.

12. Ecommerce and Payment Gateway.

- 12.1 Define eCommerce Business.
- 12.2 Describe planning eCommerce Website.
- 12.3 Explain a effective eCommerce Website layout.
- 12.4 Describe various online payment methods

PRACTICAL:

1. Domain & Web site hosting activities.

- 1.1 Purchase a corporate domain.
- 1.2 Register a domain.
- 1.3 Renew a registered domain.
- 1.4 Manage a online hosting server.
- 1.5 Publish a corporate web site on online hosting server.

2. Works on SEO.

- 2.1 Analysis & Review of web site.
- 2.2 Perform Keyword Research & Selection.
- 2.3 Update Content & Layout.
- 2.4 Create Meta Tags.
- 2.5 Design SEO Site Map.
- 2.6 Use SEO Webmaster Tools.
- 2.7 Perform Off-Page Optimisation.
- 2.8 Perform Inbound Links & Link Building.
- 2.9 Implement Laws & Guidelines.

3. Works on Social media marketing.

- 3.1 Setup social media accounts for Facebook, Twitter, Google Plus, LinkedIn etc .
- 3.2 Manage social media accounts.
- 3.3 Create posts for various social media
- 3.4 Publish, manage & update posts on social media.
- 3.5 Analysis user responses & take necessary actions.
- 3.6 Create & manage Facebook events.
- 3.7 Plan for Ads (Free & Paid).
- 3.8 Publish & boosting Ads.

4. Perform Display advertising activities.

- 4.1 Track your Campaign
- 4.2 Optimize the Campaign
- 4.3 Campaign Planning
- 4.4 Run Effective Ad

5. Manage Video Marketing.

- 5.1 Create Account and Channel in YouTube, Meta Cafe etc
- 5.2 Design the YouTube Channel
- 5.3 Create & Promote videos on YouTube
- 5.4 Customize the YouTube Channel
- 5.5 Perform live broadcast.

6. Perform Email Marketing.

- 6.1 Setup & manage email accounts.
- 6.2 Setup & manage email client software.
- 6.3 Manage email lists.
- 6.4 Plan & design email templates for campaign.
- 6.5 Perform email marketing.

7. Works on Mobile Marketing.

- 7.1 Plan SMS Strategy.
- 7.2 Plan Mobile Advertising.
- 7.3 Analyze Mobile Optimized Websites.
- 7.4 Step Process for Mobile Apps.
- 7.5 Proximity Marketing.
- 7.6 Implement Strategic Steps.
- 7.7 Develop a corporate mobile app.
- 7.8 Review & Testing.

8. Works Affiliate Marketing and AdSense.

- 8.1 Select Affiliate Program.
- 8.2 Apply for an Affiliate.
- 8.3 Build Assets for Affiliate Promotion.
- 8.4 Select Payments and Payouts.
- 8.5 Choose CPC, CPA, CPI and other metrics.
- 8.6 Perform Day to Day Work Scheduling.
- 8.7 Manage Affiliate Accounts.
- 8.8 Setup & manage Google AdSense Account.

9. Perform Strategy & Planning activities.

- 9.1 Perform Situation Analysis, Planning, Budget& Measurement.
- 9.2 Perform Information Gathering & Research activities.
- 9.3 Works on Key Strategy & Planning Concepts & Methodologies.
- 9.4 Best Practice Case Studies.

10. Project (Any one):

- 10.1 Develop Complete SEO Audit with Keywords Research.
- 10.2 Develop AdWords Campaign: Search, Display, Video, Remarketing.
- 10.3 Develop a Complete Social Media Asset.

Note: Prepare a PowerPoint Presentation (PPT) on project report.

REFERENCE BOOK:

- 1. Social Media Explained: Untangling the World's Most Misunderstood Business Trend, Revised and Expanded -Mark Schaefer
- 2. Inbound Marketing: Get Found Using Google, Social Media, and Blogs-Brian Halligan, Dharmesh Shah
- 3. The Art of Social Media: Power Tips for Power Users-Guy Kawasaki, Peg Fitzpatrick

REFERENCE WEB SITE:

- 1. https://www.tutorialspoint.com/social_media_marketing/
- 2. <https://www.eduonix.com/complete-guide-to-social-media-marketing>
- 3. <https://neilpatel.com/what-is-affiliate-marketing/>
- 4. <https://ads.google.com/home/>
- 5. <https://www.youtube.com/creators/>
- 6. <https://neilpatel.com/>

AIMS

- To be able to explain various Information Management Security System threat and controls.
- To be able to analyze a security incidents and design countermeasures.
- To be able to explain information management security system incident response.
- To be able to explain the usage of Common Key cryptography and Public Key cryptography.
- To be able to explain the mechanism to protect confidentiality and completeness of data.

SHORT DESCRIPTION

Fundamentals of information management security, in both management and technical aspect//Different kinds of security incidents and attacks//Techniques to prevent, detect and react on incidents and attacks//Basics of cryptography// Key technology to implement security//Presentation of their study project for a topic related to information management security.

DETAIL DESCRIPTION**THEORY****1. Overview of Information Management Security**

- 1.1 Define Information Management System
- 1.2 Define Information Security System
- 1.3 Define Information Management Security
- 1.4 Define Information Security Strategy Development
- 1.5 Discuss the examples of Information Management Security Incidents
- 1.6 Discuss relevant information on security policies, standards, frameworks, & issuing bodies

2. Discuss Basics of Information Security and Human aspects

- 2.1 Describe the three concepts of Information Security (Confidentiality, Integrity, Availability)
- 2.2 Explain the basic terminologies in Information Security
- 2.3 Describe Human Aspect of Information Security
- 2.4 Describe Social Engineering

3. Explain Information Security for Server system

- 3.1 Discuss Attacks to Server Systems connected to the Internet and counter measures
- 3.2 Discuss Attacks to Web Servers and counter measure
- 3.3 Explain Denial of Service Attack
- 3.4 Describe Attacks to Network Systems

4. Explain Information Security for Client Devices

- 4.1 Explain Attacks for Personal Computers and Smart phones, and counter measure
- 4.2 Discuss how the malicious software intrudes the device
- 4.3 Describe what are the malicious software does to the system
- 4.4 Define and Discuss about Stolen and Lost Devices

5. Discuss Information Security Risk Management

- 5.1 Define Risk Management Concepts, Process and Framework
- 5.2 Identify Threat and Vulnerability
- 5.3 Explain Risk, threat, & vulnerability management life cycle
- 5.4 Discuss Information Assets
- 5.5 Discuss Security Risk and evaluation
- 5.6 Explain risk assessment analysis, methodologies
- 5.7 Discuss Risk treatment

6. Discuss Security Risk Management as an Organization

- 6.1 Overview of Information Security Governance
- 6.2 Discuss Information Security Management System (ISMS)
- 6.3 Explain Information Security Policy, Standards and Procedures
- 6.4 Explain Information Security Evaluation

7. Discuss Security Incident Response

- 7.1 Define Security Incident Response
- 7.2 Define Computer Security Incident Response Team
- 7.3 Discuss Incident Response Process
- 7.4 Discuss Response Team Activities

8. Discuss Information Security and Cryptography

- 8.1 Describe the requirement for secure communication.
- 8.2 Define Cryptography
- 8.3 Discuss Classic Cryptography
- 8.4 Explain Modern Cryptography
- 8.5 Discuss Common Key Cryptography algorithm: DES, Triple DES, AES
- 8.6 Explain Encryption modes

9. Discuss Public Key Cryptography

- 9.1 Discuss problems of key distribution for common key cryptography
- 9.2 Define Public Key Cryptography
- 9.3 Discuss RSA
- 9.4 Explain Hybrid Encryption
- 9.5 Explain Recommended Ciphers

10. Discuss Data Integrity and Digital Signature

- 10.1 Discuss Integrity of Data
- 10.2 Explain Hash Function
- 10.3 Discuss Digital Signature

11. Discuss Public Key Certificate and PKI

- 11.1 Discuss Digital Signature of Public Key
- 11.2 Explain Public Key Infrastructure
- 11.3 Discuss Certificate Authority

12. Discuss Cyber Security

- 12.1 Define Cyber Security
- 12.2 Explain the importance of Cyber Security
- 12.3 Describe the types of Cyber Security Threats

12.4 Describe the elements of Cyber Security

12.5. Describe Cyber Security Challenges

PRACTICAL

1. Perform Information Security Risk Management Exercise

- 1.1 Identify Information Assets
- 1.2 Identify Security Risk and evaluation
- 1.3 Perform listing Risk Treatment
- 1.4 Prepare presentation of exercise result

2. Perform Security Incident Response Exercise

- 2.1 Identify Security Incident Events
- 2.2 Identify Response Lists
- 2.3 Perform Response Tasks
- 2.4 Prepare Presentation of exercise result

3. Perform Common Key Cryptography exercise

- 3.1 Exercise on Common Key Cryptography
- 3.2 Work with Key Selection File
- 3.3 Work with Encoding
- 3.4 Prepare Plaintext and Cipher Text File
- 3.5 Prepare Decoding Sheet

4. Perform Public Key Cryptography Exercise

- 4.1 Exercise on Public Key Cryptography
- 4.2 Work with Key Selection File
- 4.3 Work with Encoding
- 4.4 Prepare Plaintext and Cipher Text File
- 4.5 Prepare Decoding Sheet
- 4.6 Exercise on Hybrid Encryption

5. Perform PKI Exercise

- 5.1 Establishing the Standalone CA and subordinate CA
- 5.2 Install a stand-alone root certification authority
 - 5.2.1 Logon to the system
 - 5.2.2 Step by step to install the certificate
- 5.3 Install a stand-alone subordinate certification authority
 - 5.3.1 Logon to the system and Obtain the certificate for the subordinate
 - 5.3.2 Step by step to install the certificate

6. Perform Malware Investigation Exercise

- 6.1 Use web browser to investigate the technical difference a virus, a worm and a Trojan horse.
- 6.2 Identify results by searching separately and all together
- 6.3 Identify the search result differences.
- 6.4 Add word "computer" and perform the job again.
- 6.5 Prepare a work definition of each.
- 6.6 Run "netstat -an" command on different computer.

6.7 Consider the output, identify the differences.

6.8 Prepare a presentation of exercise result

7. Perform Firewall and Intrusion Detection System Exercise

7.1 Install Ubuntu as Operating System

7.2 Install Snort

7.3 Configure and Start the Snort IDS

7.4 Write and Add some Snort Rules

7.5 Triggering an Alert for new rule

REFERENCE BOOKS

1. Title: Principles of Information Security
Author: Michael E. Whitman and Herbert J. Mattord
Publisher: Cengage Learning;
ISBN: 1285448367
2. Title: Understanding Cryptography: A Textbook for Students and Practitioners
Author: Christof Paa and Jan Pelzl
Publisher: Springer
ISBN: 3642041000

REFERENCE WEBSITES

1. www.cca.gov.bd
2. www.snort.org
3. www.isaca.org/pages/default.aspx
4. www.en.wikipedia.org/wiki/Public_key_infrastructure
5. www.en.wikipedia.org/wiki/Cryptography
6. www.en.wikipedia.org/wiki/Security_information_management
7. www.scholar.google.com/scholar?q=information+management+and+security+system
8. <https://searchsecurity.techtarget.com/definition/cybersecurity>

OBJECTIVES

- To develop knowledge and skill on Scripting with Python.
- To develop knowledge and skill to write non trivial Python programs dealing with a wide variety of subject matter domains.
- To develop knowledge and skill on language components, the IDLE/IDE environment, control flow constructs, strings, I/O, collections, classes, modules, and regular expressions, Database Access, Network Programming, Web Scraping

SHORT DESCRIPTION

Execute Python code in a variety of environments; Correct Python syntax; Control flow construct; Collection data types; Home grown Python functions; Modules such as os, sys, math, and time; Python Exception Handling model; IO model; Python classes; Regular Expression capabilities for data verification, Database Access, Network Programming, Web Scraping.

DETAIL DESCRIPTION**Theory:****1. Basic Python Syntax**

- 1.1. Describe the Basic Syntax
- 1.2. Explain Python Comments
- 1.3. Explain String Methods
- 1.4. Explain String Values
- 1.5. State the format Method
- 1.6. Explain String Operators
- 1.7. Describe the Numeric Data Types
- 1.8. Explain Conversion Functions
- 1.9. State Simple Input /Output

2. Language Components

- 2.1.State indenting Requirements
- 2.2.Explain the if Statement
- 2.3.Describe Relational and Logical Operators
- 2.4.Describe Bit Wise Operators
- 2.5.State the while Loop
- 2.6.State break and continue
- 2.7.State the for Loop

3. Understand Collections

- 3.1.State the basic concept of collection
- 3.2.Define Lists and its type
- 3.3.Assigning values in Tuples
- 3.4.Define Sets
- 3.5.State Dictionaries
- 3.6.State Sorting Dictionaries

3.7.State Copying Collections

4. Understand Functions

- 4.1.Define Parameters
- 4.2.Explain Keyword and Optional Parameters
- 4.3.Explain Passing Collections to a Function
- 4.4.Define the Scope of function
- 4.5.Define map and filter
- 4.6.Describe the Mapping Functions in a Dictionary
- 4.7.Define Lambda
- 4.8.Discuss Inner Functions
- 4.9.Define Closures

5. Understand Modules

- 5.1.Define Modules
- 5.2.State Standard Modules - sys
- 5.3.State Standard Modules - math
- 5.4.State Standard Modules - time
- 5.5.State the dir Function

6. Understand Exceptions

- 6.1.Define Errors
- 6.2.Describe Runtime Errors
- 6.3.Discuss the Exception Model
- 6.4.Define Exception Hierarchy
- 6.5.Describe Handling Multiple Exceptions
- 6.6.Define Raise
- 6.7.Define assert

7. Understand Input and Output

- 7.1. Discuss the basic concept of I/O
- 7.2. Define Data Streams
- 7.3.Creating Your Own Data Streams
- 7.4.State Access Modes
- 7.5.Writing Data to a File
- 7.6.Reading Data From a File
- 7.7.State the Additional File Methods
- 7.8.Using Pipes as Data Streams
- 7.9.Handling IO Exceptions

8. Understand Classes in Python

- 8.1. Define Class
- 8.2. Describe Principles of Object Orientation
- 8.3. Creating Classes
- 8.4. State Instance Methods
- 8.5. State File Organization
- 8.6. State Special Methods
- 8.7. State Class Variables
- 8.8. Explain Inheritance
- 8.9. Explain Polymorphism

9. Understand Regular Expressions

- 9.1. State Quantifiers
- 9.2. Define the Dot Character
- 9.3. Define Greedy Matches
- 9.4. Define Grouping
- 9.5. State Matching at Beginning or End
- 9.6. State Match Objects
- 9.7. Define Substituting
- 9.8. Splitting a String
- 9.9. Compiling Regular Expressions

10. Understand Database Access

- 10.1. Create Database Connection
- 10.2. Creating Database Table
- 10.3. INSERT Operation
- 10.4. READ Operation
- 10.5. Update Operation
- 10.6. DELETE Operation
- 10.7. Performing Transactions
- 10.8. COMMIT Operation
- 10.9. ROLLBACK Operation

11. Understand Network Programming

- 11.1. Define Sockets
- 11.2. State the Socket Module
- 11.3. Explain Server Socket Methods
- 11.4. Explain Client Socket Methods
- 11.5. Explain General Socket Methods
- 11.6. Define A Simple Server
- 11.7. Define A Simple Client
- 11.8. State Python Internet modules

12. Understand Web Scraping

- 12.1. Define Web Scraping
- 12.2. Origin of Web Scraping
- 12.3. Web Crawling v/s Web Scraping
- 12.4. Uses of Web Scraping
- 12.5. Components of a Web Scraper
- 12.6. Working of a Web Scraper
- 12.7. Create Dynamic Website
- 12.8. Approaches for Scraping data from Dynamic Websites

PRACTICAL:

Perform the tasks to develop the following projects using Python programming language:

1. A Simple Calculator
2. Alarm clock using Python
3. Currency convertor app using Python
4. Digital display application using Python
5. Password Generator Solutions
6. List Remove Duplicates Solutions
7. XML parsing in Python

8. Twitter Sentiment Analysis using Python
9. Working with Images in Python
10. Simple Chat Room using Python
11. Implementing Web Scraping in Python with Beautiful Soup
12. Computer Vision module application for finding a target in a live camera

Each Project must follow the following steps:

- Write the objectives of the proposed project.
- Design the user interface of the proposed project in paper.
- Create different forms, buttons, label, text box, check box, combo box and menus according to the need of the project.
- Create table if necessary.
- Write codes for the above objects.
- Run and test the program.
- Debug and modify the program if needed.
- Prepare user manual.
- Write a detail report about the developed project.
- Prepare a Power Point Presentation for Submit the project

REFERENCE BOOKS:

1. Learning Python by Mark Lutz; Pratham Books, Bangalore
2. Foundations of Python Network Programming by John Goerzen and Brandeu Rhodes; Apress-eBook distributed by Springer Science and Business Media, New York
3. Dive Into Python by Mark Pilgrim; Pratham Books, Bangalore
4. Think Python by Allen B. Downey; O'Reily Media
5. Python Programming For Beginners: A Must Read Introduction to Python Programming by Robert Richards; Pratham Books, Bangalore
6. e-books/e-tools/relevant software to be used as recommended by AICTE/HSBTE/NITTTR.

Websites for Reference:

1. [http:// python.howtocode.com.bd](http://python.howtocode.com.bd)
2. <http:// www.learnpython.org>
3. <http://pythontutor.com>

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Computer Science Project

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AIMS

- To be able to understand the project concept paper (PCP)
- To be able to develop knowledge, skill and attitude of preparing different stages of computer software related project
- To be able to gather experience of writing report on project work.

SHORT DESCRIPTION

Information management system, Control system, Packages, Educational software.

DETAIL DESCRIPTION

PROJECT:

- 1. Perform the tasks to develop any one of the following software using standard programming language and necessary tools (Python/ Java/ C/C++/C#/Visual programming/ MySQL/PostgreSQL/Oracle/ HTML/XML/JS/CSS etc.).**
 - Polytechnic institute management system
 - School management system
 - Hotel management system
 - Accounting software
 - Transport ticketing management system
 - Departmental store management system
 - Admission management system
 - Billing management system.
 - Library management system
 - Online voting system
 - Any other computerized system/control system/ network system/ packages/ educational software.
- 1.1. State the abstract PCP of the proposed software.
- 1.2. Write the objectives of the proposed software.
- 1.3. Design the user interface of the proposed software in paper.
- 1.4. Choose an appropriate programming language.
- 1.5. Create different forms, buttons, label, text box, check box, combo box and menus according to the need of the software.
- 1.6. Create table if necessary.
- 1.7. Write codes for the above objects.
- 1.8. Run and test the program.
- 1.9. Debug and modify the program if needed.
- 1.10. Prepare user manual.
- 1.11. Write a detail/complete report about the developed software.
- 1.12. Prepare a Power Point Presentation (PPT) on the Project Report.

REFERENCE WEB ADDRESS AND BOOKS

1. <https://www.postgresql.org/>
2. <https://www.oracle.com>
3. <https://dotnet.microsoft.com/>
4. <https://www.java.com/en/>
5. <https://www.mysql.com/>
6. <https://www.w3schools.com/html/>
7. <https://isocpp.org/>
8. <https://www.python.org/>

AIMS

To provide the students with an opportunity to acquire knowledge, skill and attitude in the fields of system analysis, design and computer based development with special emphasis on system concept, system development life cycle, system analysis, system design & Development, implementation & Information security and object-oriented system design.

SHORT DESCRIPTION

System concept, system development life cycle, system analysis, system design & Development, implementation & Information security and object-oriented system design.

DETAIL DESCRIPTION**Theory:****1. Understand the elements of information systems and management.**

- 1.1 Define system and information systems.
- 1.2 Mention the characteristics of systems.
- 1.3 Describe the key elements of a system.
- 1.4 Define open and closed system.
- 1.5 Describe the characteristics of open system.
- 1.6 Describe the categories of information.
- 1.7 State the qualities of information.
- 1.8 State the need of computer based information system.

2. Understand the Organizational functions and system development life cycle.

- 2.1 State the common functions of an organization.
- 2.2 State the various functions an educational institution.
- 2.3 State the functions of various departments of a manufacturing organization.
- 2.4 Describe the Management and Information System levels in an organization.
- 2.5 State the meaning of system development life cycle.
- 2.6 Describe the function of each stages of system development life cycle (SDLC).

3. Understand the roles of system analyst and functions of MIS facility center.

- 3.1 State the meaning of systems Analyst and system analysis
- 3.2 Describe the skills required for a system analyst.
- 3.3 Describe the relationship between interpersonal and technical skills required in different stages of system development.
- 3.4 Mention the primary functions of an MIS facility center.
- 3.5 State the activities of administrator in an MIS facility center.
- 3.6 Describe different structures of systems analysis.
- 3.7 Describe different functions, responsibilities and duties of system analyst, programmers and operators.

4. Understand the process of initial investigation and information gathering.

- 4.1 Mention the steps of systems analysis.
- 4.2 State the meaning of system planning.

- 4.3 List the probable fields of a user request form.
- 4.4 Describe the steps of initial investigation process.
- 4.5 Mention the sources and categories of information.
- 4.6 List the information gathering tools.
- 4.7 Mention the phases of information gathering.
- 4.8 Describe the information gathering methods.
- 4.9 State the guideline of a successful interview.
- 4.10 State the types of questionnaires.

5. Understand the tools of structured analysis.

- 5.1 State the meaning of structured analysis.
- 5.2 List the name of tools of structured analysis.
- 5.3 Define physical document flow diagram and logical data flow diagram (DFD).
- 5.4 State the meaning and functions of DFD symbols.
- 5.5 Mention the thumb rules of drawing DFDs.
- 5.6 Draw sample document flow diagram and data flow diagram (DFD).
- 5.7 State the meaning of decision trees, decision table, structured English and data dictionary.
- 5.8 Prepare DFD, decision trees, decision table, structured English and data dictionary for sample small process like store/purchase/accounts /order/receive etc.

6. Understand the feasibility analysis.

- 6.1 Mention the meaning of feasibility study.
- 6.2 Describe the economic, technical and behavioral feasibility.
- 6.3 Describe the steps in feasibility analysis.
- 6.4 State the categories of cost and benefit.
- 6.5 State the procedure for cost/benefit determination.
- 6.6 State the alternating solutions to be examined during feasibility analysis.
- 6.7 State the content of feasibility report.

7. Understand the system design and development.

- 7.1 Mention the meaning of systems design and development.
- 7.2 Distinguish between logical design and physical design.
- 7.3 Mention activities covered in systems design and development.
- 7.4 Mention the steps in physical systems design and design methodologies.
- 7.5 Mention the meaning of input/output design.
- 7.6 Mention the characteristics of different forms.
- 7.7 Describe the factors to be considered to design a form.
- 7.8 Describe the objectives of database and steps of database design.
- 7.9 State the structure and general principles to be used in designing output reports.

8. Understand the process of systems testing and security.

- 8.1 Describe the objectives of control and testing the information systems.
- 8.2 Describe different types of systems test.
- 8.3 Describe the quality factor specification.
- 8.4 State the term Information Security Management System (ISMS)
- 8.5 Explain the information security risk management process.
- 8.6 State the requirements to be met to ensure security of information systems.

9. Understand the implementation and software maintenance activities.

- 9.1 Mention the activities considered in systems conversion.

- 9.2 Describe the need of user training.
- 9.3 Describe the post implementation activities.
- 9.4 State the points to be mentioned for requesting proposal from vendors.
- 9.5 Prepare a feature form to make a comparative evaluation of vendors' proposal for computer system.

10. Understand the concept of object-oriented approach.

- 10.1 Define object oriented analysis and design.
- 10.2 State the elements of Object-Oriented system.
- 10.3 Distinguish between structured approach and object-oriented approach.
- 10.4 Define Unified Modeling Language (UML).
- 10.5 State the ways to apply UML.
- 10.6 Describe the perspectives to apply UML.
- 10.7 Describe the object-oriented system development life cycle.

PRACTICAL:

Perform the tasks to develop any one of the following software using standard programming language and necessary tools (using Python/ Java/ C/C++ /C#/Visual programming/ MySQL/PostgreSQL/Oracle/ HTML/XML/JS/CSS or any other necessary software).

- Polytechnic institute management system
- School management system
- Hotel management system
- Accounting software
- Transport ticketing management system
- Departmental store management system
- Admission management system
- Billing management system.
- Library management system
- Online voting system
- Student attendance system
- Any other computerized system/control system/operating system/ network system/ packages/ educational/ entertainment software.

STEPS:

- Step-1: Perform the collection of documents to recognize the need of a new computerized system.
- Step-2: Perform the collection of information of the personnel currently solving the problem into the manual system.
- Step-3: Perform the observation of existing system process & gather information by interview and questionnaires.
- Step-4: Perform the preparation of end-user's requirements & select the feasible solution for the alternative candidate systems.
- Step-5: Perform the design of external forms, input & dialogue screens.
- Step-6: Perform the design of reports, display screens & databases.
- Step-7: Perform the design of test plan & procedure.
- Step-8: Perform the selection of tools, databases and development of menus.

Step-9: Perform the development of input screens and dialogues.

Step-10: Perform the development of modules for data entry & processing.

Step-11: Perform the development of modules for output display and printing.

Step-12: Perform the integration & testing of the developed systems.

Step-13: Perform the preparation of manuals & documentations.

REFERENCE BOOKS

1. System Analysis and Design - Elias M. Awad
2. Analysis and Design of Information Systems - V. Rajaraman
3. System Analysis and Design Methods - Whitten, Bentley, Barlow

AIMS

After completion of the course students will be able to acquire knowledge, skill, attitude in the area of Apps Development emphasizes on:

- Skills to design and build an Android application from scratch.
- Thorough understanding of main components of an Android application and its entire life cycle.
- Ability to use tools to debug and maintain your Android applications.
- Using external resources, manifesting adapters and file intents.
- Understand storage tools and techniques: files, preferences, databases, and content providers.
- Using background processing techniques available in Android.

SHORT DESCRIPTION

Introduction to Android Programming, Fundamentals, Classes, Layout, Exception Handling, Android Components, Content providers, Messaging, Connectivity, Location services, Build and App Publish.

DETAIL DESCRIPTION

1. Create Android Environment for App Development.

- 1.1 Install the latest Android Studio.
- 1.2 Install Android SDK.
- 1.3 Configure the IDE.
- 1.4 Find your configuration files.
- 1.5 Explore the IDE.
- 1.6 Define Android Scope.
- 1.7 Features of Android.
- 1.8 Understand SDK, AVD and Emulator.

2. Create an Application and understand the Anatomy.

- 2.1 Explore Application Framework.
- 2.2 Explore Application Component.
- 2.3 Create a Hello World Program.
- 2.4 Explore Anatomy of Application – Folder, File & Description.
- 2.5 Describe Main Activity File, Manifest File, Strings File, Layout File.
- 2.6 Debug and Exception handle procedure.

3. Work with Activities.

- 3.1 Define Android Activity and Understand Activity life cycle.
- 3.2 Handle Activity State Changes.
- 3.3 Create an Android application and test your app's activities.
- 3.4 Create an activity.
- 3.5 Drive the activity to a new state.
- 3.6 Recreate the activity.
- 3.7 Trigger actions in the activity.

4. Work with Fragment.

- 4.1 Explore fragment life cycle, use and types of fragments.
- 4.2 Create a Fragment Class.
- 4.3 Build a flexible UI.
- 4.4 Add a Fragment to an Activity at Runtime.

- 4.5 Replace One Fragment with Another.
- 4.6 Communicate with other fragments.
- 4.7 Deliver a Message to a Fragment.
- 5. Work with Android Intents and Filters.**
 - 5.1 Understand the intent object and fundamental use cases.
 - 5.2 Explore Intent types.
 - 5.3 Data transfer between activities.
 - 5.4 Register an Activity for the Intent which is triggered when someone wants to open a webpage.
 - 5.5 Build a service in your app to download a file from the web.
- 6. Create Android User Interface.**
 - 6.1 Understand the basic building block for user interface.
 - 6.2 Explore the Frame layout, Linear layout, Table layout, Relative layout, Frame layout, List View, Grid View
 - 6.3 Adapt layout attributes.
 - 6.4 Build Layouts with an Adapter.
 - 6.5 Improve layout performance.
- 7. Design user Interface with views.**
 - 7.1 Add Text, Buttons, checkboxes, radio buttons, toggle buttons, spinners, pickers, tooltips to the layout files.
 - 7.2 Create and manage notifications and channels, modify notification badges.
 - 7.3 Create an activity from a notification.
 - 7.4 Add app bar.
 - 7.5 Dim system bars, Hide status bar and navigation bar.
- 8. Work with Navigation.**
 - 8.1 Design effective navigation.
 - 8.2 Create swipe view with tabs.
 - 8.3 Create a navigation drawer.
 - 8.4 Implement proper Back navigation.
- 9. Display Pictures and Menus with Views.**
 - 9.1 UseImageView, ImageSwitcher to Display Pictures.
 - 9.2 Use GridView to Display Pictures.
 - 9.3 ExploreMenus with Views.
- 10. Work with App data & files.**
 - 10.1 Save files on device storage - Internal Storage, External Storage (SD Card).
 - 10.2 Save data in a local database.
 - 10.3 Send data to other apps.
 - 10.4 Share files.
 - 10.5 Retrieve file information.
- 11. Use Content Providers.**
 - 11.1 Understand content providers and advantages.
 - 11.2 Accessing and retrieving data from a provider.
 - 11.3 Creating Own Content Providers.
 - 11.4 Create an address book using the Content Provider.

12. Work with Messaging.

- 12.1 Understand Sms Manager API.
- 12.2 Analyze Method & Description.
- 12.3 Send an SMS to the given mobile number.
- 12.4 Analyze Email Messaging.
- 12.5 Analyze Extra Data & Description.
- 12.6 Send an Email to the given recipients.

13. Illustrate Location Based Services.

- 13.1 Display Maps.
- 13.2 Get the current location.
- 13.3 Get the Updated Location.
- 13.4 Displaying a Location Address.
- 13.5 Project – Build a Location Tracker.

14. Establish Connectivity.

- 14.1 Learn how to connect to the network, choose an HTTP client, and perform network operations outside of the UI thread.
- 14.2 Learn how to check a device's network connection, create a preferences UI for controlling network usage, and respond to connection changes.
- 14.3 Optimize network data usage.
- 14.4 Parse XML data.
- 14.5 Reduce network battery drain.

15. Develop Android Services.

- 15.1 Creating Own Services - Long Running Task and Services, Repeated Task in a Service, Execute a synchronous Task on separate.
- 15.2 Establishing Communication Between a Service and Activity.
- 15.3 Bind activities to services.
- 15.4 Understand Threading.

16. Configure your build

- 16.1 The build process.
- 16.2 Custom build configurations.
- 16.3 Build configuration files.
- 16.4 Set the application ID.
- 16.5 Add build dependencies, Dependency types, configurations.
- 16.6 Optimize your build speed.
- 16.7 Configure build variants.

17. Publish your App

- 17.1 Prepare for release, Gather materials and resources.
- 17.2 Set application version information.
- 17.3 Create Certificates and key stores, Manage keys.
- 17.4 Upload your app bundle.
- 17.5 Update your App.

18. Create a Contact Book.

- 18.1 Understand the project scope and requirement analysis.
- 18.2 Create a Form that will take username, gender, email, phone number.
- 18.3 Upload user image.
- 18.4 Store data to database.
- 18.5 Update and Delete a contact.

- 18.6 Display user information in List View.
- 18.7 Test your App with UI-Testing and with testing tools.

19. Create a BMI Tracker.

- 19.1 Understand the project scope and requirement analysis.
- 19.2 Create a calculator that will take user height, weight and age.
- 19.3 Create BMI Standard to compare.
- 19.4 Show user BMI and give status.
- 19.5 Store BMI result.
- 19.6 Display monthly BMI.
- 19.7 Test your App with UI-Testing and with testing tools.

20. Create a Location based App.

- 20.1 Understand the project scope and requirement analysis
- 20.2 Create a form that will take name of type like Hospital, Institute, Fire station.
- 20.3 Create a form that will take information about Address, contact number, latitude, longitude of the address, basic service related information.
- 20.4 Create a signup form for user and store.
- 20.5 Filter nearby locations stored in database.
- 20.6 Test your App with UI-Testing and with testing tools.

Reference Books

1. Beginning Android programming with Android Studio
By - J F DIMarjio
2. Hello Android Introducing Google's Mobile Development Platform
By - ED Burnette

Essential Links

1. developer.android.com
2. www.tutorialspoint.com/android

AIMS

- To be able to understand the concept of entrepreneurship & entrepreneur.
- To be able to understand the concept of environment for entrepreneurship.
- To be able to understand the sources of venture ideas in Bangladesh.
- To be able to understand the project selection.
- To be able to understand business planning.
- To be able to understand the insurance and premium.
- To be able to understand the MDG & SDG.

SHORT DESCRIPTION

Concepts of entrepreneurship & entrepreneur; Entrepreneurship & economic development; Environment for entrepreneurship; Entrepreneurship in the theories of economic growth; Sources of ventures ideas in Bangladesh; Evaluation of venture ideas; Financial planning; Project selection; Self employment; Entrepreneurial motivation; Business plan; Sources of assistance & industrial sanctioning procedure; Concept of SDG; SDG 4,8 .

DETAIL DESCRIPTIONTheory :**1. Understand the basic concept of entrepreneurship & entrepreneur.**

- 1.1 Define entrepreneurship & entrepreneur.
- 1.2 Discuss the characteristics and qualities of an entrepreneur.
- 1.3 Mention the classification of entrepreneur.
- 1.4 Discuss the necessity of entrepreneurship as a career.
- 1.5 Discuss the prospect of entrepreneurship development in Bangladesh.

2. Understand the concept of entrepreneurship and economic development.

- 2.1 Define economic development.
- 2.2 Discuss the economic development process.
- 2.3 Discuss the capital accumulation or rate of savings.
- 2.4 Discuss the role of entrepreneur in the technological development and their introduction into production Process.
- 2.5 Discuss the entrepreneur in the discovery of new product.
- 2.6 Discuss the discovery of new markets.

3. Environment for entrepreneurship development:

- 3.1 Define the micro environment.
- 3.2 Discuss individual income, savings and consumption.
- 3.3 Define macro environment.
- 3.4 Discuss political, socio-cultural, economical, legal and technological environment.
- 3.5 Difference between micro and macro environment .

4. Understand the concept of entrepreneurship in the theories of economic growth.

- 4.1 Define entrepreneurship in the theories of economic growth.
- 4.2 Discuss the Malthusian theory of population and economic growth.
- 4.3 Discuss the stage theory of growth.
- 4.4 Discuss the Schumpeterian theory of economic development.
- 4.5 Discuss the entrepreneurship motive in economic development.

5. Understand the sources and evaluation of venture ideas in Bangladesh.

- 5.1 Define sources of venture ideas in Bangladesh.
- 5.2 Discuss different types of sources of venture ideas in Bangladesh.
- 5.3 Define evaluation of venture ideas.
- 5.4 Discuss the factors that influence the selection of venture idea.

6. Understand the concept of project selection and financial planning.

- 6.1 Define project.
- 6.2 Discuss the idea of project.
- 6.3 Describe the guide lines for project ideas.
- 6.4 Discuss the sources of project ideas.
- 6.5 Discuss the evaluation of project ideas.
- 6.6 Describe the technical aspect of project.
- 6.7 Define financial planning.
- 6.8 Discuss the long term financial plan.
- 6.9 Discuss the short term financial plan.

7. Understand the concept of self employment.

- 7.1 Define self employment.
- 7.2 Describe different types of employment.
- 7.3 Describe the importance of business as a profession.
- 7.4 Discuss the reasons for success and failure in business.

8. Understand the business plan and the concept of the environment for entrepreneurship.

- 8.1 Define business plan.
- 8.2 Describe the importance of business plan.
- 8.3 Discuss the contents of business plan.
- 8.4 Define environment of business.
- 8.5 Describe the factors which effect environment on entrepreneurship

9. Understand the concept of sources of assistance & industrial sanctioning procedure.

- 9.1 Define sources of assistance.
- 9.2 Describe different types of sources of assistance.
- 9.3 Discuss the aid of sources.
- 9.4 Discuss the industrial policy.
- 9.5 Define foreign aid.

10. Understand the insurance and premium.

- 10.1 Define insurance and premium
- 10.2 Describe the essential conditions of insurance contract.
- 10.3 Discuss various types of insurance.
- 10.4 Distinguish between life insurance and general insurance.

11. Understand the concept of Sustainable Development Goals (SDG)

- 11.1 Define Sustainable development
- 11.2 State UN targets of MDG
- 11.3 State UN targets of SDG
- 11.4 Describe the importance of SDG
- 11.5 Explain the objectives of SDG
- 11.6 State the Challenges to achieve SDGs
- 11.7 Explain the actions to face the challenges of SDGs
- 11.8 State the of 7th 5 years plan
- 11.9 Mention the link of 7th 5 years plan with SDGs
- 11.10 Write down the 5 ps of sustainable development goals

12. Understand SDG 4,8 and 17

- 12.1 Describe SDG 4 and its targets
- 12.2 State the elements of Quality education for TVET
- 12.3 Describe the gender equality and equal access of TVET for economic growth
- 12.4 Describe SDG 8 and its targets
- 12.5 Explain Green development, Green Economy, Green TVET & Green Jobs
- 12.6 Explain the role an entrepreneur for achieving SDG

Reference book :

1. A hand book of new entrepreneur-by p.c jain.
- 2.A manual on business opportunity Identification and selection-by j.B patel and S S modi.
- 3.Uddokta unnoyan Nirdeshika -Md.Sabur khan.
- 4.Entrepreneurship- bashu and mollik.
- 5.Business Entrepreneurship-kage faruke.
6. Website, Youtube and Google