BANGLADESH TECHNICAL EDUCATION BOARD

Agargaon, Dhaka-1207.

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

COMPUTER SCIENCE & TECHNOLOGY

TECHNOLOGY CODE: 685

FIRST SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

Computer Science & Technology 1st Semester

Sl. No	Subject Code	Name of the subject	T	P	C	Marks				
						Theory		Practical		Total
						Cont. assess	Final exam	Cont. assess	Final exam	
1	66612	Computer Laboratory Practices	0	6	2	0	0	50	50	100
2	65811	Social Science	3	0	3	60	90	0	0	150
3	65812	Physical Education & Life Skill Development	0	3	1	0	0	25	25	50
4	65911	Mathematics-1	3	3	4	60	90	50	0	200
5	65913	Chemistry	3	3	4	60	90	25	25	200
6	66611	Computer Application	0	6	2	0	0	50	50	100
7	66712	Electrical Engineering Fundamentals	3	3	4	60	90	25	25	200
Total			12	24	20	240	360	225	175	1000

66612 **Computer Laboratory Practices** **T P C**
0 6 2

OBJECTIVES

SHORT DESCRIPTION

DETAIL DESCRIPTION

1. Assemble a PC

1.1 Prepare specification of the parts and components of a PC

1.1.1 Parts and components are listed
1.1.2 Specification are prepared and written
1.1.3 Costing of the PC parts and accessories are estimated

1.2 Prepare hardware for assemble

1.2.1 Hardware, parts and components are collected as per specification and documented Or Required PC components are collected from store according to the manual or user guide or clients requirement
1.2.2 PC equipment is Isolated from electrical source before assembling
1.2.3 Electrostatic discharge precautions are observed
1.2.4 Safe work practice observed and personal protective equipment (PPE) worn as required
1.2.5 Tools and equipment are selected and collected as required
1.2.6 Modification of check list is observed

1.3 Install PSU and Assemble motherboard components into the casing

1.3.1 PC power supply unit (PSU) is installed in casing
1.3.2 Processor, processor heat sink and cooling fan are installed to the motherboard
1.3.3 RAM module are installed into the motherboard
1.3.4 Motherboard is set to the casing
1.3.5 Other peripherals are installed
1.3.6 WiFi adapter is installed
1.3.7 AGP,NIC and Sound card is installed as required

1.4 Install storage devices and electrical connection to the PC

1.4.1 Hard disk, optical drive (CD/DVD R/W drive),are installed
1.4.2 Power and data cables are properly connected
1.4.3 Front panel power switch, front or back panel USB port status LED's etc. are properly connected
1.4.4 Motherboard is connected with power supply

1.5 Assemble the system unit

1.5.1 All connections are checked
1.5.2 Screwing is observed
1.5.3 Installation is completed by setting and screwing the cover

1.6 Connect Input and output units

1.6.1 Ensure power switch is switched off
1.6.2 PC system unit is connected to the electrical power line
1.6.3 Display unit (monitor) is connected to the electrical power line

1.7 Modify the BIOS setting

1.7.1 Power switch is switched On
1.7.2 Entered to the BIOS setting
1.7.3 Date and Time is adjusted
1.7.4 Correct processor and memory clock frequency is chosen
1.7.5 Hard disk and CD/DVD interface is selected correctly
1.7.6 Boot device sequence is modified as required
1.7.7 Change and modification are saved
1.7.8 Exit from the BIOS setting

1.8 Install operating system and required device driver

1.8.1 Operating system container is connected or entered to the drive of the PC
1.8.2 Installation is started
1.8.3 Hard disk partition is done correctly
1.8.4 Operating system is configured and installed
1.8.5 Required device driver is installed
1.8.6 System information is observed and cross checked with the requirements check list

1.9 Shut-down and clean work place

1.9.1 Operating system is shut down properly
1.9.2 Computer is switched off
1.9.3 Tools and equipment is cleaned and stored as per workplace standard
1.9.4 Waste materials are disposed as per workplace practice.

2. Install and configure custom software in a personal computer

2.1 Follow Electrical and Electronic safety in work

2.1.1 PC equipment is isolated from electrical source when assembling
2.1.2 Electrostatic discharge precautions are observed
2.1.3 Safe work practice observed and personal protective equipment (PPE) worn as required for the work performed

2.2 Determine client requirements

2.2.1 User requirements for software and hardware are documented.
2.2.2 Analyze user requirements and list of PC components and their costs are determined
2.2.3 Components and budget are verified with the Client
2.2.4 Approval of components and required budget from the client is confirmed
2.2.5 PC hardware and software components are collected and stored according to user manual or guidelines

2.3 Install hardware components

2.3.1 Ensure that computer power is switched off
2.3.2 Software container is inserted in appropriate to PC or drives
2.3.3 I/O slot or Hardware components are connected to the appropriate port(s)
2.3.4 PC and peripherals are connected with the AC power line if external power is required.
2.3.5 System automatically detected the hardware and device driver is installed
2.3.6 Vendor's given or from internet device driver is installed and configured
2.3.7 Correct functioning of hardware component is confirmed

2.4 Install software components

2.4.1 Identify if older version of the software component is exists
2.4.2 If older version is already installed, software component is upgraded
2.4.3 Fresh installation of the software component is done
2.4.4 Documented the changes or modification of the system
2.4.5 Installed/updated software component is checked to work correctly

2.5 Determine user satisfaction and documentation

2.5.1 User requirements for software and hardware are verified
2.5.2 User satisfaction is recorded
2.5.3 Confirmation of completion of work is documented.

3. Use peripherals(Printer, Scanner and Projector) with PC/ Laptop

3.1 Install Printer with PC

3.1.1 Safety measures are identified and taken
3.1.2 Printer is selected and placed in appropriate places
3.1.3 External connectors, setting and controls are identified and interpreted using user manual
3.1.4 Necessary connection of the cables are confirmed
3.1.5 Driver software are installed or printer is added
3.1.6 Installed printer is found or checked.

3.2 Print documents using the installed printer

3.2.1 Document is Opened
3.2.2 Appropriate printer is selected
3.2.3 Necessary configuration and settings are performed
3.2.4 Document is printed
3.2.5 Buffer is cleared for any irregularities
3.2.6 Power switch is turn safely

3.3 Replace the tonner of the printer

3.3.1 Appropriate tonner is selected
3.3.2 Cartage/Tonner/ Ribbon is prepared using user manual for installation to the printer
3.3.3 Old Cartage/Tonner/Ribbon is removed
3.3.4 New cartage/tonner /ink ribbon is Installed
3.3.5 Test print is performed to check the print /print quality

3.4 Install Scanner into the PC

3.4.1 Safety measures are identified and taken
3.4.2 Scanner is selected and placed in appropriate places
3.4.3 External connectors ,setting and controls are identified and interpreted using user manual
3.4.4 Necessary connection of the cables are confirmed
3.4.5 Driver software are installed or scanner is added to
3.4.6 Installed scanner is found or checked.

3.5 Scan picture/ documents using the installed scanner

3.5.1 Document / picture / drawing object is collected and selected
3.5.2 Document/picture is placed in scanner plate properly

3.5.3 Appropriate scanner is selected
3.5.4 Necessary configuration and settings are performed
3.5.5 Necessary file type is selected
3.5.6 Document / picture / drawing is scanned
3.5.7 Scanned document is saved in proper drive/ folders
3.5.8 Maintain proper action for any irregularities
3.5.9 Power switch is turn off safely

3.6 Install Multimedia Projector with PC/ Laptop

3.6.1 Safety measures are identified and taken
3.6.2 MMP is selected and external connectors, setting and controls are identified and interpreted using user manual
3.6.3 MMP is placed in appropriate places for proper projection
3.6.4 Necessary connection of the cables are confirmed
3.6.5 Turn on the projector and pc properly
3.6.6 Installed MMP is found or checked.
3.6.7 Necessary configuration and settings are performed
3.6.8 Ensure the connection for laptop
3.6.9 Use fn and appropriate function key if necessary for laptop connection

3.7 Use and maintain the projector

3.7.1 Document / picture / drawing object is opened
3.7.2 MMP controls and setting are adjusted
3.7.3 Projector screen is set.
3.7.4 Focus control is adjusted
3.7.5 Use projector
3.7.6 Turn off projection after a definite time to save life time of bulb.
3.7.7 Maintain proper action for any irregularities
3.7.8 Power switch is turn off safely.

4. Connect a PC to an existing network

4.1 Follow workplace health and safety – OSH

4.1.1 Electrical isolation is maintained at the time of installation of the network equipment
4.1.2 Electrical hazard is avoided at all times
4.1.3 Safe work practice observed and personal protective equipment (PPE) worn as required for the work performed

4.2 Collect existing network specification

4.2.1 The person in the organization responsible for existing network is interviewed.
4.2.2 Existing network topology and network protocol is reviewed and documented
4.2.3 Existing network topology and IP is reviewed and documented
4.2.4 Network address plan is documented

4.3 Determine client network hardware and software components are required

4.3.1 Hardware and software components are determined
4.3.2 Cost of components is determined
4.3.3 Approval of components and confirmation of required budget is obtained from the client

4.4 Connect PC to the existing network

4.4.1 Network hardware and hardware driver software (if not automatically installed) is installed

4.4.2 Existing network transmission media is determined. e.g.; wireless, wired

4.4.3 Appropriate transmission media is connected with the existing network Infrastructure

4.5 Assign client machine address

4.5.1 Address is assigned to client machine (automatically or statically. e.g.; assign IP address, sub net mask statically in the case of TCP/IP protocol)

4.5.2 Conflict of network interface card is assessed

4.5.3 Domain name assigned if required.

4.5.4 Host name assigned if required.

4.5.5 Network interface card (NIC) is disabled and enabled

4.6 Test network connectivity

4.6.1 Test is done using simple network connectivity tools like ping, local loop-back and remote loop-back

4.6.2 If loop-back test fails, network interface card, connecting wire (continuity) is tested.

65811	SOCIAL SCIENCE	T	P	C
		3	0	3

OBJECTIVES:

To provide opportunity to acquire knowledge and understanding on:

- importance of civics and its relationship with other social sciences;
- the relationship of an individual with other individuals in a society;
- social organizations, state and government;
- rule of law, public opinion and political parties;
- UNO and its roles;
- the basic concepts and principles of economics and human endeavor in the economic system;
- the realities of Bangladesh economy and the current problems confronting the country;
- the role of Diploma Engineers in industries;
- our motherland and its historical background;
- good citizenship through practicing our socio- economic culture;
- liberation war and its background;
- nationalism and life style of the nation;

SHORT DESCRIPTION:

Civics and Social Sciences; Individual and Society; Nation and Nationality; Citizenship; State and government; Law; Constitution; Government and its organs; Public Opinion; Political Party; UNO and its organs;
Scope and importance of Economics; Basic concepts of Economics- Utility, Wealth, Consumption, income wages, salary, value in use and savings; Production – meaning, nature, factors and laws; Demand and Supply; market equilibrium, national income, Current economic problems of Bangladesh; Role of Diploma Engineers in the economic development of Bangladesh; Occupations and career planning; Engineering team.

DETAIL DESCRIPTION:

1. **Understand the meaning and scope of civics and interrelations of social science.**
   - 1.1 Define civics and social science.
   - 1.2 Explain the importance of civics in the personal and social life of an individual.
   - 1.3 Describe the relationship of all social science (civics, economics, political science, sociology, ethics).

2. **Understand the relationship of the individual with the society, Nationality and nation, Rights and duties of a citizen.**
   - 2.1 Define the concept (individual, society, socialization, Nation, Nationality, citizen and citizenship).
   - 2.2 State the relationship among the individuals in the society.
   - 2.3 Discuss the methods of acquiring citizenship and state the causes of losing citizenship.
   - 2.4 Describe the rights of a citizen and state the need for developing good citizenship.

3. **Appreciate the relationship between the state and government, law and organs of government.**
   - 3.1 Define state, government and law.
   - 3.2 Discuss the elements of state.
   - 3.3 Discuss the classification of the forms of government.
   - 3.4 Distinguish between cabinet form of Government and presidential form of government.
   - 3.5 Describe the main organs of Government (legislature, Executive and judiciary).
   - 3.6 Discuss the sources of law.

4. **Understand and the classification of constitution.**
   - 4.1 Define constitution.
   - 4.2 Explain the deferent forms of constitution.
   - 4.3 Explain the salient feature of Bangladesh constitution.
   - 4.4 Define the fundamental rights of Bangladesh constitution.
   - 4.5 Describe the meaning of human rights.

5. **Understand the role of UNO in maintaining world peace.**
   - 5.1 Explain the major functions of UNO.
   - 5.2 State the composition and functions of General Assembly.
   - 5.3 Describe the composition and functions of Security Council.
   - 5.4 Discuss the role of Bangladesh in UNO.

6. **Understand the role of Ethics values and good governance.**
   - 6.1 Define the values, ethics and good governance.
   - 6.2 Discuss the role of government to establish good governance.

7. **Understand the fundamental concepts of economics.**
   - 7.1 Define Microeconomics and Macroeconomics.
   - 7.2 Discuss the definition of economics as given by eminent economists.
   - 7.3 Describe the importance of economics for Technical Student.
   - 7.4 Define commodity, utility, value, wealth, consumption, income, savings, wages, value in use, value in exchange and salary.
   - 7.5 Differentiate between value in use and value in exchange.
   - 7.6 Explain wealth with its characteristics.

8. **Understand the production process and the concept of the law of diminishing returns in the production process.**
   - 8.1 Discuss production mode and process
   - 8.2 Explain the nature of different factors of production.
   - 8.3 Discuss production function.
   - 8.4 Discuss the law of diminishing returns.
   - 8.5 State the application and limitations of the law of diminishing returns.
   - 8.6 Describe the law of production (increasing constant and diminishing).

9. **Understand the concept of demand, supply and utility.**
   - 9.1 Define the term, “demand and supply”.
   - 9.2 Explain the law of demand and supply.
   - 9.3 Draw the demand and supply curve.
   - 9.4 Discuss market equilibrium.
   - 9.5 Define the utility, total and marginal utility
   - 9.6 Illustrate the law of diminishing utility.
   - 9.7 Explain the law of diminishing marginal utility.

10. **Understand national income.**
    - 10.1 Define national income.
    - 10.2 Explain how to measure national income.
    - 10. 3Discuss GNP, GDP and NNP.
    - 10.4 Discuss economic development and growth.

11. **Understand the current issues and the availability and use of natural resource in the economic development of Bangladesh.**
    - 5.1 Define rural and urban economics.

5.2 Identify major problems of rural and urban economy.

5.3 Explain the migration of rural population to urban areas.

5.4 List of the Natural resource of Bangladesh and classify them according to sources of availability.

5.5 Explain the importance of the mine, forest and water resources and potential uses for sustainable development.

12. Understand role of a Diploma Engineer in the development of Bangladesh economy.

6.1 Explain the concept of the term, "Engineering team"

6.2 Identify the functions of Engineers, Diploma Engineers and Craftsmen forming the engineering team.

6.3 Discuss the role of a Diploma Engineer in the overall economic development of Bangladesh.

6.4 Explain socio-economic status of a Diploma Engineer.

Bangladesh: History & Culture

১৩. ইতিহাস

১৩.১ ইতিহাসের সংজ্ঞা।

১৩.২ বাংলাদেশের আবহাওয়া ও অধিবাসী।

১৩.৩ বাংলায় ইংরেজ শাসন ক্ষমতালাভ ও প্রতিষ্ঠা।

১৩.৪ ব্রিটিশ বিরোধী সশস্ত্র প্রতিরোধ আন্দোলন; সংস্কার আন্দোলন ও জাতীয়তাবাদের বিকাশ এবং বাংলার নবজাগরণ; বঙ্গভঙ্গ ও বঙ্গভঙ্গ উত্তরকালে বাংলার রাজনীতি ও দেশ বিভাগ।

১৩.৫. পাকিস্তান আমলে বাংলাদেশ, বঙ্গবন্ধুর নেতৃত্বে বাংলাদেশের মুক্তি সংগ্রাম ও স্বাধীনতালাভ।

১৪. সংস্কৃতি

১৪.১ সংস্কৃতি।

১৪.২ সভ্যতার সংজ্ঞা।

১৪.৩ সংস্কৃতির প্রকরণ।

১৪.৪ ভাষা আন্দোলন উত্তর বাংলার সংস্কৃতি।

১৪.৫ স্বাধীনতা উত্তর বাংলাদেশের সংস্কৃতির বিবর্তন।

১৪.৬ বাংলাদেশের সংস্কৃতিতে প্রত্নতাত্ত্বিক নিদর্শন ও ক্ষুদ্র নৃতাত্ত্বিক গোষ্ঠীসমূহ।

সহায়ক পুস্তক

১. হক, মোজাম্মেল "পৌরনীতি"– হাসান বুক হাউস।

২. প্রফেসর এমাজউদ্দিন "রাষ্ট্রবিজ্ঞান" আজিজিয়া লাইব্রেরী।

৩. আলী, মাসুম "অর্থনীতি"।

৪. চক্রবর্তী, মনতোষ– "প্রিন্সিপলস অব ইকোনোমিক্স"।

৫. মার্শাল, আলফ্রেড–" প্রিন্সিপলস অব ইকোনোমিক্স" ।

৬. রহমান, আনিসুর –"অর্থনীতি"।

৭. রহিম, চৌধুরী, মাহমুদ ও ইসলাম, "বাংলাদেশের ইতিহাস(পরিবর্ধিত ও পরিমার্জিত)"; নওরোজ কিতাবিস্তান, ১৯৯৯।

৮. কে, আলী"বাংলাদেশের ইতিহাস"; আজিজিয়া বুক ডিপো, ২০০১।

৯. সিরাজুল ইসলাম, "বাংলাদেশের ইতিহাস-১৭০৪-১৯৭১"; ১ম, ২য় ও ৩য় খন্ড; বাংলাদেশ এশিয়াটিক সোসাইটি, ২০০০।

১০. কো-আন্তোনভা, প্রি, কতোভস্কি, "ভারত বর্ষের ইতিহাস"; প্রগতি প্রকাশন, ১৯৮৮।

১১. গোপাল হালদার; "সংস্কৃতির রূপান্তর"; মুক্তধারা, ১৯৮৪।

১২. মোতাহের হোসেন চৌধুরী, "সংস্কৃতি কথা"; নওরোজ কিতাবিস্তান, ১৯৯৮।

১৩. গোপাল হালদার, "বাংলা সাহিত্যের রূপরেখা-১ম ও ২য় খন্ড"; মুক্তধারা।

65812 PHYSICAL EDUCATION & LIFE SKILL DEVELOPMENT

T	P	C
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OBJECTIVES:

- To enhance body fitness.
- To make aware of First aid procedure.
- To acquaint with the common games and sports.
- To develop Life Skill.

SHORT DESCRIPTION

Warm up; Yoga; Muscle developing with equipment; Meditation, First aid; Sports science, Games & sports; Life skill development.

DETAIL DESCRIPTION

1. Recite national anthem and make assembly

1.1 line and file.
1.2 Make assembly.
1.3 Recitation of national anthem.
1.4 National anthem in music.

2. Conduct warm up.

2.1 Conduct general warm up :
Spot running (Slow, Medium & Fast), Neck rotation, Hand rotation, Side twisting, Toe touching, Hip rotation, Ankle twisting, Sit up and Upper body bending (Front & Back).

2.2 Conduct squad drill :
Line, File, Attention, Stand at ease, Stand easy, Left turn, Right turn, About turn, Mark time, Quick march, Right wheel, Left wheel, Open order march & Closed order march.

2.3 Conduct specific warm up :
Legs raising one by one, Leg raising in slanting position, Knee bending and nose touching, Heels raising, Toes touching (standing and laying position), Hand stretch breathing (Tadasana, Horizontal, Vertical).

2.4 Conduct mass physical exercise
Hand raising, Side twisting, Front & back bending, Front curl, Straight arm curl two hand, Hands raising overhead and Push up.

3. Conduct YOGA.

3.1 Dhyanasan : Shabasan, Padmasan, Gomukhasan, Sharbangasan, Shashangasan, Shirshasan
3.2 Shasthyasan : Halasan, Matshasan, Paban Muktasan, Ustrasan.
3.3 Prana and Pranayama: Nadisuddhi Pranayma, cooling pranayamas (sitali pranayama, Sitkari Pranayama, Sadanta pranayama), Ujjayi pranayama,

4. Exercise Muscle developing with equipment.

4.1 Practice Damball: Front curl, Hand sidewise stretching, Arms raising overhead.
4.2 Practice Barball: Front press, Leg press, rowing motion with leverage bar.
4.3 Practice Rope climbing: Straight way climbing, Leg raising climbing.
4.4 Practice Horizontal bar: Chinning the bar with front grip, chinning the bar with wide back grip.
4.5 Practice Jogging Machine: Slow, Medium, and Fast running.
4.6 Practice A. B king pro (Rowing Machine): Sit up.
4.7 Practice Sit up bench: Sit up.

5. Conduct Meditation.

5.1 Define meditation.
5.2 Classification of Meditation.
5.3 Nadanusandhana (A-Kara chanting, U-Kara chanting, M-Kara chanting, AUM-kara chanting.
5.4 OM-Meditation.
5.5 Cyclic Meditation (Starting Prayer, Instant Relaxation Technique, Centering, Standing Asanas, Sitting Asanas, Quick Relaxation Technique).

6. Demonstrate First Aid Skill.

6.1 Define First aid.
6.2 Know First aider.
6.3 Discuss the responsibilities of a First aider.
6.4 Identify different types of equipment of First aid.
6.5 Practice Muscle Cramp-Ice applications (Remedy).
6.7 Practice dislocation-Ice application (Remedy).

7. Exercise Rules and technique of following games and sports.

7.1 Kabadi.
7.2 Football.
7.3 Cricket.
7.4 Badminton.
7.5 Athletics.
7.6 Swimming.

8. Sports Science.

8.1 Define exercise physiology.
8.2 State the function of muscles.
8.3 Know the concept of work, energy and power.
8.4 Express the effect of exercise on heart and circulatory system.
8.5 Show the motor components for physical fitness.
8.6 Define sports biomechanics.
8.7 Define sports psychology.
8.8 State the meaning of nutrition, diet and balanced diet.
8.9 State the meaning of the terms –test, measurement and evaluation.

9. Show skill on conversation on day to day life of the following:

9.1 Today's market price.
9.2 Festivals (religious festivals, National festivals).
9.3 Celebration of National days.
9.4 Aim in life.
9.5 Visite to historical places/sites.

10. Understand human relation.

10.1 Define family relation.
10.2 Know the relation with neighbor.
10.3 Identify humanitarian service.
10.4 Explain service for handicapped (intelligent, physical, social etc).
10.5 Explain service for orphan/patient.

11. Experience vote of appreciation.

11.1 About dress.
11.2 For good work.
11.3 For good result.

11.4 For good news.

12. Practice stress management.

12.1 Grow habit to be a man of humor.
12.2 Always keep brain cool.
12.3 Run with positive thinking.
12.4 Explain factors that determine our attitude.
12.5 State the benefits of a positive attitude.
12.6 Follow steps to building a positive attitude.

13. Practice time management.

13.1 Determine essential time for a task.
13.2 Determine delay and unexpected time.
13.3 Determine time for daily activities.
13.4 Plan for daily activities.

14. Play roll to conduct interview technique on:

14.1 Mental preparation to face an interview.
14.2 Selection of dress for interview.
14.3 Introducing himself/herself to the interviewer.
14.4 Coping interview.

15. Practice team work on:

15.1 Organize a team.
15.2 Select a team leader.
15.3 Distribute the task to the members.
15.4 Accept opinion of team members.
15.5 Complet the task as a team.

16. Practice social work.

16.1 Exercise tree plantation.
16.2 Exercise community service.
16.3 Rover Scout.
16.4 Sanitation.
16.5 Pure drinking water.
16.6 Social Culture.

REFERENCE BOOK:

Modern Yoga _ Kany Lal Shah
Rules of games and sports _ Kazi Abdul Alim
Yoga _ Sobita Mallick
Iron Man _ Nilmoni Dass

65911 **MATHEMATICS-1** **T P C**
3 3 4

OBJECTIVES:

- To acquaint the students with the basic terminology of Algebra.
- To be able to understand the complex numbers which are being used in electrical engineering.
- To be able to understand the binomial expansion.
- To be able to use the knowledge of trigonometry in solving problems of engineering importance.

SHORT DESCRIPTION:

Algebra: AP & GP, polynomials & polynomial equations, complex number, permutation & combination, binomial theorem for positive integral index and negative & fractional index.

Trigonometry: ratio of associated angles, compound angles, transformation formulae, multiple angles and sub-multiple angles.

DETAIL DESCRIPTION:

1 Understand the concept of AP & GP.
- 1.1 Define AP and common difference.
- 1.2 Find last term and sum of n terms, given first term and common difference.
- 1.3 Define GP and common ratio.
- 1.4 Find the sum of n terms given first and common ratio.

2 Apply the concept of polynomial in solving the problems.
- 2.1 Define polynomials and polynomial equation.
- 2.2 Explain the roots and co-efficient of polynomial equations.
- 2.3 Find the relation between roots and co-efficient of the polynomial equations.
- 2.4 Determine the roots and their nature of quadratic polynomial equations.
- 2.5 Form the equation when the roots of the quadratic polynomial equations are given.
- 2.6 Find the condition of the common roots of quadratic polynomial equations.
- 2.7 Solve the problems related to the above.

3 Understand the concept of complex numbers.
- 3.1 Define complex numbers.
- 3.2 Perform algebraic operation (addition, subtraction, multiplication, division, square root) with complex number of the form a + ib.
- 3.3 Find the cube roots of unity.
- 3.4 Apply the properties of cube root of unity in solving problems.

4 Apply the concept of permutation.
- 4.1 Explain permutation.
- 4.2 Find the number of permutation of n things taken r at a time when,
  - i) Things are all different.
  - ii) Things are not all different.
- 4.3 Solve problems related to permutation:

i) Be arranged so that the vowels may never be separated.

ii) From 10 men and 6 women a committee of 7 is to be formed. In how many ways can this be done so as to include at least two women in the committee.

5 Apply the concept of Combination.
- 5.1 Explain combination.
- 5.2 Find the number of combination of n different things taken r at a time.
- 5.3 Explain nCr, nCn, nC0

5.4 Find the number of combination of n things taken r at a time in which p particular things
i) Always occur ii) never occur.
5.5 Establish i) nCr = nCn-r
ii) nCr + nCr-1 = n+1Cr
5.6 Solve problems related to the combination.

6 Apply partial fractions to break the numerator and denominator.
6.1 Define proper and improper fractions.
6.2 Resolve into partial fraction of the following types:
a) Denominator having a non-repeated linear factor.
b) Denominator having a repeated linear factor.
c) Denominator having a quadratic factor.
d) Denominator having a combination of repeated, non repeated and quadratic factors.

7 Apply the concept of the binomial theorem.
7.1 State binomial expression.
7.2 Express the binomial theorem for positive index.
7.3 Find the general term, middle term, equidistant term and term independent of x.
7.4 Use binomial theorem to find the value of
i) $(0.9998)^2$, correct to six places of decimal.
ii) $(1+\sqrt{2})^5 - (1-\sqrt{2})^5$

8 Apply the concept of the binomial theorem for negative index.
8.1 Express the binomial theorem for negative and fractional index.
8.2 Solve problems of the following types:
Expand (i) $(1-nx)^{-\frac{1}{n}}$ (ii) $\frac{1}{\sqrt{4.08}}$

9 Apply the concept of associated angles.
9.1 Define associated angles.
9.2 Find the sign of trigonometrical function in different quadrants.
9.3 Calculate trigonometrical ratios of associated angle.
9.4 Solve the problems using above.

10 Apply the principle of trigonometrical ratios of compound angles.
10.1 Define compound angles.
10.2 Establish the following relation geometrically for acute angles.
i) $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$.
ii) $\cos(A \pm B) = \cos A \cos B \pm \sin A \sin B$.
10.3 Deduce formula for tan (A ± B), Cot (A ± B).
10.4 Apply the identities to work out the problems:
i) Find the value of sin 750, tan 750.
ii) Show that $\frac{\sin 75^\circ + \sin 15^\circ}{\sin 75^\circ - \sin 15^\circ} = \sqrt{3}$
iii) if $\alpha + \beta = \theta$, $\tan\alpha + \tan\beta = b$, $\cot\alpha + \cot\beta = a$,
Show that $(a - b) = ab \cot\theta$.

11 Apply sum and product formula of trigonometrical ratios.
11.1 Express sum or difference of two sines and cosines as a product and vice-versa
11.2 Solve problems of the Following types:
i) Show that, $\sin 55^\circ + \cos 55^\circ = \sqrt{2}\cos 10^\circ$
ii) Prove that, $\cos 80^\circ \cos 60^\circ \cos 40^\circ \cos 20^\circ = \frac{1}{16}$

12 Apply the concept of ratios of multiple angles.
12.1 State the identities for sin 2A, cos 2A and tan 2A.
12.2 Deduce formula for sin 3A, cos 3A and tan 3A.

12.3 Solve the problems of the following types.

i) express cos 5θ in terms of cos θ.

ii) if tan α = 2 tan β, show that, tan (α + β) = $\frac{3 \sin 2\alpha}{1 + 3 \cos 2\alpha}$

13 Apply the concept of ratios of sub-multiple angles.

13.1 Find mathematically the identities for sin α, cos α and tan α in terms of $\frac{\alpha}{2}$ and $\frac{\alpha}{3}$

13.2 Solve the problems of the type:

find the value of cos 3°, cos 6°, cos 9°, cos 18°, cos 36° etc.

REFERENCE:

SL No	Author	Title	Publication
01	S. P Deshpande	Mathematics for Polytechnic Students	Pune Vidyarthi Graha Prakashan
02	H. K. Das	Mathematics for Polytechnic Students (Volume I)	S.Chand Prakashan
03	Ashim Kumar Saha	Higher Mathematics	Akshar Patra Prakashani
04	S.U Ahamed & M A Jabbar	Higher Mathematics	Alpha Prakashani

65913	CHEMISTRY	T	P	C
		3	3	4

OBJECTIVES:

1. To understand mole concept and volumetric analysis.
2. To represent the formation of bonds in molecules.
3. Able to select appropriate materials used in construction.
4. Apply knowledge to enhance operative life span of engineering material and structure by various protective methods.

SHORT DESCRIPTION:

Chemistry is a basic science subject which is essential to all engineering courses. It gives knowledge of engineering material, their properties related application and selection of material for engineering application. It is intended to teach student the quality of water and its treatment as per the requirement and selection of various construction materials and their protection by metallic and organic coatings. The topics covered will provide sufficient fundamental as well as background knowledge for the particular branch.

DETAIL DESCRIPTION:

1. Understand Atomic Structure and Chemical Bond.

1.1 Define element, atoms, molecules, Fundamental particle of atom, their mass, charge, location.
1.2 Define atomic number, mass number, Isotope, Isotone and Isobar.
1.3 Explain electronic configuration based on Hunds Rule, Aufbau's principle, Paulis exclusion principle.
1.4 Define atomic weight, equivalent weight of an element, molecular weight, mole in terms of number, mass, volume.
1.5 Define symbol, valency and formula.
1.6 Explain Chemical bond, octet rule.
1.7 Explain Formation of various types of chemical bonds: Covalent, Ionic, Co-ordinate bond.
1.8 Explain the bonding along with example CH_4, H_2, O_2, NaCl, $MgCl_2$.
1.9 Explain Quantum number, Orbit and Orbital.

2. Understand Ionic Equilibrium.

2.1 Explain the concept of acid, base, salt and types of salts.
2.2 Define pH, pOH, pH scale.
2.3 Distinguish between basicity of an acid and acidity of a base.
2.4 State normality, molarity, molality, volumetric analysis.
2.5 Explain Titration and Indicator.
2.6 Describe buffer solution and its mechanism.

3. Understand chemical reaction, oxidation and reduction.

3.1 Define Chemical reaction and explain the various types of chemical reaction.
3.2 Explain the full meaning of a chemical equation.
3.3 State the concept of catalyst.
3.4 Explain the modern concept of oxidation and reduction.
3.5 Describe the simultaneous process of oxidation and reduction.
3.6 Explain the oxidation number.

4. Understand Water Treatment.

4.1 State the concept of hard and soft water.
4.2 Define hardness of water.
4.3 Describe the softening method of permuted process and ion exchange resin process.
4.4 Mention the advantages and disadvantages of hard water in different industries.
4.5 Visit a water treatment plant write a report.

5. Understand Corrosion and Alloy.

5.1 Mention the types of corrosion(dry and wet corrosion).
5.2 Describe atmospheric corrosion, types of atmospheric corrosion and their mechanism, oxide films factors affecting atmospheric corrosion.
5.3 Explain electrochemical corrosion, mechanism of electrochemical corrosion, types of electrochemical corrosion. factors affecting electrochemical corrosion.
5.4. Explain protective measures against corrosion: Coating (Galvanic and Zinc, Organic coating agents, Electroplating, metal cladding)
5.5 Explain the concept of alloy.

6. Understand the Concept of Organic Chemistry and Introduction to polymers.

6.1 Mention types of Chemistry.
6.2 Mention the catenation property of carbon.
6.3 State organic compounds, its properties and applications.
6.4 Explain the classification of organic compound by structure and functional group: Define Homologous series, Alkanes, Alkenes and Alkynes; properties and uses of general formula; Names and structure of first five members hydrocarbons.
6.5 Explain polymer, monomer, classification of polymers, polymerization, addition and condensation polymerization.
6.6 Define plastics and explain its types and uses.

7. Understand Glass and Ceramic.

7.1 Define glass and its constituents; classify glasses, give elementary idea of manufacturing process of glass.
7.2 Give introduction to ceramic materials and its constituent.
7.3 Describe industrial application of glass and ceramic.
7.4 Visit industry and write a report.

8. Understand Soap and Detergent.

8.1 Give introduction to Lipid, Fats and oils.
8.2 Explain saponification of fats and oils, manufacturing of soap.
8.3 Describe synthetic detergent, types of detergents and its manufacturing.
8.4 State exclusives: TNT, RDX, Dynamite.
8.5 Define paint and varnish.
8.6 Describe adhesives.

9. Cement, pulp and papers.

9.1 Classify cement and mention its uses and manufacturing process.
9.2 Describe manufacturing process of pulp and papers.
9.3 Conduct industry visit and reporting.

PRACTICAL:

1. Practice the use of laboratory tools and safety measures.

2. Conduct observation and measurement.

2.1 Determine the strength of HCl solution using 0.1N Na_2CO_3
2.2 Determine the strength of NaOH by using 0.1N HCl solution.

3. Perform qualitative analysis of known and unknown salts.

3.1 Identify known salt (sample Copper, Iron, Aluminum, led, Ammonium and Zinc salt.)
3.2 Identify unknown basic radical (e.g. led, Copper, Iron, Zinc, Aluminum, Ammonium)
3.3 Identify unknown acid radicals (e.g. Chloride, Nitrate, Sulphate, Carbonate)

REFERENCE BOOKS:

1. Higher secondary Chemistry (paper 1st and 2nd) -Dr.Gazi Md.Ahsanul Karim. And Md.Robiul Islam
2. Higher secondary Chemistry (Paper 1st and 2nd) -Dr.Soroz kanti Singha Hazari .
3. An Introduction to Metallic corrosion and its prevention - Raj Narayan.
4. Organic Chemistry - Morrisson and Boyad.
5. Inorganic Chemistry - Ali Haider

66611 COMPUTER APPLICATION

T	P	C
0	6	2

OBJECTIVES

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SHORT DESCRIPTION

DETAIL DESCRIPTION

1. Operate a personal Computer

1.1 Start up a Computer

1.1.1 ***Peripherals*** are checked and connected with system unit.
1.1.2 Power cords / adapter are connected properly with computer and power outlets socket.
1.1.3 Computer is switched on gently.
1.1.4 PC ***desktop / GUI settings*** are arranged and customized as per requirement.

1.2 Operate Computer

1.2.1 Files and folders are created.
1.2.2 Files and folders are ***manipulated*** as per requirement.
1.2.3 Properties of files and folders are viewed and searched.
1.2.4 Control panel settings are practiced.
1.2.5 ***Memory devices*** are formatted as per requirement.

1.3 Shutdown computer

1.3.1 Unsaved file and folders are closed
1.3.2 Open software is closed and hardware devices are switched off.
1.3.3 Computer is switched off gently.
1.3.4 Power at the respective power outlets is switched off.

2. Type text and documents in English and Bangla.

2.1 Install the Typing Tutor software

2.1.1 Required ***Hardware*** and ***software*** are ready to use.
2.1.2 Typing tutor software are collected and selected.
2.1.3 English Typing tutor software is installed.
2.1.4 Specialized Bangla Typing tutor software is installed.

2.2 Practice text typing in English and Bangla

2.2.1 Typing tutor software is started.
2.2.2 English Home key drilling are practiced systematically
2.2.3 Intermediate level typing speed(25 cps) are achieved.
2.2.4 Specialized Bangla Typing tutor / software are installed.
2.2.5 Bangla Home key typing are practiced systematically.
2.2.6 Text documents are typed repeatedly for increasing typing speed.

2.3 Type documents

2.3.1 ***Word processor*** is started.
2.3.2 Text document are typed.
2.3.3 Intermediate level typing speed (30 cps) in English and (20 cps) in Bangla are achieved.

3. Operate Word Processing Application

3.1 Create documents:

3.1.1 Word-processing application are opened.
3.1.2 ***Documents*** are created.
3.1.3 Data are added according to information requirements.
3.1.4 Document templates Used as required.
3.1.5 Formatting tools are used when creating the document.
3.1.6 Documents are saved to directory.

3.2 Customize basic settings to meet page layout conventions:

3.2.1 Adjust page layout to meet information requirements
3.2.2 Open and view different toolbars.
3.2.3 Change ***font format*** to suit the purpose of the document.
3.2.4 Change alignment and line spacing according to document information requirements.
3.2.5 Modify margins to suit the purpose of the document.
3.2.6 Open and switch between several documents.

3.3 Format documents

3.3.1 Use formatting features and styles as required.
3.3.2 Highlight and copy text from another area in the document or from another active document.
3.3.3 Insert headers and footers to incorporate necessary data.
3.3.4 Save document in another ***file format.***
3.3.5 Save and close document to ***a storage device.***

3.4 Create tables:

3.4.1 Insert standard table into document.
3.4.2 Change cells to meet information requirements.
3.4.3 Insert and delete columns and rows as necessary.
3.4.4 Use formatting tools according to style requirements.

3.5 Add images:

3.5.1 Insert appropriate ***images*** into document and customize as necessary.
3.5.2 Position and resize images to meet document formatting needs.

3.6 Print information and Shutdown computer:

3.6.1 Printer is connected with computer and power outlet properly.
3.6.2 Power is switched on at both the power outlet and printer.
3.6.3 Printer is installed and added.
3.6.4 Correct printer settings are selected and document is printed.
3.6.5 Print from the printer spool is viewed or cancelled.
3.6.6 Unsaved data is saved as per requirements.
3.6.7 Open software is closed and computer hardware devices are shut downed.
3.6.8 Power at the respective power outlets is switched off.

4. Operate Spreadsheet application

4.1 Create spreadsheets

4.1.1 Open spreadsheet application,
4.1.2 Create spreadsheet files and enter numbers, text and symbols into cells according to information requirements.
4.1.3 Enter ***simple formulas and functions*** using cell referencing where required.
4.1.4 Correct formulas when error messages occur.
4.1.5 Use a range of common tools during spreadsheet development.
4.1.6 Edit columns and rows within the spreadsheet.
4.1.7 Use the auto-fill function to increment data where required.
4.1.8 Save spreadsheet to directory or folder.

4.2 Customize basic settings:

4.2.1 Adjust page layout to meet user requirements or special needs.
4.2.2 Open and view different toolbars.
4.2.3 Change font settings so that they are appropriate for the purpose of the document.
4.2.4 Change ***alignment*** options and line spacing according to spreadsheet ***formatting features.***
4.2.5 ***Format*** cell to display different styles as required.
4.2.6 Modify margin sizes to suit the purpose of the spreadsheets.
4.2.7 View multiple spreadsheets concurrently.

4.3 Format spreadsheet:

4.3.1 Use formatting features as required.
4.3.2 Copy selected formatting features from another cell in the spreadsheet or from another active spreadsheet.

4.3.3 Use ***formatting tools*** as required within the spreadsheet.
4.3.4 Align information in a selected cell as required.
4.3.5 Insert headers and footers using formatting features.
4.3.6 Save spreadsheet in another format.
4.3.7 Save and close spreadsheet to ***storage device.***

4.4 Incorporate object and chart in spreadsheet:

4.4.1 Import an object into an active spreadsheet.
4.4.2 Manipulate imported ***object*** by using formatting features.
4.4.3 Create a chart using selected data in the spreadsheet.
4.4.4 Display selected data in a different chart.
4.4.5 Modify chart using formatting features.

4.5 Create worksheets and charts

4.5.1 Worksheets are created as pre-requirement.
4.5.2 Data are entered.
4.5.3 ***Functions*** are used for calculating and editing logical operation.
4.5.4 ***Sheets*** are formatted as per requirement.
4.5.5 ***Charts*** are created.
4.5.6 Charts/ Sheets are previewed.

4.6 Print spreadsheet:

4.6.1 Preview spreadsheet in print preview mode.
4.6.2 Select basic printer options.
4.6.3 Print spreadsheet or selected part of spreadsheet.
4.6.4 Submit the spreadsheet to ***appropriate person*** for approval or feedback.

5. Operate Presentation Package:

5.1 Create presentations:

5.1.1 Open a presentation package application and create a simple design for a presentation according to organizational requirements.
5.1.2 Open a blank presentation and add text and graphics.
5.1.3 Apply existing styles within a presentation.
5.1.4 Use presentation template and slides to create a presentation.
5.1.5 Use various ***Illustrations*** and ***effects*** in presentation.
5.1.6 Save presentation to correct directory.

5.2 Customize basic settings:

5.2.1 Adjust display to meet user requirements.
5.2.2 Open and view different ***toolbars*** to view options.
5.2.3 Ensure ***font settings*** are appropriate for the purpose of the presentation.
5.2.4 View multiple slides at once.

5.3 Format presentation:

5.3.1 Use and incorporate organizational charts, bulleted lists and modify as required.
5.3.2 Add ***objects*** and manipulate to meet presentation purposes.
5.3.3 Import ***objects*** and modify for presentation purposes.
5.3.4 Modify slide layout, including text and colors to meet presentation requirements.
5.3.5 Use ***formatting tools*** as required within the presentation.
5.3.6 Duplicate slides within and/or across a presentation.
5.3.7 Reorder the sequence of slides and/or delete slides for presentation purposes.
5.3.8 Save presentation in another ***format.***
5.3.9 Save and close presentation to disk.

5.4 Add slide show effects:

5.4.1 Incorporate preset animation and multimedia effects into presentation as required to enhance the presentation.
5.4.2 Add slide transition effects to presentation to ensure smooth progression though the presentation.
5.4.3 Test presentation for overall impact.
5.4.4 Use onscreen navigation tools to start and stop slide show or move between different slides as required.

5.5 Print presentation and notes:

5.5.1 Select appropriate print format for presentation.

5.5.2 Select preferred slide orientation.

5.5.3 Add notes and slide numbers.

5.5.4 Preview slides and spell check before presentation.

5.5.5 Print the selected slides and submit presentation to appropriate person for feedback.

6. Access Information using Internet and electronic mail.

6.1 Access resources from internet.

6.1.1 Appropriate internet ***browsers*** are selected and installed.

6.1.2 Internet browser is opened and web address / URL is written/selected in /from address bar to access information**.**

6.1.3 ***Search engines*** are used to access information.

6.1.4 Video / Information are Shared/downloaded/uploaded from/to web site/***social media.***

6.1.5 ***Web based resources*** are used.

6.1.6 Netiquette' (or web etiquette) principles are searched and followed.

6.2 Use and manage Electronic mail

6.2.1 ***Email services*** are identified and selected to create a new email address.

6.2.2 Email account is created.

6.2.3 Document is prepared, attached and sent to different types of recipient.

6.2.4 Email is read, forwarded, replied and deleted as per requirement.

6.2.5 Custom email folders are created and ***manipulated.***

6.2.6 Email message is printed.

66712 ELECTRICAL ENGINEERING FUNDAMENTALS

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3	3	4

OBJECTIVES:

- To familiarize the basic electrical quantities & laws and to apply them in solving problems of electrical circuits.
- To acquaint with electromagnetism, electromagnetic induction.
- To develop skill in electrical wiring.
- To familiarize with DC generator, AC generator, AC motor, DC Motor & Transformers.
- To appreciate the safety measures to be taken for electrical wiring.

SHORT DESCRIPTION:

Electric current, Voltage & Resistance; Conductors and insulators; Ohm's law; Kirchhoff's Law; Joule's law; Faraday's law; Basic electrical circuits; Power and energy; Electromagnetic induction; House wiring; Controlling devices; Protective devices; Earthling; DC Motor, AC Motor, DC Generator; AC Generator; Transformer & Electricity Act/Rule.

DETAIL DESCRIPTION:

Theory:

1. Understand electricity and its nature.

1.1 State the meaning of electricity.
1.2 Describe the structure of atom.
1.3 Define current, voltage and resistance.
1.4 State the units of current, voltage and resistance.

2 . Understand conductor semiconductor & insulator.

2.1 Define conductor, semiconductor and insulator.
2.2 Explain the conductor, semiconductor and insulator according to electron theory.
2.3 List at least 5 conductors, 5 semiconductor and 5 insulators.
2.4 Describe the factors upon which the resistance of a conductor depends.
2.5 State laws of resistance.
2.6 Prove the relation $R=\rho L/A$
2.7 Explain the meaning of resistivity and name the unit of resistivity.
2.8 Solve problems relating to laws of resistance.

3 . Understand Ohm's Law.

3.1 State Ohm's law.
3.2 Deduce the relation between energy current, voltage and resistance.
3.3 Solve problems relating to Ohm's law.

4. Understand Kirchhoff's Law**.**

4.1 State Kirchhoff's current law.
4.2 Explain the Kirchhoff's current law.
4.3 Sate Kirchhoff's Voltage law.
4.4 Explain the Kirchhoff's Voltage law.
4.5 Solve problem by Kirchhoff's Law

5. Understand electric circuit.

5.1 Define electric circuit.
5.2 Name the different types of electric circuits.
5.3 Define series circuit, parallel circuit and mixed circuit.
5.4 Describe the characteristics of series circuit and parallel circuit.
5.5 Calculate the equivalent resistance of series circuit, parallel circuit.

5.6 Solve problems relating to DC series circuit, parallel circuit and mixed circuit.
5.7 Define inductor, capacitor, inductive reactance & capacitive reactance.
5.8 Write the formula of inductive reactance, capacitive reactance & impedance.
5.9 Draw the AC circuit containing Resistor, Inductor and Capacitor in Series and parallel circuit.
5.10 Problem on AC series & parallel circuit.

6. Apply the concept of electrical power and energy.
6.1 Define electrical power and energy.
6.2 State the unit of electrical power and energy.
6.3 Show the relation between electrical power and energy.
6.4 Name the instruments for measuring electrical power and energy.
6.5 Draw the connection diagram of wattmeter and energy meter in an electrical circuit.
6.6 Solve problems relating to electrical power and energy calculation.

7. Understand the principles of Joule's law.
7.1 Explain Joule's law regarding the development of heat in electrical circuit.
7.2 Describe meaning of "J".
7.3 Solve problems relating to Joule's law.

8. Understand the Faraday's laws of Electromagnetic Inductions
8.1 Define Electromagnetic Inductions.
8.2 Explain Faraday's laws of Electromagnetic Induction.
8.3 Solve problems on Electromagnetic Induction.

9. Understand the uses of wires and cables.
9.1 Define electrical wires and cables.
9.2 Distinguish between wires and cables.
9.3 Describe the procedure of measuring the size of wires and cables by wire gauge.

10. Understand the different methods of house wiring.
10.1 State the meaning of wiring.
10.2 List the types of wiring.
10.3 State the types of wiring used in:
a) Residential building.
b) Workshop
c) Cinema hall/Auditorium
d) Temporary shed
10.4 List the name of fittings used in different types of electrical wiring.

11. Understand the controlling and protective devices & use of those.
11.1 Define controlling device.
11.2 Name the different types of controlling device.
11.3 Define protective device.
11.4 Name the different types of protective device.
11.5 Name the different types of fuses used in house wiring.
11.6 Name the different types of circuit breaker used in house wiring.

12. Understand the necessity of earthing.
12.1 Define earthing.
12.2 Explain necessity of earthing.
12.3 Name different types of earthing.

13. Understand the principle of operation of transformer.

13.1 Define transformer.
13.2 Explain the working principle of transformer.
13.3 Write the equation relating to voltage, current & turns of primary & secondary winding of transformer.
13.4 Name the different losses of transformer.
13.5 Define transformation ratio (voltage, current and turns).
13.6 Solve problems on transformation ratio.

14. Understand the principle of DC generator.
14.1 Define DC generator.
14.2 Classify DC generator.
14.3 Explain the constructional features of DC generator.
14.4 Explain the working principle of DC generator.
14.5 Name the different losses of DC generator.

15. Understand the principle of AC generator.
15.1 Define AC generator.
15.2 Explain the constructional features of AC generator.
15.3 Explain the working principle of AC generator.
15.4 Name the different losses of AC generator.

16. Understand the principle of DC motor.
16.1 Define DC motor.
16.2 Classify DC motor.
16.3 Name the different parts of DC motor.
16.4 Explain the working principle of DC motor.
16.5 Name the different losses of DC motor.
16.6 List the uses of different types of DC motor.

17. Understand the principle of Induction motor.
17.1 Define Induction motor.
17.2 Classify Induction motor.
17.3 Describe the principles of operation of capacitor motor.
17.4 List the uses of induction motor.

18. Understand act/rule of Bangladesh and safety practices.
18.1 Sate electricity act/rule of Bangladesh to be followed in electrical wiring.
18.2 Describe the importance of electricity act/rule.
18.3 Describe safety procedure against electricity hazard.
18.4 List the performance of safety practices for electrical equipment, machines and accessories.

PRACTICAL:

1. Identify and use electrical measuring instruments.
1.1 Identify voltmeters, ammeters, clip-on meter, frequency meter, wattmeter, energy meter and AVO meter.
1.2 Select & read the scale of given meters.
1.3 Connect correctly voltmeter, ammeter, wattmeter and energy meter to a given circuit.

2. Show skill in verification of Ohm's Law.
2.1 Sketch the circuit diagram for the verification of Ohm's Law.
2.2 List tools, equipment and materials required for the experiment.
2.3 Prepare the circuit according to the circuit diagram using proper equipment.
2.4 Check all connections before the circuit is energized.
2.5 Verify the law by collecting relevant data.

3. Show skill in verification of Kirchhoff's Law.

3.1 Sketch the circuit diagram for the verification of Kirchhoff's Law.
3.2 List tools, equipment and materials required for the experiment.
3.3 Prepare the circuit according to the circuit diagram using proper equipment.
3.4 Check all connections before the circuit is energized.
3.5 Verify the laws by collecting relevant data.

4. Verify the characteristics of series and parallel circuits.

4.1 Draw the working circuit diagram.
4.2 List tools, equipment and materials required for the experiment.
4.3 Prepare the circuit according to the circuit diagram using proper equipment.
4.4 Check all connections before the circuit is energized.
4.5 Record data and verify that in a series circuit total voltage and resistance is equal to the summation of individual voltage and resistance respectively but total current is equal to the individual current.
4.6 Record data and verify that for a parallel circuit supply voltage is equal to the branch voltage, supply current is equal to summation of branch currents.

5. Show skill in measuring the power of an electric circuit.

5.1 Sketch the necessary circuit diagram of an electrical circuit with electrical load, ammeter, voltmeter and wattmeter.
5.2 Prepare the circuit according to the circuit diagram using ammeter, voltmeter and wattmeter.
5.3 Record the power, measured by the wattmeter and verify the reading with that of calculated from ammeter and voltmeter.
5.4 Compare the measured data with that of calculated and rated power.

6. Show skill in measuring the energy consumed in an electrical circuit.

6.1 Sketch the necessary diagram of an electric circuit wattmeter, energy meter and electrical load.
6.2 Prepare the circuit according to the circuit diagram using wattmeter and energy meter.
6.3 Record the energy measured by the energy meter and verify with that of calculated from wattmeter for a fixed time.

7. Show skill in using of hand tools, wires and cables.

7.1 List the hand tools used in electrical wiring.
7.2 Identify the hand tools used in electrical wiring.
7.3 Draw neat sketches of hand tools used in electrical wiring.
7.4 Identify different types of wires and cables.
7.5 Measure the diameter of the identified wire and cables using standard wire gauge.

8. Show skill in preparing wiring circuit of two lamps controlled from two points separately.

8.1 Sketch a working circuit of two lamps controlled from two points separately.
8.2 Make the wiring circuit using required materials and equipment on a wiring board.
8.3 Test the connection of circuit by providing proper supply.

9. Show skill in preparing wiring circuit of one lamp controlled from two points.

9.1 Sketch a working diagram of one lamp controlled by two SPD tumbler Switches.
9.2 Complete the wiring circuit using required materials and equipment on wiring board.
9.3 Test the connection of circuit by providing proper supply.

10. Show skill in preparing wiring circuit of one bell with two indicating lamp controlled from two points.

10.1 Sketch a working diagram of one bell with two indicating lamps controlled by two push button switch.
13.2 Make the wiring circuit using required materials and equipment on wiring board.
13.3 Test the connection of circuit by providing proper supply.

11. Show skill in preparing wiring circuit of a fluorescent tube light.

11.1 Sketch a working diagram of a fluorescent tube light circuit.

11.2 Make the connection of a fluorescent tube light circuit using required materials and equipment.

11.3 Test the connection of the circuit by providing supply.

12. Find the transformation ratio of a transformer.

12.1 Develop a circuit to perform the experiment.

12.2 Select required equipment and materials.

12.3 Connect the components according to the circuit diagram.

12.4 Check the connections.

12.5 Record the primary (EP) and secondary (ES) voltages.

12.6 Calculate the transformation ratio using the relation

$$\frac{E_S}{E_P} = \frac{N_S}{N_P} = K$$

12.7 Note down the observations.

13. Disassemble and re-assemble the parts of a DC generator/ DC motor.

13.1 Select the necessary tools required for disassembling and re-assembling the parts of DC generator/ DC motor.

13.2 Identify at least ten main parts of the generator/motor.

13.3 Sketch at least ten main parts of the generator/motor.

13.4 Re-assemble the parts of the generator/motor.

13.5 Connect the generator/motor to the proper power source.

13.6 Start the generator/motor.

14. Start a 1-phase capacitor type motor/ceiling fan with regulator.

14.1 Select the equipment and tools required for the experiment.

14.2 Sketch a working diagram.

14.3 Identify the two sets of coils.

14.4 Connect the capacitor with the proper set of coil.

14.5 Connect power supply to the fan motor.

14.6 Test the rotation of the motor in opposite direction by changing the capacitor connection.

14.7 Note down the observations.

REFERENCE BOOKS

1 A Text Book of Electrical Technology - B. L. Theraja

2 Basic Electricity - Charles W Ryan

3 Basic Electrical Theory and Practice - E. B. Babler

4 Electrical Machine - Siskind

BANGLADESH TECHNICAL EDUCATION BOARD
Agargoan, Dhaka-1207.

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

COMPUTER SCIENCE & TECHNOLOGY

TECHNOLOGY CODE: **685**

2nd SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

COMPUTER SCIENCE & TECHNOLOGY (685)

2nd 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	65711	Bangla	3	3	4	60	90	50	0	200
2	65712	English	2	0	2	40	60	0	0	100
3	65912	Physics-1	3	3	4	60	90	25	25	200
4	65921	Mathematics -2	3	3	4	60	90	50	0	200
5	66623	Graphic Design -1	0	6	2	0	0	50	50	100
6	66823	Analog Electronics	3	3	4	60	90	25	25	200
7	66621	Database Application	0	6	2	0	0	50	50	100
Total			**14**	**24**	**22**	**280**	**420**	**250**	**150**	**1100**

65711	BANGLA	T	P	C
		3	3	4

উদ্দেশ্য :
১. মাতৃভাষা হিসেবে বাংলা ভাষার প্রকৃতি ও বৈশিষ্ট্য সম্পর্কে ধারণা লাভ। ভাষার ব্যবহারে প্রায়োগিক যোগ্যতা অর্জন।
২.বাংলা সাহিত্য পঠন-পাঠনের মাধ্যমে জাতীয় চেতনা, দেশপ্রেম, মুক্তিযুদ্ধের চেতনা, শুদ্ধাচার, নীতি ও মূল্যবোধের উন্মেষ ঘটানো।

সংক্ষিপ্ত বিবরণী :
মাতৃভাষা ও সৃজনশীলতা : বাংলা ভাষা রীতির বিচিত্রতা, বানান রীতি, পত্র রচনা এবং কবিতা, প্রবন্ধ, নাটক, উপন্যাস ও ছোট গল্প ।
বিশদ বিবরণী:

১.বাংলা ভাষার প্রয়োগ:
ক)বাংলা ভাষা :
ভাষার সংজ্ঞা, বাংলা ভাষা রীতি - সাধু, চলিত, আঞ্চলিক বা উপভাষা (সংজ্ঞা, বৈশিষ্ট্য, পার্থক্য ও উদাহরণ)
খ) বাংলা বানান রীতি ও শব্দ প্রয়োগ:
১.বাংলা একডেমির প্রমিত বানান রীতি, ণ-ত্ব ও ষ-ত্ব বিধি

২. শব্দ ও শব্দের শ্রেণি বিভাগ (সংজ্ঞা, শব্দের গঠন, উৎস বা উৎপত্তি ও অর্থগত)
৩.বাক্য প্রকরণ ও গঠন রীতি (সংজ্ঞা, বাক্য গঠন এবং প্রকার)
গ) পত্র রচনা :
আবেদন পত্র (চাকুরি, ছুটি), চাকুরিতে যোগদান পত্র, মানপত্র, স্মারকলিপি, সংবাদপত্রে প্রকাশের জন্য পত্র

২. বাংলা সাহিত্য:

ক. কবিতা :
১.বঙ্গভাষা –মাইকেল মধুসূদন দত্ত
২. সোনার তরী – রবীন্দ্র নাথ ঠাকুর
৩. উমর ফারুক –কাজী নজরুল ইসলাম
৪. বাংলার মুখ আমি– জীবনানন্দ দাশ
৫. আসাদের শার্ট – শামসুর রাহমান
৬. স্বাধীনতা শব্দটি কি করে আমাদের হলো? – নির্মলেন্দু গুণ

খ. প্রবন্ধ :
১. অর্ধাঙ্গী –রোকেয়া সাখাওয়াত হোসেন
২.বইকেনা – সৈয়দ মুজতবা আলী

গ. একাঙ্কিকা (নাটিকা): মানুষ –মুনীর চৌধুরী

ঘ. উপন্যাস: লালসালু – সৈয়দ ওয়ালী উল্লাহ

ঙ.ছোট গল্প:
১. হৈমন্তী – রবীন্দ্র নাথ ঠাকুর
২. একুশের গল্প – জহির রায়হান
৩. পাতালেহাসপাতালে – হাসান আজিজুল হক

ব্যবহারিক

১.নির্ধারিত বক্তৃতা :
বাংলাদেশ ও বাঙালি সংস্কৃতি, বিভিন্ন জাতীয় দিবস (একুশে ফেব্রুয়ারি ও আন্তর্জাতিক মাতৃভাষা দিবস, স্বাধীনতা দিবস, বিজয় দিবস,জাতীয় শোক দিবস, মুজিব নগর দিবস, মহান মে দিবস)
প্রাতিষ্ঠানিক বক্তৃতা- নবাগত শিক্ষক/ছাত্রছাত্রীদের বরণ, গুরুত্বপূর্ণ ব্যক্তিবর্গের আগমন উপলক্ষে বক্তৃতা।

২. উপস্থিত বক্তৃতা :
বিষয়বস্তু উন্মুক্ত

৩.আবৃত্তি :

১. মানুষ - কাজী নজরুল ইসলাম
২. আকাশ নীলা - জীবনানন্দ দাশ
৩. পল্লী জননী -জসীম উদ্‌দীন
৪. ছাড়পত্র - সুকান্ত ভট্টাচার্য
৫. তোমাকে পাওয়ার জন্য হে স্বাধীনতা - শামসুর রাহমান
৬. নিষিদ্ধ সম্পাদকীয় – হেলাল হাফিজ

৪. বিতর্ক (নমুনা)

সংস্কৃতিই আধুনিক মানুষের ধর্ম
তথ্য প্রযুক্তির অবাধ ব্যবহারই যুব সমাজেরঅবক্ষয়ের মূল কারণ
গতানুগতিক শিক্ষা নয় কর্মমুখি শিক্ষাই অর্থনৈতিক মুক্তির চাবিকাঠি
চালকের অসাবধনতাই সড়ক দুর্ঘটনার প্রধান কারণ
মুক্তিযুদ্ধের চেতনাই অসাম্প্রদায়িক বাংলাদেশ প্রতিষ্ঠার মূলমন্ত্র
প্রযুক্তির বিকাশই প্রকৃতি বিনাশের একমাত্র কারণ

৫. প্রতিবেদন প্রণয়ন ও উপস্থাপন:

স্থানীয় বিভিন্ন সমস্যা ও অনুসন্ধানী যে কোন বিষয়।

65712 **ENGLISH** **T P C**
2 0 2

Objectives:

After The Completion of the Course, Learners Will Be Able To Develop-

- Reading, Listening With Understanding
- The Fluency Of Speech
- Grammatical Accuracy With Emphasis On Spelling & Punctuation
- Creative Writing

Seen Comprehension: (Marks-20)

Unit	Lesson	Title
People Or Institutions Making History (Unit One)	1	Nelson Mandela ,From Apartheid Fighter To President
	2	The Unforgettable History
Food Adulteration(Unit Three)	1	Food Adulteration Reaches Height
	2	Eating Habit And Hazards
Human Relationship(Unit Four)	2	Love And Friendship
Environment And Nature (Unit Eight)	1	Water ,Water Everywhere
	5	Kuakata: Daughter Of The Sea
Greatest Scientific Achievement (Unit Thirteen)	1	Some Of The Greatest Scientific Achievements Of The Last 50 Years
	2	Science And Technology Against An Age- Old Disease
Art And Music (Unit Fourteen)	1	What Is Beauty?
	3	Crafts In Our Time
Tours And Travels (Unit Fifteen)	1	Travelling To A Village In Bangladesh
	4	The Wonders of Vilayet

N.B: The Unit Mentioned Refers To The Text Book (1st Paper) English For Today For Class 11- 12 By National Curriculum & Text Book Board, Dhaka.

Grammar (Marks-20)

1. **(A) Uses of Articles.**
   (B) Uses of Tense *(Right Forms Of Verbs with Indicators)
   (C) Classify Verbs: (Regular and Irregular Verbs, Auxiliary, Principal, Finite, Non-Finite Verbs,)

2. **Sentence:**
   (A) Changing Sentences: (Assertive, Interrogative, Optative, Imperative, Exclamatory Simple, Complex and Compound), Comparison of Adjectives/Adverbs

   (B) Question Making: WH, Yes/No, Tag Question

3. Enrich Vocabulary: Synonyms, Antonyms; Suffix And Prefix.

4. Voice, Narration

5. Sentence Analysis:

Study of Part of Speech, (Type Of Verbs-Regular and Irregular Verbs, Auxiliary and Principal Verb)
Study of Phrases and Clauses (Noun/ Adjective/ Verb/ Participle /Adverbial/ Prepositional Phrases and Principal /Sub Ordinate /Co Ordinate Clauses)

Free Writing (Marks -20)

1. Write Dialogues: (With Teacher, Principal, Shopkeeper, Hotel Manager, Station Master, Newcomer, Buyers, Doctor, Friend, Colleagues Etc).
2. Report Writing On Different Events/ Occasions/ Accidents.
3. Writing Situational Personal and Official Letters.
4. Writing Job Application with CV /Appointment Letter / Joining Letter
5. Write A Guided Paragraph With Questions.

65912	PHYSICS-1	T	P	C
		3	3	4

OBJECTIVES

- To develop the students a background of basic science i.e. Physics required for understanding technological subjects.
- To develop a working knowledge of common engineering and industrial materials and to enable to determine through experiments the properties of such materials.
- To develop through experiments an understanding of fundamental scientific concept.
- To develop a basic knowledge and concept of physical properties of common engineering and industrial materials.

SHORT DESCRIPTION

Measurement, Units; Vector and Scalar quantities; Motion and Equations of motion; Force and Newton's Laws of motion; Gravity and Gravitation; Simple Harmonic motion; Hydrostatics; Surface tension and viscosity; Pressure, Sound; wave and sound Concepts and nature of sound, Velocity of sound, Ultrasonic.

DETAIL DESCRIPTION

THEORY :

1. PHYSICAL WORLD AND MEASUREMENT

1.1. Nature of Physical World.
1.2. Scope and Excitement of Physics.
1.3. Few Terms about Physics.
1.4. Physics and other world of Technological Knowledge.
1.5. Principle of Measurement.
1.6. Fundamental and Derived Quantities and Units.
1.7. Dimensions of Units.
1.8. Errors in Measurement.

2. SCALAR AND VECTOR QUANTITIES

2.1 Define vector and scalar quantities with examples.
2.2 Show the various representations of the vector quantities; and representation of a vector by unit vector.
2.3 Find and explain the resultant of two vectors in different directions.
2.4 Resolve a vector into horizontal & vertical component.
2.5 Explain the dot and cross product of two vectors.
2.6 Define laws of triangle of vector.

3. MOTION AND EQUATIONS OF MOTION

3.1 Define rest and motion
3.2 Classify and explain of motion.
3.3 Define and explain displacement, speed, velocity, acceleration and retardation.
3.4 Deduce the relationship between displacement, velocity, acceleration and retardation from these definitions.
3.5 Motion of a Projectile.
3.6 Equation of motion of a freely moving body thrown obliquely vertically upward or motion of a projectile.
3.7 Define angular velocity and linear velocity with their units.
3.8 Deduce the relation between angular velocity and linear velocity.
3.9 Define centripetal and centrifugal force with examples.
3.10 Prove that centrifugal force = $\frac{mv^2}{r}$
3.11 State and explain the laws of falling bodies and mention the equation of motion of a body when it is projected vertically upwards or downwards.

4. NEWTON'S LAWS OF MOTION FORCE AND FRICTION

4.1 Define force.
4.2 State Newton's laws of motion.
4.3 Define different units of force and their correlation and also mention the dimension of force.
4.4 Prove P=mf, from Newton's 2nd law of motion.
4.5 Find out the resultant of parallel forces.
4.6 Define inertia and momentum
4.7 State and prove the principles of conservation of momentum.
4.8 Define friction and describe the different kinds of friction.
4.9 Define the co-efficient of static friction.
4.10 Show that the co-efficient of static friction is equal to the tangent of angle of repose
4.11 State the merits and demerits of friction.

5. GRAVITY AND GRAVITATION

5.1 Define and explain the Kepler's Law.
5.2 Define gravity and gravitation.
5.3 Define and determine the gravitational constant (G) and also mention its units and dimension.
5.4 Define acceleration due to gravity 'g' and also mention its units and dimension.
5.5 Discuss the variation of 'g' at different places.
5.6 Define mass and weight with their units and dimension.
5.7 Distinguish between mass and weight.
5.8 Define and explain gravitational potential and escape velocity

6. SIMPLE HARMONIC MOTION (SHM)

6.1 Define Periodic and simple harmonic motion (SHM).
6.2 State the characteristics of SHM.
6.3 Describe a simple pendulum and a second pendulum.
6.4 Define effective length, amplitude, phase, complete oscillation, period of oscillation, frequency.
6.5 State and explain the laws of simple pendulum.
6.6 Motion of simple pendulum and it's time period.

7. WORK, POWER AND ENERGY

7.1 Define work, power and energy.
7.2 State the units and dimensions of work, power and energy.
7.3 State and prove the principle of the conservation of energy.
7.4 Define potential energy (PE) and kinetic energy (KE).
7.5 Derive the equation of potential and kinetic energy.
7.6 Recognize that the useful work can be found from:

$$\text{Efficiency} = \frac{\text{output work}}{\text{input work}} \times 100.$$

8. ELASTICITY

8.1 Name some of the general and special properties of matter.
8.2 Define Elasticity and Elastic limit.
8.3 Define perfectly elastic body and perfectly rigid body.
8.4 Define stress and strain with their units and dimensions.
8.5 State and explain the Hook's law.
8.6 Describe various kinds of modulus of elasticity.
8.7 Mention the units and dimensions of modulus of elasticity.
8.8 Define and explain Poisson's ratio.

9. HYDROSTATICS

9.1 Define pressure as force per unit area and state that it is measured in N/m^2 or Pascal.
9.2 State characteristics of liquid pressure.
9.3 Establish the pressure at a point in a fluid depend upon the density of the fluid, the depth in the fluid and acceleration due to gravity.
9.4 Surface tension and surface energy, Angle of contact.
9.5 Capillarity and theory of capillarity.
9.6 Viscosity and co-efficient of viscosity.
9.8 Necessity of viscosity.

10. WAVE AND SOUND

10.1 Wave and wave motion.
10.2 Transverse wave and longitudinal wave.
10.3 Some definitions relating waves.
10.4 Progressive wave and stationary waves.
10.5 Equation of progressive wave.
10.6 Sound and production of sound.
10.7 Sound is a longitudinal traveling wave.
10.8 Interference of sound: Constructive and Destructive interference.
10.9 Define beats and Mechanism of formation of beats.

11. SOUND AND VELOCITY OF SOUND

11.1 Identify that sound is produced by vibration and travels through a medium as a longitudinal wave.
11.2 Recognize that sound can be produced of different pitches (frequencies) & that the human ear has an audible frequency range covering approximately 20 Hz to 20 KHz.
11.3 State the approximate frequency range for
a. infrasonic sound, b. Ultrasonic (supersonic) sound.
11.4 Explain how sound is absorbed, reflected & refracted by different types of surface.
11.5 Describe the practical uses of echo sounding devices.
11.6 Define velocity of sound.
11.7 State the velocity of sound at NTP in still air.
11.8 Compare the effects of pressure, temperature & humidity on the velocity of sound in air.

PRACTICAL

1. Determine accurate diameter/side of an object using vernier calipers.
2. Measure the area of cross section of a wire by micrometer screw gage.
3. Measure the thickness of a glass plate by speedometer.
4. Verify the law of parallelogram of forces by a force board.
5. Draw $L\text{-}T^2$ graph and determine the value of "g" by using a simple pendulum.
6. Determine the coefficient of static friction.
7. Determine Young's modulus of a steel wire by Searle's apparatus.
8. Determine gravity of a solid heavier than and insoluble in water by hydrostatic balance.
9. Determine specific gravity of a liquid by specific gravity bottle.
10. Determine velocity of sound by resonance air column method.

REFERENCE BOOKS:

1. Higher Secondary Physics - First Part - by Dr. Shahjahan Tapan
2. A Text Book of Properties of of matter -By N Subrahmanyam and Brij Lal
3. A Text Book of Sound -By N Subrahmanyam and Brij Lal
4. Higher Secondary Physics- First Part -by Prof. Golam Hossain Pramanik
5. Higher Secondary Physics- First Part -by Ishak Nurfungnabi

65921 **MATHEMATICS -2** **T P C**
3 3 4

OBJECTIVES

- To enable in solving the simultaneous equations with the help of determinant and matrix.
- To make understand the exponential series.
- To provide ability to apply the knowledge of differential calculus in solving problem like slope, gradient of a curve, velocity, acceleration, rate of flow of liquid etc.
- To enable to apply the process of integration in solving practical problems like calculation of area of a regular figure in two dimensions and volume of regular solids of different shapes.

SHORT DESCRIPTION

Algebra : Determinants, Matrix, Exponential Series.

Trigonometry : Inverse circular functions, Properties of triangle and solution of triangles.

Differential Calculus : Function and limit of a function, differentiation with the help of limit, differentiation of functions, geometrical interpretation of $\frac{dy}{dx}$, successive differentiation and Leibnitz theorem, partial differentiation.

Integral Calculus : Fundamental integrals, integration by substitutions, integration by parts, integration by partial fraction, definite integrals.

DETAIL DESCRIPTION

ALGEBRA :

1 Apply determinants to solve simultaneous equations.

1.1 Expand a third order determinant.
1.2 Define minor and co-factors.
1.3 State the properties of determinants.
1.4 Solve the problems of determinants.
1.5 Apply Cramer's rule to solve the linear equation.

2 Apply the concept of matrix.

2.1 Define matrix, null matrix, unit matrix, square matrix. column matrix, row matrix, inverse matrix, transpose matrix, adjoin matrix, rank of a matrix, singular matrix.
2.2 Explain equality, addition and multiplication of matrix.
2.3 Find the rank of a matrix.
2.4 solve the problems of the following types:
i) Solve the given set of linear equations with the help of matrix.
ii) Find the transpose and adjoin matrix of a given matrix.

3 Understand exponential series.

3.1 Define e.
3.2 Prove that e is finite and lies between 2 and 3.
3.3 Prove that $e^x = 1 + \frac{x}{\lfloor 1} + \frac{x^2}{\lfloor 2} + \frac{x^3}{\lfloor 3} + \frac{x^4}{\lfloor 4}$ ..... to ∞
3.4 Solve problems of the followings types :

i) $1 + \frac{1}{\lfloor 2} + \frac{1}{\lfloor 4} + \frac{1}{\lfloor 6}$ + ... to ∞

ii) $\frac{1}{\lfloor 2} + \frac{1+2}{\lfloor 3} + \frac{1+2+3}{\lfloor 4} + \frac{1+2+3+4}{\lfloor 5}$ + ... to ∞

TRIGONOMETRY

4 Apply the concept of inverse circular function.

4.1 Explain the term inverse circular function and principal value of a trigonometrical ratio.

4.2 Deduce mathematically the fundamental relations of different circular functions.

4.3 Convert a given inverse circular function in terms of other functions.

4.4 Prove mathematically

i) $\tan^{-1} x + \tan^{-1} y = \tan^{-1} \dfrac{x+y}{1-xy}$.

ii) $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \tan^{-1} \dfrac{x+y+z-xyz}{1-xy-yz-zx}$

iii) $\sin^{-1} x + \sin^{-1} y = \sin^{-1} \left(x\sqrt{1-y^2} + y\sqrt{1-x^2}\right)$

iv) $2\tan^{-1} x = \sin^{-1} \dfrac{2x}{1+x^2} = \cos^{-1} \dfrac{1-x^2}{1+x^2} = \tan^{-1} \dfrac{2x}{1-x^2}$

4.5 Solve problems of the following types.

a) $2\tan^{-1} \dfrac{1}{3} + \tan^{-1} \dfrac{1}{4} = \dfrac{\pi}{4}$

b) $\cos \tan^{-1} \cot \sin^{-1} x = x$.

c) Prove that the area of the segment cut from a circle of radius r by a chord at a distance d from the centre is given by

$K = r^2 \cos^{-1} \dfrac{d}{r} - d\sqrt{r^2 - d^2}$

5 Apply the principle of properties of triangles.

5.1 Prove the followings identities :

i) $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C} = 2R$.

ii) $a^2 = b^2 + c^2 - 2bc \cos A$

iii) $a = b \cos C - c \cos B$.

v) $\Delta = \dfrac{1}{2} bc \sin A$.

5.2 Establish the followings.

a) $\tan \dfrac{A}{2} = \sqrt{\dfrac{(s-b)(s-c)}{s(s-a)}}$

b) $\tan \dfrac{B-C}{2} = \dfrac{b-c}{b+c} \cot \dfrac{A}{2}$

c) $\Delta = \dfrac{abc}{4R}$

5.3 Solve the problems of the following types:

i) Prove $\cos (B - C) + \cos A = \dfrac{bc}{2R}$

ii) An object experiences two forces F_1 and F_2 of magnitude 9 and 13 Newtons with an angle 100^0 between their directions. Find the magnitude of the resultant R.

DIFFERENTIAL CALCULUS

6 Understand the concept of functions.

6.1 Define constant, variable, function, domain, range

6.2 Solve problems related to functions.

7 Understand the concept of limits.

7.1 Define limit and continuity of a function.

7.2 Distinguish between $\lim_{x \to a}$ f(x) and f(a).

7.3 Establish (i) $\lim_{x \to 0} \frac{\sin x}{x} = 1$

(ii) $\lim_{x \to 0} \frac{\tan x}{x} = 1$

8 Understand differential co-efficient and differentiation.

8.1 Define differential co-efficient in the form of

$$\frac{dy}{dx} = \lim_{h \to 0} \frac{f(x + h) - f(x)}{h}$$

8.2 Find the differential co-efficient of algebraic and trigonometrical functions from first principle.

9 Apply the concept of differentiation.

9.1 State the formulae for differentiation:

(i) sum or difference

(ii) product

(iii) quotient

(iv) function of function

(v) logarithmic function

9.2 Find the differential co-efficient using the sum or difference formula, product formula and quotient formula.

9.3 Find the differential co-efficient function of function and logarithmic function.

10 Apply the concept of geometrical meaning of $\frac{dy}{dx}$

10.1 Interpret $\frac{dy}{dx}$ geometrically.

10.2 Explain $\frac{dy}{dx}$ under different conditions

10.3 Solve the problems of the type:
A circular plate of metal expands by heat so that its radius increases at the rate of 0.01 cm per second. At what rate is the area increasing when the radius is 700 cm ?

11 Use Leibnitz's theorem to solve the problems of successive differentiation.

11.1 Find 2nd, 3rd and 4th derivatives of a function and hence find n-th derivatives.

11.2 Express Leibnitz's theorem

11.3 Solve the problems of successive differentiation and Leibnitz's theorem.

12 Understand partial differentiation.

12.1 Define partial derivatives.

12.2 State formula for total differential.

12.3 State formulae for partial differentiation of implicit function and homogenous function.

12.4 State Euler's theorem on homogeneous function.

12.5 Solve the problems of partial derivatives.

INTEGRAL CALCULUS

13 Apply fundamental indefinite integrals in solving problems.

13.1 Explain the concept of integration and constant of integration.

13.2 State fundamental and standard integrals.

13.3 Write down formulae for:

(i) Integration of algebraic sum.

(ii) Integration of the product of a constant and a function.

13.4 Integrate by method of substitution, integrate by parts and by partial fractions.

13.5 Solve problems of indefinite integration.

14 Apply the concept of definite integrals.

14.1 Explain definite integration.

14.2 Interpret geometrically the meaning of $\int_a^b f(x)\,dx$

14.3 Solve problems of the following types:

(i) $\int_0^{\pi/2} \cos^2 x \, dx.$ (ii) $\int_0^1 \frac{(\sin^{-1} x)^2}{\sqrt{-x^2}} dx$

P* =Practical continuous assessment

Reference

SL No	Athour	Title	Publication
01	S. P Deshpande	Mathematics for Polytechnic Students	Pune Vidyarthi Graha Prakashan
02	H. K. Das	Mathematics for Polytechnic Students(Volume I)	S.Chand Prakashan
03	Shri Shantinarayan	Engg.Maths Vol I & II	S.Chand & Comp
04	Dr. B M Ekramul Haque	Higher Mathematics	Akshar Patra Prakashani
05	Md. Abu Yousuf	Differential & Integral Calculus	Mamun Brothers

66623	GRAPHICS DESIGN-1	T	P	C
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Separate and compose Images

1.1. Follow OSH practices
- 1.1.1. Safe work practices are observed according to workplace procedures
- 1.1.2. OSH hazards and incidents are reported to appropriate personnel.

1.2. Identify image source
- 1.2.1. Appropriate Image separation software is identified.
- 1.2.2. Image sources are identified
- 1.2.3. Image separation tools are identified.
- 1.2.4. Images are successfully Imported from appropriate source

1.3. Identify image standards
- 1.3.1. Image properties are identified
- 1.3.2. Image resolution are identified and demonstrated.
- 1.3.3. Image format are identified and selected.

1.4. Separate Images using magic wand tools
- 1.4.1. Magic wand tool is selected
- 1.4.2. Image is selected
- 1.4.3. Image is separated

1.5. Separate Images using lasso tools
- 1.5.1. Lasso tool is selected
- 1.5.2. Image is selected
- 1.5.3. Image is separated

1.6. Separate Images using pen tools
- 1.6.1. pen tool is selected
- 1.6.2. Image is selected
- 1.6.3. Image is separated

1.7. Create layer and compose
- 1.7.1. New document is created
- 1.7.2. Images are pasted for edit
- 1.7.3. Layers are created and selected.
- 1.7.4. Images are edited and arranged.

1.8. Evaluate own work
- 1.8.1. Constructive criticism from others is applied to improve own work.
- 1.8.2. Own work is evaluated against planned Strategy for own practice.
- 1.8.3. Work processes and practice are adjusted as necessary to improve technical, conceptual and commercial outcomes.

Create basic designs using illustration software

b. Follow OSH practices
   c. Safe work practices are observed according to workplace procedures
   d. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.

e. Create basic designs
   f. Required designs are specified.
   g. Appropriate shape and size are identified
   h. Content area is defined
   i. Contents are inserted and composed
   j. Shapes are modified as per requirements.
   k. Typographical design is applied as per requirements.
   l. Font attributes are applied per requirements.
   m. Design and colour are applied per requirements.
   n. Design is saved in appropriate file format

o. Create Outline and transfer.
   p. Design is reviewed and finalized
   q. Outline is created and grouped
   r. Final design is saved in appropriate file format
   s. Final design is transferred to the recipients

t. Develop conceptual skills and ideas
   u. Working with others to develop basic design ideas is demonstrated.
   v. Ability to gain experience in a range of genres and interpretation of basic design guidelines is demonstrated.
   w. Ability to gain experience in a range of genres and interpretation of basic design guidelines is demonstrated.
   x. A range of opportunities to develop own practice and keep informed about current design practice are identified and used for basic design guidelines.

y. Evaluate own work
   z. Constructive criticism from others is applied to improve own work.
   aa. Own work is evaluated against planned strategy for own practice.
   bb. Work processes and practice are adjusted as necessary to improve technical, conceptual and commercial outcomes.

Manipulate image using image processing Software

3.1. Follow OSH practices
   3.1.1. Safe work practices are observed according to workplace procedures
   3.1.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures

3.2. Retouch Image
   3.2.1. Appropriate retouch tools are identified
   3.2.2. Tools are calibrated as required
   3.2.3. Layers are created and preserved
   3.2.4. Different retouch tools are used as per requirement
   3.2.5. Images are corrected and saved in appropriate file format

3.3. Colour Correction
   3.3.1. Different colour correction methods are identified
   3.3.2. Appropriate image mode is selected
   3.3.3. Various colour correction methods are used
   3.3.4. Compare image enhancement with the original one

3.3.5. Save in appropriate file format
3.3.6. Transfer the image to recipient

3.4. Apply Effect
3.4.1. Identify appropriate effect options
3.4.2. Proper image mode is selected
3.4.3. Different Effects are applied to images as per requirements
3.4.4. Compare and adjust effects
3.4.5. Save in appropriate file format
3.4.6. Transfer the image to recipient

3.5. Evaluate own work
3.5.1. Constructive criticism from others is applied to improve own work
3.5.2. Own work is evaluated against planned strategy for own practice
3.5.3. Work processes and practice are adjusted as necessary to improve technical, conceptual and commercial outcomes.

Create professional designs using Illustration software.

cc. Follow OSH practices
dd. Safe work practices are observed according to workplace procedures
ee. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.

ff. Prepare design
gg. Required Professional Design works are selected.
hh. Appropriate Tools, Palette and arrange them as needed are identified.
ii. Ruler/unit/Grids/Guides/Smart Guides as per requirement are set
jj. Key Drawing / Design Layout are prepared
kk. Various Marks.
ll. Layer lock is applied

mm. Create Design
nn. Insert Contents are inserted.
oo. Colour/Design/Pattern is applied.
pp. Pathfinder to create complex Objects are used
qq. Font Attributes as per requirement Applied
rr. Zoom In-Out and Panning are used
ss. Design for further use is Saved

tt. Review and Finalize
uu. Artwork and Preview is used
vv. Layer Hide-Unhide option is used
ww. Outline and Group Created
xx. Appropriate File Format Saved
yy. The image to recipient Transferred

66823	ANALOG ELECTRONICS	T	P	C
		3	3	4

OBJECTIVES

- To provide understanding soldering technique and color code.
- To provide understanding and skill on the basic concept of semiconductor and to identify physically a range of semiconductor diodes.
- To develop comprehensive knowledge and skill on special diodes and devices.
- To develop the abilities to construct different rectifier circuits.
- To provide understanding of the basic concept and principle of transistor and to identify physically a range of transistor.
- To provide understanding and skill on the basic concept of ICs.
- To provide the understanding skill on Op-Amp.

SHORT DESCRIPTION

Color code and soldering; Semiconductor; P-N junction diode; Special diodes and devices; Power supply; Transistor; Transistor amplifier; Oscillator, Multivibrator; IC; Op-Amp.

DETAIL DESCRIPTION

Theory:

1 Soldering and Color Code

1.1 Define soldering.
1.2 List the materials needed in soldering.
1.3 Mention the properties of a good soldered joint.
1.4 Multi layered Printed circuit board.
1.5 Mention the function of resistor, capacitor and inductor in electronic circuits.
1.6 Describe the procedure of determining the value of Capacitor, & Resistor using numeric and color code.

2 Semiconductor

2.1 Define Conductor, Semiconductor and Insulator.
2.2 Describe Semiconductor with atomic structure.
2.3 Explain the energy band diagram of Conductor, Semiconductor and Insulator.
2.4 Classify Semiconductor.
2.5 Describe the formation of P-type & N-Type Semiconductor material.
2.6 Explain the majority & minority charge carrier of P-type & N-Type Semiconductor.

3 P-N Junction Diode

3.1 Define PN junction diode
3.2 Describe the formation of depletion layer in PN junction.
3.3 Mention the behavior of PN junction under forward and reverse bias.
3.4 Explain the forward & reverse current voltage (IV) characteristics of PN junction diode.
3.5 Describe the operation of Zener diode.
3.6 Describe the application of Zener diode in voltage stabilization.
3.7 Describe the construction operation and application of (i) varactor diode (ii) LED (iii) LCD (viii) Photo diode (ix) Solar cell.
3.8 Describe the construction operation and application of (i) DIAC (ii) TRIAC and (iii) SCR.

4 DC power supplies

4.1 Define (i) dc power supply (ii) Regulated and Unregulated Power Supply.
4.2 Describe the block diagram of a typical regulated dc power supply.
4.3 Explain the operation of Half wave, Full wave and Bridge rectifier.
4.4 Mention ripple factor of Half wave, Full wave and Bridge rectifier.
4.5 Explain the operation of different types filter circuits with wave shape.

5 Bipolar Junction Transistor (BJT)

5.1 Define Transistor.
5.2 Describe the construction PNP and NPN Transistor.
5.3 State the biasing rules of BJT.
5.4 Explain the mechanism of current flow of PNP and NPN Transistor.
5.5 Draw the three basic transistor configuration circuits (CB, CC, CE).
5.6 Describe the characteristics of transistor in CB, CE, CC configuration.
5.7 Describe current amplification factor α , β and γ.
5.8 Establish the relation among α , β and γ.
5.9 Solve problem related to I_E, I_C, I_B,α , β and γ.

6 Bipolar Junction Transistor biasing and load line

6.1 Mention the needs for biasing of transistor
6.2 State the conditions for proper biasing of transistor.
6.3 Describe the methods of drawing load line of transistor.
6.4 Explain the Effect of the location of operating point on the output signal.
6.5 Describe the various methods of transistor biasing.

7 Bipolar Junction Transistor Amplifier

7.1 Define (i) Amplifier (ii) Amplification and (III) Gain
7.2 Mention the classification of Amplifier.
7.3 Describe the principle of operation of a single stage common emitter (CE) Amplifier.
7.4 Draw DC & AC equivalent circuits of the CE amplifier circuit.
7.5 Explain the operation of RC coupled and transformer coupled multistage amplifier.
7.6 Describe the operation of Push-Pull amplifier.

8 Field-Effect Transistor (FET)

8.1 Define field effect transistor (FET).
8.2 Mention the types of FET
8.3 Describe the construction and operation Junction Field Effect Transistor (JFET).
8.4 Explain characteristics of JFET.
8.5 Describe the parameters of JFET.
8.6 Establish the relationship among FET parameters.
8.7 Describe the DC biasing of JFET and its load line.
8.8 Describe the Construction and operation of DE and E-Only MOSFET.

9. **Sinusoidal Oscillators**

9.1 Define feedback
9.2 Describe different types of feedback with block diagram.
9.3 Calculate the gain of amplifier with feedback (positive and negative).
9.4 Mention the advantages and disadvantages of negative feedback.
9.5 Explain the principle of operation of a oscillatory tank circuit.
9.6 Describe the essentials of feedback LC oscillators.
9.7 Explain the principle of operation of Hartly, Colpitt and Wein-bridge oscillators.
9.8 Explain the principle of operation phase shift & crystal oscillators.

10. Multivibrator circuits

10.1 State what is meant by multivibrator.
10.2 Describe the operation of transistor as a switch.
10.3 Explain the operation of astable, monostable and bistable mutivibrator circuits with wave shapes.
10.4 Mention the principle of operation of Schmitt trigger circuit.

11. **Wave shaping circuits**

11.1 Mention the types of wave shaping circuit.
11.2 Discuss the principles of RC and RL differentiating and integrating circuits.
11.3 Analyze the output waves for various input wave shapes of differentiating and integrating circuit.
11.4 Explain the operation of various clippers by PN junction diode,.

11.5 Describe the operation of of diode clamping circuit for different input wave shape.

12. **Integrated Circuit (IC)**
- 12.1 Define IC
- 12.2 List the advantages and limitation of IC's.
- 12.3 Mention the scale of integration.
- 12.4 Identify the types of Integrated circuits.
- 12.5 Describe the fabrication of monolithic integrated circuits.

13. **Operational Amplifier (Op- Amp)**
- 13.1 Define operational amplifier.
- 13.2 Recognize the Op-Amp symbol.
- 13.6 State the golden rule and virtual ground of Op-Amp.
- 13.7 List the characteristics of an ideal Op-Amp.
- 13.8 Explain the operation of Op-Amp in inverter, comparator, adder & subtractor

Practical : (Using Real component and Simulation Software)

1 Show skill in identifying the electronic components.
- 1.1 Observe the electronic components board and read the manuals.
- 1.2 Identify the different types of resistors with their values, tolerance and wattage.
- 1.3 Identify the different types of potentiometers with their values, & wattage.
- 1.4 Identify the different types of capacitors with their values, dc working voltages and types.
- 1.5 Identify the different types of diodes & rectifiers with the numbers and specifications.
- 1.6 Identify the different types of transistors and thyristors with their number and specifications.
- 1.7 Identify the different types of LED's, IC's and miniature relays with their number & specification.
- 1.8 Identify different types of transformer with their specification.
- 1.9 Identify different inductors with their values & current ratings.
- 1.10 Study the printed circuit boards.
- 1.11 Sketch the symbols of components used in electronic circuits.
- 1.12 Describe the basic function of each component.
- 1.13 Write a report on above activities.

2 Show skill for determining the values of different resistors and capacitors with the help of color code.
- 2.1 Select color code resistors & capacitors of different values.
- 2.2 Identify the colors and their numerical numbers.
- 2.3 Determine the value of resistors with tolerance.
- 2.4 Determine the value of capacitors and dc working voltage.
- 2.5 Write a report on above activities.

3 Show skill in performing soldering.
- 3.1 Select wires (single strand and multi strand) and cut wires to required length.
- 3.2 Select soldering iron, soldering tag and soldering lead.
- 3.3 Remove wire insulation to required length.
- 3.4 Clean and tin both iron and work piece.
- 3.5 Use a tinned iron in order to transfer adequate heat to the joint.
- 3.6 Joint two singles& multi stranded wires mechanically and solder.

4 Show skill in soldering & de-soldering of electronic components and wires to the other components and circuit boards.
- 4.1 Select electronic components, wires and PCB.
- 4.2 Determine the rating of the soldering iron suitable for the work piece.
- 4.3 Clean and tin both iron & work piece.
- 4.4 Feed new soldering materials to the tinned and heated joint, in order to produce a correctly soldering.

4.5 Check the quality of soldering.
4.6 Clean and tin iron and de-solder the joint and components.
4.7 Use solder suckers and solder braid for de-soldering.
4.8 Write a report on the Job.

5 Show skill in checking the semi-conductor diode.

5.1 Collect a range of semi-conductor diodes and manufactures literature.
5.2 Select the digital multi-meter and set the selector switch to ohm range.
5.3 Determine the specification of semi-conductor diode.
5.4 Compare the determined specification with that of manufactures literature.
5.5 Measure forward & reverse resistances of the diode.
5.6 Identify p and p side of the diode.
5.7 Determine the condition of the diode.

6 Show skill in sketching forward and reverse characteristics curves of a semiconductor diode.

6.1 Select meter, power supply, components and materials.
6.2 Complete circuit according to circuit diagram for forward bias.
6.3 Check all connections.
6.4 Measure forward bias and corresponding forward current.
6.5 Record results in tabular form.
6.6 Connect circuit according to circuit diagram of reverse bias.
6.7 Measure reverse bias and corresponding reverse current.
6.8 Record results in tabular form.
6.9 Sketch the curves form data.

7 Show skill in sketching waves of half wave rectifier circuit.

7.1 Select meter, component, oscilloscope and materials.
7.2 Complete circuit of a half wave rectifier according to circuit diagram.
7.3 Check the circuit before operation.
7.4 Measure the input and output voltage and observe wave shapes in the oscilloscope.
7.5 Sketch the output voltage wave shape.

8 Show skill in sketching waves of full wave center tapped rectifier circuit.

8.1 Select meter, component, oscilloscope and materials.
8.2 Complete a full wave rectifier circuit according to circuit diagram.
8.3 Check the circuit supply & polarity of supply.
8.4 Measure the input & output voltages and observe wave shapes in the oscilloscope.
8.5 Sketch the output voltage wave shape.
8.6 Compare the result with half-wave rectifier circuit.

9 Show skill in constructing full wave bridge rectifier.

9.1 Select meter, component, oscilloscope and materials.
9.2 Build the circuit according to the circuit diagram.
9.3 Check the circuit.
9.4 Measure the input and output voltage.
9.5 Observe wave shape.
9.6 Compare the result with other rectifiers.

10 Show skill in identifying the terminals of bipolar junction transistor.

10.1 Select PNP & NPN bipolar junction transistors.
10.2 Take AVO meter and manufacture's literature of transistor.
10.3 Identify transistor legs.
10.4 Measure base-emitter, base-collector, forward and reverse resistance.
10.5 Determine the specifications with help of manufacturer's literatures.
10.6 Identify PNP & NPN transistor.

11 Show skill in determining input and output characteristics of a transistor in common emitter connection.

11.1 Select component, AVO meters, circuit board and required materials.
11.2 Construct the circuit.
11.3 Adjust the biasing voltage to appropriate point.
11.4 Record input and output voltage and current.
11.5 Plot the curve with recorded data.

12 Show skill in measuring operating points (V_{CE} and I_C) for Transistor circuit.

12.1 Select a fixed bias transistor circuit materials.
12.2 Select required equipment.
12.3 Prepare the circuit.
12.4 Check the connections
12.5 Adjust the circuit**.**

13. Studythe operation of Op-Amp (for IC 741) as inverting adnoun inverting amplifier, adder, comparator, buffer and sub tractor.

13.1 Select the specific Op-Amp IC.
13.2 Select &Prepare the experimental circuit. the associate equipments and materials.
13.3 Buildup the circuit.
13.4 Observe the input and output wave shape on CRO screen.

14. Demonstrate the operation of a Hartly, Colpitt and R-C oscillator.

14.1 Draw the circuit diagram**.**
14.2 Select tools, equipment and materials.
14.3 Connect the circuit diagram.
14.4 Check and energize the circuit.
14.5 Observe the output for different frequencies

15. **Study the operation of a transistor astable, monostable & bi-stable multivibrator circuit. Select an experiment circuit.**

15.1 Select the required tools and materials.
15.2 Build up the circuit as per diagram.
15.3 Switch on the power supply.
15.4 Switch on the trigger signal.
15.5 Observe the wave shapes at each collector & base of the transistor

REFERENCE BOOKS :

1. A Text Book of Applied Electronics - R.S. SEDHA
2. Principles of Electronics - V. K. Mehta

66621	DATABASE APPLICATION	T	P	C
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1. Design Database Table

1.1. Follow OSH practices

1.1.1. Safe work practices are observed according to IT workplace guideline.

1.1.2. OSH hazards and incidents are reported to appropriate personnel according to Workplace procedures.

1.1.3. Safe workplace environment are assured.

1.2. Plan database table design

1.2.1. Pencil, pen, eraser and paper are collected to design the database as per client's requirement.

1.2.2. Object of the database are identified as per client's specification.

1.2.3. Entities, attributes and relationship are determined

1.2.4. Attribute name, data type and description /validation are defined in tabular form.

1.3. Incorporate basic design principles

1.3.1. Database application is selected as per requirement

1.3.2. Database application is opened

1.3.3. Database objects are selected as per plan requirement

1.3.4. Design tools are selected as per requirement

1.3.5. Design tools are used

1.3.6. Database objects are used.

1.4. Develop a table with fields and attributes

1.4.1. Field name are created according to the design plan

1.4.2. Data types of a fields are selected

1.4.3. Field's properties are set

1.4.4. Field descriptions are written as requirement

1.4.5. Primary key is determined and set

1.4.6. Index is established

1.4.7. Additional attribute is set as required

1.4.8. Table structure, field name and field properties are edited

1.4.9. Table structure is saved

1.5. Create a relationship between the tables

1.5.1. Common field in each table with same data type is ensured

1.5.2. Primary key and foreign key are assigned

1.5.3. Closing of all table are observed

1.5.4. Manipulation of relationship are performed

1.5.5. Database Tables are saved.

1.6. Shut down the computer and clean workplace

1.6.1. Database is closed

1.6.2. Computer is shut down according to Standard Operating Procedure(SOP)

1.6.3. Clean the workplace as per company rules

2. Create forms

2.1. Follow OSH practices

2.1.1. Safe work practices are observed according to IT workplace guideline.

2.1.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.

2.1.3. Safe workplace environment are assured.

2.2. Create form using wizard

2.2.1. Form object is selected from the object list
2.2.2. Create menu is selected from the ribbon
2.2.3. More forms tool is selected from the ribbon
2.2.4. Table is selected from the form wizard dialog box
2.2.5. Fields are selected from the available fields list
2.2.6. The procedure is finished by clicking the finish button Form is saved

2.3. Insert command buttons on the form using wizard

2.3.1. Previously created form is opened in design view
2.3.2. Design tab is selected from menu bar
2.3.3. Use control wizard is activated from the design ribbon
2.3.4. Command Button tool is drag & dropped in the form from the design ribbon
2.3.5. Appropriate category is selected from the category list
2.3.6. Appropriate action is selected from the action list
2.3.7. Button insertion is finished by clicking the finish button of the wizard

2.4. Create form manually

2.4.1. Form object is selected from the object list
2.4.2. Create menu is selected from the ribbon
2.4.3. Form design tool is selected from the ribbon
2.4.4. Add existing fields tool is selected under design ribbon
2.4.5. Table is selected from the available table list
2.4.6. Fields are drag & dropped in the form from the available fields list
2.4.7. Form is viewed in form view
2.4.8. Form is saved

2.5. Insert command buttons manually

2.5.1. Previously created form is opened in design view
2.5.2. Design tab is selected from menu bar
2.5.3. Command Button tool is drag & dropped in the form from the design ribbon
2.5.4. Property sheet is viewed by double clicking the button
2.5.5. Macros are Built by clicking the appropriate event under the event tab
2.5.6. Records and command buttons are Navigated
2.5.7. Form is saved

2.6. Manipulate the records using command buttons

2.6.1. Database is opened properly
2.6.2. Previously created form is opened in form view
2.6.3. Records are added by clicking Add new record button
2.6.4. Records are deleted by clicking Delete record button
2.6.5. Records are modified

3. Retrieve database information

3.1. Follow OSH practices

3.1.1. Safe work practices are observed according to IT workplace guideline.
3.1.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.
3.1.3. Safe workplace environment are assured.

3.2. Create simple query and retrieve required information

3.2.1. Existing database and location are accessed
3.2.2. Query is created by Query Wizard
3.2.3. Field are selected from existing table
3.2.4. Data are sorted using simple query
3.2.5. Parameter is used
3.2.6. Criteria is used for query
3.2.7. Query is run and saved

3.3. Create append query

3.3.1. Existing database and location are accessed as required
3.3.2. Query object is selected
3.3.3. Design view is opened of the query
3.3.4. Table(s) are added in the query
3.3.5. Fields are selected as per requirement
3.3.6. Append are performed as per required table.
3.3.7. Query is run and saved

3.4. Create delete query

3.4.1. Existing database and location are accessed as required
3.4.2. Query object is selected
3.4.3. Design view is opened of the query
3.4.4. Table(s) are added in the query
3.4.5. Fields are selected as per requirement
3.4.6. Deletion is performed as per requirement.
3.4.7. Query is run and saved

3.5. Perform Filter Operations

3.5.1. Filter are applied to table and forms
3.5.2. Filter are removed from table and forms

3.6. Sort Records

3.6.1. Data sorted in a table, form and query output in ascending/descending numerical /alphabetical order as required.
3.6.2. Report Based on table and query are created and saved as required

3.7. Shut down the computer and clean workplace

3.7.1. Database is closed
3.7.2. Computer is shut down according to Standard Operating Procedure(SOP)
3.7.3. Clean the workplace as per company rules

4. Generate database Reports

4.1. Follow OSH practices

4.1.1. Safe work practices are observed according to IT workplace guideline.
4.1.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.
4.1.3. Safe workplace environment are assured.

4.2. Create reports

4.2.1. Reports format are planed and determined
4.2.2. Report based on a table and query are created and saved as required.
4.2.3. The arrangement of data fields and headings within a report layout are changed as required.
4.2.4. Data under a specific heading (field) in a report are grouped in ascending/descending order as required.
4.2.5. Specific fields in a grouped report are presented by sum, minimum, maximum, average, count at appropriate break points.

4.3. Modify reports to include or exclude additional requirements

4.3.1. Text in headers, footers in a report are added or modified as necessary.
4.3.2. Report is deleted correctly.
4.3.3. Report is saved and closed correctly.

4.4. Sort Records

4.4.1. Data sorted in a table, form and query output in ascending/ descending numerical /alphabetical order as required.
4.4.2. Report Based on table and query are created and saved as required

4.5. Distribute and print reports in a suitable format

4.5.1. Table, forms, reports are previewed to ensure that errors are detected and corrected.
4.5.2. Report orientation, paper size changed as required

4.5.3. The results of query printed as required
4.5.4. Specific pages in a report or a complete report printed as required

4.6. Export data in various Formats

4.6.1. Report is exported as PDF or XPS.
4.6.2. Report is exported as word Document.
4.6.3. Report is exported as HTML Document.

5. Test and use database

5.1. Follow OSH practices

5.1.1. Safe work practices are observed according to IT workplace guideline.
5.1.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.
5.1.3. Safe workplace environment are assured.

5.2. Plan to test the correctness of the database

5.2.1. Possible errors are listed
5.2.2. Testing sequence is planed

5.3. Verify the feature of the database

5.3.1. Database is opened
5.3.2. Tables, forms and reports are opened
5.3.3. Features of the tables, forms and report are shown
5.3.4. Format of the text are modified if required
5.3.5. Alignment of the tables, forms and reports are changed as per client's requirements.

5.4. Navigate the buttons and forms

5.4.1. Forms are opened
5.4.2. Buttons of the forms are identified
5.4.3. Functions of the buttons are tested to verify the usability for every events.

5.5. Perform data entry operation

5.5.1. Forms are identified for data entry
5.5.2. Data is organized
5.5.3. Forms are opened for data entry
5.5.4. Data is entered in the concern field
5.5.5. Error is detected if any and corrected by modification if required.
5.5.6. All forms are filled up and checked for malfunctions
5.5.7. Malfunctions are corrected if required.

5.6. View and print reports

5.6.1. Table, forms, reports are previewed to ensure that errors are detected and corrected.
5.6.2. Report orientation, paper size changed as required
5.6.3. The results of query are printed as required
5.6.4. Specific pages in a report or a complete report is printed as required

BANGLADESH TECHNICAL EDUCATION BOARD
Agargoan, Dhaka-1207.

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

COMPUTER SCIENCE & TECHNOLOGY

TECHNOLOGY CODE: **685**

3rd SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

COMPUTER SCIENCE & TECHNOLOGY (685)

3rd 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	66631	Programming Essentials	2	3	3	40	60	25	25	150
2	66632	Web Design	0	6	2	00	00	50	50	100
3	66633	Graphics Design-II	0	6	2	00	00	50	50	100
4	66834	Digital Electronics	3	3	4	60	90	25	25	200
5	65931	Mathematics -III	3	3	4	60	90	50	0	200
6	65922	Physics -II	3	3	4	60	90	25	25	200
7	65722	Communicative English	1	3	2	20	30	50	0	100
Total			**12**	**27**	**21**	**240**	**360**	**275**	**175**	**1050**

66631 Programming Essentials

T	P	C
2	3	3

OBJECTIVES

- To develop knowledge and skill on programming Basics.
- To develop knowledge and skill to create, compile, debug & execute a program.

SHORT DESCRIPTION

Basics of programming Language; Basics of Python; Variables; Data types; Strings; Operators; Decision making and Looping statements; Lists; Tuples; Functions; File operations;

DETAIL DESCRIPTION

Theory:

1. Basics of Programming
   - 1.1. State Computer Program and Programming
   - 1.2. Explain Programming Language and its classification.
   - 1.3. State Generation of Programming Languages.
   - 1.4. Describe Translator Program.
   - 1.5. Uses of Computer Programs
   - 1.6. Describe Algorithm and Flowchart.
   - 1.7. Prepare Algorithm and Flowchart for simple problems.
   - 1.8. Explain the Process of Program Planning.

2. BASICS OF PYTHON
   - 2.1. Describe the History of Python.
   - 2.2. Explain the features of Python.
   - 2.3. Describe the Structure of Python Program
   - 2.4. State Identifiers and Keywords
   - 2.5. State Lines , Indentation, Multi-Line Statements and Multiple Statements on a Single Line
   - 2.6. State Quotation and Comments in Python
   - 2.7. State Command Line Arguments

3. VARIABLE AND DATA TYPES
   - 3.1. Assigning Values to Variables
   - 3.2. State Multiple Assignment
   - 3.3. Describe Standard Data Types
   - 3.4. Explain Data Type Conversion

4. STRINGS
   - 4.1. State Accessing Values in Strings and Updating Strings
   - 4.2. Uses of Escape Characters
   - 4.3. Explain String Special Operators and String Formatting Operator

4.4. Describe Triple Quotes and Unicode String
4.5. Write Simple programs using strings.

5. PYTHON OPERATORS

5.1. State Operators and their types.
5.2. Describe Arithmetic Operators, Comparison Operators and Logical Operators
5.3. State Assignment Operators, Bitwise Operators and Membership Operators Identity Operators
5.4. Explain Operators Precedence

6. DECISION MAKING

6.1. Describe the conditional and unconditional branching flow.
6.2. Explain If Statement and If…else Statement
6.3. State the nested if Statement
6.4. Write simple program using if, if…else and nested if.

7. LOOPS

7.1. Describe the conditional and unconditional Looping flow.
7.2. State For Loop
7.3. State While Loop
7.4. Explain The Infinite Loop and Nested Loops
7.5. State Break ,Continue and pass Statement
7.6. Write simple program using for and while loop

8. LISTS

8.1. Define Lists and its type.
8.2. Assigning Values in Lists
8.3. Explain Updating and Deleting List Elements
8.4. State Basic List Operations
8.5. Explain Built-in List Functions and Methods
8.6. Write simple program using Lists.

9. TUPLES

9.1. Assigning Values in Tuples
9.2. Explain Updating and Deleting Tuple Elements
9.3. Describe Basic Tuples Operations
9.4. State No Enclosing Delimiters:
9.5. Explain Built-in Tuple Functions
9.6. Write simple program using Tuples.

10. FUNCTIONS

10.1. Defining a Function
10.2. State Calling a Function
10.3. Explain Passing by Reference Versus Passing by Value
10.4. Describe Function Arguments
10.5. Uses of Date and Time Functions.
10.6. Write simple program using functions.

11. FILES I/O

11.1. Printing to the Screen
11.2. Reading Keyboard Input
11.3. Uses of input Function
11.4. Describe Opening and Closing Files
11.5. Explain Reading and Writing Files

Practical:

Perform skill to create, compile, debug & execute programs to solve specific problems.

1. **Simple programs using basic structure of a programming Language (Python).**
   1.1. A program for printing a message.
   1.2. A program for adding two integer numbers.
2. **Simple programs using variables**
   2.1. A program to calculate the average of a set of N numbers.
   2.2. A program to convert the given temperature in Fahrenheit to Celsius and vice versa.
   2.3. A program to calculate the area of a circle.
   2.4. Write similar programs using variables.
3. **programs using operators**
   3.1. A program to convert days to months and days.
   3.2. A program to calculate the area of a triangle.
   3.3. A program to compare two integer numbers.
   3.4. Write similar programs using operators.
4. **Programs using Branching Statements.**
   4.1. A program to select and print the largest of the three numbers.
   4.2. A program to compute the roots of a quadratic equation.
   4.3. Write similar programs using Branching Statements.
5. **Programs using Looping Statements**
   5.1. A program to print odd or even numbers from 1 to 100.
   5.2. A program to find the maximum or minimum number from a set of numbers
   5.3. A program for searching prime numbers.
   5.4. Write similar programs using Loop Statements.

6. **Programs using Lists.**
   - 6.1. A program to sort numbers in ascending or descending order using one dimensional array.
   - 6.2. A program to print numbers in two dimensional forms.
   - 6.3. Write similar programs using Lists.

7. **Programs using functions.**
   - 7.1. A program to calculate the area of a triangle using function.
   - 7.2. A program that uses a function to sort an array of integers.
   - 7.3. A program to calculate factorial of any integer using recursive function.
   - 7.4. Write similar programs using functions.

8. **Programs using files.**
   - 8.1. A program to store information to or to read information from file.
   - 8.2. Write similar programs using files.

Reference books:

1. Learning Python – Mark Lutz
2. Website List:
   http:// python.howtocode.com.bd
   http:// www.learnpython.org
   http://pythontutor.com

66632	Web Design	T	P	C
		0	6	2

Objectives

To be able to perform Web Design.

To be able to perform Design to HTML.

Short Description

This Subject covers the knowledge, skills and attitudes required to –

- Enter text and graphic medias for the webpage using HTML (Hypertext Mark-up Language) and check the completed website for QA (Quality Assurance) using latest common browsers.
- Use advanced web editing software's to design and develop interactive websites and check the completed website for accuracy using common browsers.
- Convert design (.psd, in design, image etc) to HTML and check the completed HTML for accuracy using common browsers.
- Add animations for website using CSS3, HTML5 or latest.
- Develop Cascading Style Sheets (CSS) that are linked to a HTML document in order to externally define and control styles and structure to enhance and achieve commonality among web documents, and check compatibility of the completed CSS with common browsers.
- Add and edit animations for website using common front end framework.
- Enter dynamic features for the Client Side Dynamic Web page using JavaScript and check the completed website for accuracy using common browsers.

1. Create and Edit Webpage Using HTML

1.1. Follow OSH practices
  1.1.1. Safe work practices are observed as according to workplace procedures.
  1.1.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.
  1.1.3. Turn on your PC properly.

1.2. Plan a website to meet client requirements.
  1.2.1. The purpose and intended audience of the website are identified.
  1.2.2. The design requirements and constraints are identified.
  1.2.3. A conceptual design is developed.
  1.2.4. Necessary software installed and checks other requirement.

1.3. Create the website using hypertext mark-up language in accordance with the design specifications.
  1.3.1. Structure and element tags are added and attributes are assigned to meet client requirements in terms of the layout and formatting of the pages and enhancements using given templates and follow the web standards.
  1.3.2. Webpage content are added to the site, and also formatted in accordance with client requirements and be aware of legislation.
  1.3.3. Hyperlinks are added to allow successful navigation between the pages of the website.
  1.3.4. A sitemap is created that allows for ease of access to content
  1.3.5. The website is saved to a file by use of the program tools available for the task.

1.4. Test the website.

1.4.1. The website is tested to ensure functionality, correct any errors and log in according to the testing procedures in the plan.

1.4.2. The website is opened in a variety of common browsers and check for accessibility, readability, legibility and presentation in accordance with client requirements.

1.4.3. The website is evaluated for fitness for purpose in terms of the purpose, target audience and specifications of client requirements.

2. Use web design and content guidelines

2.1. Plan a website to meet the client requirements.

2.1.1. The purpose and intended audience of the website are identified.

2.1.2. The design requirements and constraints are identified.

2.1.3. A conceptual design is developed.

2.1.4. Necessary software installed and checks other requirement.

2.2. Select web editing softwares

2.2.1. Appropriate web editing software is started.

2.2.2. A virtual web folder is created in application server

2.2.3. A website project is created in editing tool

2.3. Create the website using templates

2.3.1. Use appropriate front end design framework i.e. Twitter bootstrap, Zurb Foundation, uikit etc.

2.3.2. Structure and element tags are added and attributes are assigned to meet client requirements in terms of the layout and formatting of the pages and enhancements using given design templates.

2.3.3. Contents (Text and graphics) are added to the site, and also formatted in accordance with client requirements by maintain standards and be aware of legislation.

2.3.4. Hyperlinks are added to allow successful navigation between the pages of the website.

2.3.5. A sitemap is created that allows for ease of access to content

2.3.6. The website is saved to a file by use of the program tools available for the task.

2.4. Test the website.

2.4.1. The website is tested to ensure functionality, correct any errors and log in according to the testing procedures in the plan.

2.4.2. The website is opened in a variety of common browsers and check for accessibility, readability, legibility and presentation in accordance with client requirements.

2.4.3. The website is evaluated for fitness for purpose in terms of the purpose, target audience and specifications of client requirements.

3. Convert design to HTML

3.1. Plan a website to meet client requirements.

3.1.1. The purpose and intended audience of the website are identified.

3.1.2. The design requirements and constraints of using provided templates are identified.

3.1.3. Required design is developed.

3.1.4. Necessary software installed and checks other requirement.

3.2. Convert design to HTML.

3.2.1. The given design template is converted into the required format (image, text etc).

3.2.2. Website layout developed.

3.2.3. Web content (image, text etc) placed into the right position by using proper HTML tags.

3.2.4. Content is formatted properly by maintain standards and be aware of legislation.

3.2.5. Structure and element tags are added and attributes are assigned to meet the specifications of the brief in terms of the enhancements, layout and formatting of the pages using given design.

3.2.6. Hyperlinks are added to allow successful navigation between the pages of the website.

3.2.7. The HTML file is named properly and saved in a proper location.

3.3. Test the website.

3.3.1. The website is tested to ensure functionality, correct any errors and log in according to the testing procedures in the plan.

3.3.2. The website is opened in a variety of common browsers and check for accessibility, readability, legibility and presentation in accordance with client requirements.

3.3.3. The website is evaluated for fitness for purpose in terms of the purpose, target audience and specifications of client requirements.

4. Use Web Animation (Basic level)

4.1. Select appropriate language to create animation.

4.1.1. Appropriate animation language file is attached.

4.1.2. Necessary plug-ins are installed. (animate.css)

4.1.3. Necessary software installed and checks other requirement.

4.2. Use animation in the website

4.2.1. Appropriate style sheet is added to the project.

4.2.2. Animation is applied onto the website by maintain standards and be aware of legislation.

4.3. Animation test

4.3.1. The animation is tested to ensure functionality, correct any errors and log in according to the testing procedures in the plan.

4.3.2. The website is opened in a variety of common browsers and check for accessibility, readability, legibility and presentation in accordance with client requirements.

4.3.3. The website is evaluated for fitness for purpose in terms of the purpose, target audience and specifications of client requirements.

5. Develop Cascading Style Sheet (CSS)

5.1. Determine Purpose and Accessibility

5.1.1. Plan to purpose of the HTML document is identified.

5.1.2. The IDE where the CSS will be used is identified and necessary software installed and checks other requirement.

5.1.3. Accessibility options are identified and determine for visually, physically or otherwise impaired persons.

5.2. Set styles

5.2.1. Appropriate styles that are to be controlled by the CSS are identified.

5.2.2. The styles are defined and documented in accordance with established design principles or business guidelines.

5.3. Create CSS

5.3.1. CSS is created using the determined styles by maintain standards and be aware of legislation.

5.3.2. CSS is edited and changes are confirmed in linked HTML document

5.3.3. CSS is tested / validated according to established design principles or business guidelines. (https://jigsaw.w3.org/css-validator)

5.4. Link CSS to HTML documents

5.4.1. CSS is linked to the HTML document

5.4.2. CSS styles are applied to the mark-up language document.

6. Use Web Animation (Intermediate level)

6.1. Select the animation editing tool

6.1.1. Appropriate front end framework (slick slider, cycle slider, wow.js, http://zurb.com/playground/motion-ui, bootstrap component jQuery or relevant) is determined.

6.1.2. Appropriate animation tool is started

6.1.3. Necessary plug-ins are installed by maintain standards and be aware of legislation.

6.2. Prepare animation using editing tool

6.2.1. Plan a conceptual animation flow is determined.

6.2.2. Animation is edited and prepared to be implemented in the webpage

6.2.3. Necessary software installed and checks other requirement.

6.3. Use animation in the website

6.3.1. Required and accompanying files are included at right place and appropriate class or id declared plus properly activated.

6.3.2. The website is opened in a variety of common browsers and check for accessibility, readability, legibility and presentation in accordance with client requirements.

7. Develop a Client Side Dynamic Webpage using JavaScript (Basic Level)

7.1. Plan the dynamic features to be added to a website to meet client requirements.

7.1.1. Plan the purpose and intended audience of the website are identified.

7.1.2. The design requirements and constraints are identified.

7.1.3. A conceptual design is developed.

7.1.4. Necessary software installed and checks other requirement.

7.2. Add JavaScript to the website in accordance with the design specifications.

7.2.1. JavaScript element is added and attributes are assigned to meet client requirements in terms of the layout and formatting of the pages and enhancements.

7.2.2. Interactivity is added, edited and formatted to the website in accordance with client requirements.

7.2.3. Dynamic content is added in each and every page, if required, in accordance with client requirements.

7.2.4. The website is saved to a file by use of the program tools available for the task.

7.3. Test the website.

7.3.1. The theme is tested to ensure compatibility, functionality, correct any errors and log in according to the testing procedures in the plan.

7.3.2. The theme is opened in a variety of common browsers and check for accessibility, readability, legibility and presentation in accordance with client requirements.

7.3.3. The theme is evaluated for fitness for purpose in terms of the purpose, target audience and specifications of client requirements.

66633	Graphic Design II	T	P	C
		0	6	2

Objectives

To be able to perform Design.

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Short Description

This Subject covers the knowledge, skills and attitude required to –

- Demonstrate creative Design work using multiple Graphics Design Software
- Create Template using Graphic Design Software.
- Develop graphics incorporating a range of features for cross-media publishing based on a client brief using a high-end application.
- Find recent developments in Graphic Design.

1. Perform creative design work using multiple Graphics Design Software

1.1. Follow OSH practices
- 1.1.1. Safe work practices are observed according to workplace procedures
- 1.1.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.

1.2. Preparations
- 1.2.1. Specify the required Creative Design work
- 1.2.2. Identify multiple Graphics Design Software as per requirement
- 1.2.3. Collect required contents
- 1.2.4. Identify appropriate Tools and arrange them as needed

1.3. Initiate Design work
- 1.3.1. Set ruler/unit/Grids/Guides as per requirement
- 1.3.2. Prepare Key Drawing / Design Layout as per requirement
- 1.3.3. Set Various Marks for Illustration Software
- 1.3.4. Apply Layer lock
- 1.3.5. Transfer Design Layout to Photo Editing Software

1.4. Create Design Background
- 1.4.1. Set resolution and colour mode as per requirement
- 1.4.2. Set guides to Photo Editing Software for designing background as required
- 1.4.3. Insert graphical contents for designing background as required
- 1.4.4. Manipulate graphical contents
- 1.4.5. Apply effects as per requirement
- 1.4.6. Save the Design for further use in appropriate File Format

1.5. Complete Design
- 1.5.1. Place and link the Design Background to Illustration Software
- 1.5.2. Insert vector related contents
- 1.5.3. Apply font attributes and typographical design
- 1.5.4. Apply Design Principles as per requirements

1.5.5. Complete the Design work

1.6. Review and Finalize

1.6.1. Use Artwork and Preview

1.6.2. Use Layer Hide-Unhide option

1.6.3. Create Outline and Group

1.6.4. Save in appropriate File Format

1.6.5. Transfer the image to recipient

2. Create Template using Graphic Design Software

2.1. Analyse design brief

2.1.1. Client's design brief is analysed and the requirements are identified

2.1.2. Key devices are selected and collected as per job requirements

2.2. Arrange elements on a page

2.2.1. Page layout application software are selected

2.2.2. Client copy, images, basic elements are created and assembled to conform to the design brief

2.2.3. Text is prepared and required fonts and font size are used

2.2.4. The help function is accessed if required and solution to queries found

2.2.5. Document set up is completed to conform to the design brief.

2.3. Finalise artwork

2.3.1. Additional text are manipulated and added

2.3.2. Pages and combined elements are composed correctly to suit specified page size

2.3.3. Artworks are outlined.

2.3.4. Bleed allowance, margins and borders are incorporated as per workplace standard

2.3.5. Character and paragraph attributes are added and changed as per job requirements.

2.4. Check quality

2.4.1. Text is reviewed for possible errors and omissions and errors are corrected

2.4.2. A hard copy proof is printed and rechecked for errors, omissions and the overall balance of the layout and correct tonal quality

2.4.3. Trim marks and margins are correctly placed

2.4.4. Necessary changes are made and reviewed on screen and re-proofed as required

2.4.5. The job is saved according to enterprise procedures

2.4.6. A proof or PDF is created

3. Develop materials for output

3.1. Create balance image quality and file size

3.1.1. Key devices are selected & collected as per job requirements.

3.1.2. Graphic software are selected as per requirements

3.1.3. Graphics files are opened and design brief requirements are confirmed.

3.1.4. Graphics are repeated efficiently using a symbol or stamp to reduce file size

3.1.5. Slices are created from objects, layers or groups and updated as required

3.1.6. Type anti-aliasing is demonstrated.

3.1.7. Tasks are automated and where necessary scripts are used for automation.

3.2. Manipulate objects and text.

3.2.1. Objects and text are manipulated and edited according to design brief.

3.2.2. Repetition tools are identified and used to create duplicates and then are manipulated as a

group

3.2.3. Complex shapes are created and edited.

3.2.4. Retouching elements are used

3.3. Import images

3.3.1. Bitmap images are embedded and / or linked in the file

3.3.2. Placed Bitmaps are modified and / or duplicated according to design requirements

3.3.3. Bitmaps are masked and / or an opacity mask is added

3.3.4. Layered file is exported to image editing program and edited

3.4. Develop variable templates

3.4.1. Based on the design brief, objects are identified within the template as variables

3.4.2. An automated script or an image server is used to ensure variations, using data stored in any ODBC-compliant source

3.4.3. The template variables are tested to ensure correct operation.

3.5. Separate Colour artwork

3.5.1. The correct format for the colour separation is determined by the requirements of the pre-press workflow system

3.5.2. Command preferences are set to correct preferences for print quality and process

3.5.3. Based on printer feedback the colour separation options are set according to print requirements of the design brief

3.5.4. Process and spot colours are combined as required

3.6. Prepare for final media

3.6.1. A screen frequency value appropriate for the print quality is selected and colour separation preferences are saved

3.6.2. Spreads and chokes traps are created to avoid mis-registration

3.6.3. The overlapping and overprint of objects are defined

3.6.4. A proof is created and the separations checked, any required editing is completed and the file is saved

3.6.5. Metadata tags are embedded to catalogue, organise and retrieve artwork

3.6.6. For cross-media publishing purposes web-safe colours are selected

3.6.7. File formats are chosen to best represent artwork styles

3.6.8. Objects are linked to create an image map that meets design requirements

3.6.9. Objects are layered to create animation frames and exported for animation set up

3.6.10. Compression options are selected that keep the image quality high and the file size low.

3.6.11. Export options are set to the best settings for the final media and the file is saved and exported

4. Find and use recent developments of tools and procedure in graphic Design

4.1. Search for new Developments

4.1.1. Use Internet and other sources to find new Software or Software Versions

4.1.2. Identify the new developments or the new Versions

4.2. Determine the new developments in design arena.

4.2.1. Compare the new tools with the old ones

4.2.2. Find Tutorials/Learning Materials for the new tools

4.3. Adopt the new Developments

4.3.1. Use the new tools on a trial basis to identify the developments

4.3.2. Identify the benefits that the new tools can provide

4.3.3. Adopt the new tools for professional use

66834 DIGITAL ELECTRONICS

T	P	C
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AIMS

- To develop knowledge & skills on codes and binary arithmetic operation.
- To provide knowledge & skills on logic gates, logic circuits, Boolean algebra and logic families.
- To assist to acquire the knowledge & skills on combinational logic circuit.
- To acquire knowledge & skills on Registers, Counters, Memories, Converters.

SHORT DESCRIPTION

Basic concept of digital electronics; Logic gates, Boolean algebra and logic simplification &Combinational logic circuits.

DETAIL DESCRIPTION

1 Understand basic concept of digital electronics.

1.1 Define digital electronics& Digital Signal.
1.2 Mention the characteristics of digital signal.
1.3 Describe the advantages of working in digital mode.
1.4 Define logic level of digital signal.
1.5 Identify DC voltage level of digital signal.
1.6 Describe parameters of a digital pulse waveform such as rise time, fall time, pulse width and duty cycle.

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2 Understand the binary arithmetic operation.

2.1 Define decimal, binary, octal and hexadecimal number system
2.2 Define BCD code, Excess–3code, Gray code, Hamming code, Unicode, and ASCII code.
2.3 Practice the conversion of one code to another.
2.4 Describe the addition and subtraction of BCD coded number and Excess-3 code.
2.5 State parity checked code and Hamming code.
2.6 Describe the error detection and correction with parity checked code.

3 Understand the concept of Logic gates.

3.1 Define logic gate.
3.2 Classify logic gate.
3.3 Explain logical statement, truth table, Boolean equation and symbol of AND, OR, NOT, NOR, NAND, EX-OR and EX-NOR gates.
3.4 Show that NAND & NOR gates used as Universal logic gates.
3.5 State the applications of logic gates.

4 Understand the features of the logic families and digital IC's.

4.1 Classify logic families.
4.1 Define SSI, MSI, LST and VLSI.
4.2 Describe Transistor logic families (DTL & TTL).
4.3 Describe MOS logic families (P-MOS, N-MOS & C-MOS)
4.4 State the characteristics of digital IC's.

4.5 State the meaning of the terms propagation delay time, speed, noise immunity, power dissipation, fan-in, fan-out, operating temperature and power rating of logic circuits.

5 Understand the concepts of electronic circuit of logic gates & logic IC's.

5.1 Describe the operation of standard TTL NAND gate.
5.2 Describe the operation of CMOS NAND & NOR gates.
5.3 State special logic gates such as buffer, tri-state and expandable gates.
5.4 Describe fixed function Integrated circuit IC's such as AND, OR, NAND etc.
5.5 Mention IC package, code numbers, and important specification of TTL/MOS commercial IC gates.

6 Understand logic simplification& design of digital circuit.

6.1 State the theorems of Boolean algebra.
6.2 State Demorgan's theorems and its applications.
6.3 Determine the terms-Sum of Product (SOP) form and Product Of Sum (POS) form.
6.4 Determine the SOP & POS form from truth table.
6.5 Mention the basic principle of ORing and ANDing.
6.6 Define Karnaugh Map.
6.7 State the structure of Karnaugh map.
6.8 State the simplification process of Boolean expression from a K-map and design logic circuit (up to 4 variables).

7 Understand Various combinational logic circuits.

7.1 Define combinational logic circuit with example.
7.2 Describe the operation of half adder and half Sub tractor.
7.3 Describe the operation of full adder and full Sub tractor.
7.4 Describe the operation of 4 bit parallel adder.
7.5 Describe the operation of 4 bit subtraction circuit.
7.6 Describe the operation of 4 bit BCD adder.
7.7 Describe the operation of multipliers & divisors.
7.8 Mention the application of combinational logic circuit.

8 Understand the concepts of encoder, decoder and display devices.

8.1 Define Encoder and Decoder.
8.2 Describe the operation of encoder and decoder circuit.
8.3 State the principle of operation of LCD, LED, seven-segment and dot matrix display.
8.4 Describe the operation of commonly used 4-bit BCD decoder/driver for seven segment display of common anode/cathode type.
8.5 Application of Encoder and Decoder.

***9* Understand the features of multiplexers and demultiplexer.**

9.1 Define multiplexers and demultiplexer.
9.2 Describe the operation of 2:1, 4:1 and 8:1 multiplexer with logic diagram.
9.3 Describe the operation of 1:2, 1:4 and 1:8 demultiplexer with logic diagram.
9.4 State the use of multiplexer &demultiplexer.
9.5 Explain the operation of Binary comparator.

10 Understand the features of sequential logic circuits.

10.1 Define sequential logic circuit
10.2 State the terms clock, timing diagram & latch of digital system.
10.3 Explain the operation of basic SR latch, D flip-flop, clocked flip-flop, J-K flip-flop, Toggle operation & J-K master-slave flip-flop.
10.4 State the concept of positive & negative edge triggering and level triggering,
11.8 Describe the pin diagram of commonly used flip-flop IC's.

11 Understand the concepts of Data shift registers &counters.

11.1 Define Data shift registers & counters
11.2 State the operation of Shift right, shift left, SISO,SIPI, PISO,PIPO & universal shift register.
11.3 State the operation of 4-bit Up/Down counter, MOD counter, Programmable counter.
11.4 Application of registers & counters.

12 Understand the concepts of Memories.

12.1 Define Memories.
12.2 Classify Memories.
12.3 Explain the internal organization of semiconductor memory.
12.4 State the operation of static and dynamic RAM.
12.5 Describe the principle and operation of ROM, PROM, EPROM and EEPROM.
12.6 List the application of some commercial memory ICs.

13 Understand D/A converter.

13.1 State the principle of D/A conversion.
13.2 Mention the types of D/A converter.
13.3 Explain the operation of a binary weighted D/A and R-2R ladder D/A converter.
13.4 State the terms – resolution and accuracy, offset error and settling time of D/A converter.
13.5 State the application of D/A converter.

14 Understand A/D converter.

14.1 State the principle of A/D conversion.
14.2 List the type of A/D converter.
14.3 State the working principle of 3-bit parallel A/D converter.
14.4 Describe the operation of Digital Ramp A/D converter
14.5 Explain the operation of successive approximation and dual slope A/D converter.
14.6 State the terms – resolution, accuracy, and conversion time of A/D converter.
14.7 List the applications of popular A/D converter ICS.
14.8 Describe the operation of sample & hold circuits and its application.

Practical :

1 To verify the truth tables of logic gates (OR, AND, NOT,NAND & NOR)

1.1 Select logic gate ICs.
1.2 Select appropriate circuits, required tools, equipments and materials.
1.3 Insert the selected ICs to the Breadboard.
1.4 Connect the circuits as per diagram.
1.5 Switch on the DC power supply,
1.6 Verify the truth tables.

2 To verify the Truth table of X-OR & X-NOR gate using basic gates.

2.1 Select logic gate ICs.
2.2 Select appropriate circuits, required tools, equipments and materials.
2.3 Insert the selected ICs to the Breadboard.
2.4 Connect the circuits as per diagram.
2.5 Switch on the DC power supply,
2.6 Verify the truth tables.

3 To Show the operation of NAND & NOR gate as universal gates.

3.1 Select logic gate ICs of NAND gate& NOR gate.
3.2 Select appropriate circuits, required tools, equipments and materials.
3.3 Insert the selected ICs to the Breadboard.
3.4 Connect the circuits as per diagram for AND OR & NOT gate.
3.5 Switch on the DC power supply,
3.6 Verify the truth tables of AND OR & NOT gate operation.

4 To design & develop a code converter circuits and observe its output operation.

4.1 Select logic gate ICs.
4.2 Select appropriate circuits, required tools, equipments and materials.
4.3 Insert the selected ICs to the Breadboard.
4.4 Connect the circuits as per diagram.
4.5 Switch on the DC power supply,
4.6 Verify the truth tables

5 To verify the functions of half adder &half sub tractor.

5.1 Select ICs.
5.2 Select required tools, equipments and materials.
5.3 Draw the pin diagram and internal connection.
5.4 Insert the selected ICs to the Breadboard.
5.5 Draw appropriate circuits.
5.6 Connect the circuits as per diagram.
5.7 Switch on the DC power supply,
5.8 Verify the truth tables.

6 To verify the functions of full adder& full sub tractor.

6.1 Select ICs.
6.2 Select required tools, equipments and materials.
6.3 Insert the selected ICs to the Breadboard.
6.4 Draw the pin diagram and internal connection.
6.5 Draw appropriate circuits.
6.6 Connect the circuits as per diagram.
6.7 Switch on the DC power supply,
6.8 Verify the truth tables.

7 To verify the output operation of binary 4 bit parallel adder.

7.1 Select appropriate ICs.
7.2 Select required tools, equipments and materials.
7.3 Insert the selected ICs to the Breadboard.
7.4 Draw the pin diagram and internal connection.
7.5 Draw appropriate circuits.
7.6 Connect the circuits as per diagram.
7.7 Switch on the DC power supply,
7.8 Verify the truth tables.

8 To Show the operation of encoder& decoder.

8.1 Select appropriate ICs.
8.2 Select required tools, equipments and materials.
8.3 Insert the selected ICs to the Breadboard.
8.4 Draw the pin diagram and internal connection.
8.5 Draw appropriate circuits.
8.6 Connect the circuits as per diagram.
8.7 Switch on the DC power supply,
8.8 Verify the truth tables.

9 To Show the operation of a decoder driver & display operation using 7 segment display.

9.1 Select appropriate ICs.
9.2 Select required tools, equipments and materials.
9.3 Insert the selected ICs to the Breadboard.
9.4 Draw the pin diagram and internal connection.
9.5 Draw appropriate circuits.
9.6 Connect the circuits as per diagram.
9.7 Switch on the DC power supply,
9.8 Verify the truth tables.

10 To Show the operation of multiplexer & demultiplexer.

10.1 Select appropriate ICs.
10.2 Select required tools, equipments and materials.

10.3 Insert the selected ICs to the Breadboard.
10.4 Draw the pin diagram and internal connection.
10.5 Draw appropriate circuits.
10.6 Connect the circuits as per diagram.
10.7 Switch on the DC power supply,
10.8 Verify the truth tables.

11 To verify the truth table of different S-R & D flip-flops.

11.1 Select appropriate ICs.
11.2 Select required tools, equipments and materials.
11.3 Insert the selected ICs to the Breadboard.
11.4 Draw the pin diagram and internal connection.
11.5 Draw appropriate circuits.
11.6 Connect the circuits as per diagram.
11.7 Switch on the DC power supply,
11.8 Verify the truth tables.

12 To verify the truth table of different J-K flip-flops.

12.1 Select appropriate ICs.
12.2 Select required tools, equipments and materials.
12.3 Insert the selected ICs to the Breadboard.
12.4 Draw the pin diagram and internal connection.
12.5 Draw appropriate circuits.
12.6 Connect the circuits as per diagram.
12.7 Switch on the DC power supply.
12.8 Verify the truth tables.
12.9 Observe the Toggle operation in JK flip-flop.

13 To verify the operation of Binary comparator.

13.1 Select appropriate ICs.
13.2 Select required tools, equipments and materials.
13.3 Insert the selected ICs to the Breadboard.
13.4 Draw the pin diagram and internal connection.
13.5 Draw appropriate circuits.
13.6 Connect the circuits as per diagram.
13.7 Switch on the DC power supply,
13.8 Verify the truth tables.

14 To verify the operation of Different Shift Registers.

14.1 Select appropriate ICs.
14.2 Select required tools, equipments and materials.
14.3 Insert the selected ICs to the Breadboard.
14.4 Draw the pin diagram and internal connection.
14.5 Draw appropriate circuits of shift registers.
14.6 Connect the circuits as per diagram.
14.7 Switch on the DC power supply.
14.8 Verify the truth tables.

15 To verify the operation of Different Memories.

15.1 Select appropriate ICs.
15.2 Insert the selected ICs to the Breadboard.
15.3 Draw the pin diagram and internal connection.
15.4 Draw appropriate circuits.
15.5 Select required tools, equipments and materials.
15.6 Connect the circuits as per diagram.
15.7 Switch on the DC power supply,
15.8 Verify the Memory Read/Write operations.

16 To verify the operation of Different Counters.

16.1 Select appropriate ICs.
16.2 Insert the selected ICs to the Breadboard.
16.3 Draw the pin diagram and internal connection.
16.4 Draw appropriate circuits.
16.5 Select required tools, equipments and materials.
16.6 Connect the circuits as per diagram.
16.7 Switch on the DC power supply,
16.8 Verify the truth tables.

REFERENCE BOOKS

1. Digital Fundamentals-Thomas L. Floyd
2. Digital Principles– Roger L. Tokhem
3. Digital system – Ronald J. Tocci and Widmer.
4. Principle of Digital Electronics & Application - Malvino
5. Digital Systems: Principles and Applications – Ronald J, Tocci, Neal Widmer, Greg Moss
6. Schaums Outline Introduction to Digital Systems -- James Palmer, David Perlman

65931 **MATHEMATICS -3** **T P C**
3 3 4

AIMS

- To enable to calculate the areas of regular polygons, hexagons, octagon, hydraulic mean depth (HMD) of a channel, area occupied by water of circular culvert. Excavation work.
- To provide the ability to calculate volume of regular solids like pyramid frustum of pyramid, prismoid, wedge and area of curved surfaces.
- To enable to use the knowledge of gradient of a straight line in finding speed, acceleration etc.
- To enable to use the knowledge of conic in finding the girder of a railway bridge, cable of a suspension bridge and maximum height of an arch.
- To make understand the basic concept and techniques of composition and resolution of vectors and computing the resultant of vectors.

- **SHORT DESCRIPTION**

Menstruation : Area of rectangles, squares, triangles, quadrilaterals, parallelograms, rhombus, trapezium, circle, sector, segment; Volume of rectangular solids, prism, parallelepiped, pyramids, cones, spheres, frustum of pyramid and cone; Area of curved surface of prism, Cylinder cone, pyramid and frustum of cone.

Co-ordinate Geometry: Co-ordinates of a point, locus and its equation, straight lines, circles and conic.

Vector: Addition and subtraction, dot and cross product.

DETAIL DESCRIPTION

MENSURATION:

1 Apply the concept of area of triangle.

1.1 Find the area of triangle in the form,

i) $A=\frac{\sqrt{3}}{4}a^2$, a = length of a side of equilateral triangle.

ii) $A=\frac{c}{4}\sqrt{4a^2-c^2}$, where a = length of equal sides, c = third side.

iii) $A=\sqrt{s\ (s-a)(s-b)(s-c)}$, where a, b, c = length of the sides of a triangle and 2s is the perimeter of the triangle.

1.2 Use formula in 1.1 to solve problems.

2 Apply the concept of finding areas of quadrilateral & Parallelogram & finding areas of rhombus & trapezium.

2.1 Define quadrilateral & Parallelogram.
2.2 Find the areas of quadrilateral when off sets are given.
2.3 Find the areas of a parallelogram.
2.4 Solve problems using above formulae.
2.5 Define rhombus & trapezium.
2.6 Find the areas of rhombus when the diagonals are given.
2.7 Find the areas of trapezium in terms of its parallel sides and the perpendicular distance between them.
2.8 Solve problems related to rhombus & trapezium.

3 Apply the concept of finding areas of regular polygon.

3.1 Define a regular polygon.
3.2 Find the area of a regular polygon of n sides, when
i) The length of one side and the radius of inscribed circle are given.
ii) The length of one side and the radius of circumscribed circle are given.
3.3 Find the area of a regular.
a) Hexagon
b) Octagon when length of side is given.
3.4 Solve problems of the followings types:

A hexagonal polygon 6 m length of each side has a 20 cm width road surrounded the polygon. Find the area of the road.

4 Understand areas of circle, sector and segment.

4.1 Define circle, circumference, sector and segment.
4.2 Find the circumference and area of a circle when its radius is given.
4.3 Find the area of sector and segment of a circle.
4.4 Solve problems related to the above formulae.

5 Apply the concept of volume of a rectangular solid.

5.1 Define rectangular solid and a cube.
5.2 Find geometrically the volume of a rectangular solid when its length, breadth and height are given.
5.3 Find the volume and diagonal of a cube when side is given.
5.4 Solve problems with the help of 6.2 & 6.3.

6 Apply the concept of surface area, volume of a prism, parallelepiped and cylinder.

6.1 Define a prism, parallelepiped and a cylinder.
6.2 Explain the formulae for areas of curved surfaces of prism, parallelepiped and cylinder.
6.3 Explain the formulae for volume of prism, parallelepiped and cylinder when base and height are given.
6.4 Solve problems related to 7.2, 7.3.

7 Apply the concept of the surface area, volume of pyramid, cone and sphere.

7.1 Define pyramid, cone and sphere.
7.2 Explain the formula for areas of curved surfaces of pyramid, cone and sphere.
7.3 Explain the formula for volumes of pyramid, cone and sphere.
7.4 Solve problems related to 8.2, 8.3.

CO-ORDINATE GEOMETRY

8 Apply the concept of co-ordinates to find lengths and areas.

8.1 Explain the co-ordinates of a point.
8.2 State different types of co-ordinates of a point.
8.3 Find the distance between two points (x_1, y_1) and (x_2, y_2).
8.4 Find the co-ordinates of a point which divides the straight line joining two points in certain ratio.
8.5 Find the area of a triangle whose vertices are given.
8.6 Solve problems related to co-ordinates of points and distance formula.

9 Apply the concept of locus & the equation of straight lines in calculating various Parameter.

9.1 Define locus of a point.
9.2 Find the locus of a point.
9.3 Solve problems for finding locus of a point under certain conditions.
9.4 Describe the Equation x=a and y=b and slope of a straight line.
9.5 Find the slope of a straight line passing through two point $(x_1, y_1,)$ and (x_2, y_2).
9.6 Find the equation of straight lines:
(i) Point slope form.
(ii) Slope Intercept form.
(iii) Two points form.
(iv) Intercept form.
(v) Perpendicular form.
9.7 Find the point of intersection of two given straight lines.
9.8 Find the angle between two given straight lines.
9.9 Find the condition of parallelism and perpendicularity of two given straight lines.
9.10 Find the distances of a point from a line.

10 Apply the equations of circle, tangent and normal in solving problems.

10.1 Define circle, center and radius.

10.2 Find the equation of a circle in the form:

(i) $x^2 + y^2 = a^2$

(ii) $(x - h)^2 + (y - k)^2 = a^2$

(iii) $x^2 + y^2 + 2gx + 2fy + c = 0$

10.3 Find the equation of a circle described on the line joining (x_1, y_1) and (x_2, y_2).

10.4 Define tangent and normal.

10.5 Find the condition that a straight line may touch a circle.

10.6 Find the equations of tangent and normal to a circle at any point.

10.7 Solve the problems related to equations of circle, tangent and normal.

11 Understand conic or conic sections.

11.1 Define conic, focus, Directorx and Eccentricity.

11.2 Find the equations of parabola, ellipse and hyperbola.

11.3 Solve problems related to parabola, ellipse and hyperbola.

VECTOR :

12 Apply the theorems of vector algebra.

12.1 Define scalar and vector.

12.2 Explain null vector, free vector, like vector, equal vector, collinear vector, unit vector, position vector, addition and subtraction of vectors, linear combination, direction cosines and direction ratios, dependent and independent vectors, scalar fields and vector field.

12.3 Prove the laws of vector algebra.

12.4 Resolve a vector in space along three mutually perpendicular directions

12.5 Solve problems involving addition and subtraction of vectors.

13 Apply the concept of dot product and cross product of vectors.

13.1 Define dot product and cross product of vectors.

13.2 Interpret dot product and cross product of vector geometrically.

13.3 Deduce the condition of parallelism and perpendicularity of two vectors.

13.4 Prove the distributive law of dot product and cross product of vector.

13.5 Explain the scalar triple product and vector triple product.

13.6 Solve problems involving dot product and cross product.

Reference

SL No	Athour	Title	Publication
01	G. V. Kumbhojkar	Companian to basic Maths	Phadke Prakashan
02	Murary R Spigel	Vector & Tensor Analysis	Schaum's Outline Series
03	Md. Abu Yousuf	Vector & Tensor Analysis	Mamun Brothers
04	Rahman & Bhattacharjee	Co-ordinate Geometry & Vector Analysis	H.L. Bhattacharjee
05	Md. Nurul Islam	Higher Mathematics	Akkhar Patra Prakashani

65922	PHYSICS-2	T	P	C
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OBJECTIVES

- To develop a foundation in scientific principles and processes for the understanding and application of technology.
- To develop an understanding of fundamental scientific concepts through investigation and experimentation.
- To provide a common base for further studies in technology and science.
- To develop the basic knowledge of modern physics.

SHORT DESCRIPTION

Thermometry and Heat Capacity; Expansion of materials (effect of heat); Heat transfer; Humidity; Nature of heat and Thermodynamics; Photometry; Reflection of light; Refraction of light; Electron , photon and Radio activity; Theory of Relativity.

DETAIL DESCRIPTION

THEORY

1. THERMOMETRY AND HEAT CAPACITY

1.1 Define heat and temperature.
1.2 Mention the units of measurement of heat and temperature.
1.3 Distinguish between heat and temperature.
1.4 Identify the range of the Celsius scale determined by the boiling point and melting point of water
1.5 State the construction and graduation of a mercury thermometer.
1.6 Define specific heat capacity, thermal capacity and water equivalent with their units.
1.7 Prove the total heat gained by an object is equal to the sum of the heat lost by all the surrounding objects.
1.8 Explain the principle of calorimetry.
1.9 Define various kinds of specific latent heat.
1.10 Determine the latent heat of fusion of ice and latent heat of vaporization of water.
1.11 Determine the specific heat of a solid by calorimeter.

2. EFFECT OF HEAT ON DIMENSION OF MATERIALS

2.1 Show that different materials change in size at different amounts with the same heat source.
2.2 Explain the meaning of differential expansion in bimetallic strip, thermostats, compensated pendulum etc.
2.3 Explain the methods of overcoming problems caused by the expansion of materials in buildings, machinery, railway lines and bridges.
2.4 Mention the units co-efficient of linear, superficial and cubical expansion of solids.
2.5 Define the co-efficient of linear, superficial and cubical expansion of solids.
2.6 Relation between the co-efficient of linear, superficial and cubical expansion of solids.
2.7 Define real and apparent expansion of liquid.
2.8 Relation between the real and apparent expansion of liquid.

3. HEAT TRANSFER

3.1 Identify the phenomena of heat transferring from hot bodies to cold bodies.
3.2 Explain the methods of heat transfer by conduction, convection and radiation with examples of each type of transfer.
3.3 Define thermal conductivity (K) and Co-efficient of thermal conductivity.
3.4 Find the unit and dimension of Co-efficient of thermal conductivity.
3.5 List the factors which determine the quantity of heat (Q) flowing through a material.
3.6 Show that the quantity of heat flowing through a material can be found from

$$Q = \frac{KA\,(\theta_H - \theta_C)t}{d}$$

3.7 State Stefan-Boltzman Law and wien's law.
3.8 State Newton's law of cooling.
3.9 Explain Green house effect.

4. HUMIDITY

4.1 Define Standard Temperature and Pressure.
4.2 Define Humidity, Absolute Humidity, Relative Humidity and Dewpoint.
4.3 Relation between vapour pressure and air pressure.
4.4 Determine Humidity by wet and dry bulb hygrometer.
4.5 Explain few phenomena related to hygrometry.

5. NATURE OF HEAT AND THERMODYNAMICS

5.1 Describe the caloric theory and kinetic theory of heat.
5.2 Explain the mechanical equivalent of heat.
5.3 State and Explain the first law of thermodynamics .
5.4 Explain Isothermal and adiabatic change.
5.5 Explain Specific heat of a gas, Molar specific heat or molar heat capacity.
5.6 Relate between pressure and volume of a gas in adiabatic Change i, e;PV^{γ}=const.
5.7 State and Explain Reversible process and irreversible process.
5.8 State & explain 2^{nd} law of thermodynamics
5.9 Entropy: Definition, unit and significant.
5.10 Explain Change of entropy in a reversible and irreversible process.
5.11 Give an example of increase of entropy in irreversible process.

6. PHOTOMETRY

6.1 Define light, medium (transparent, translucent, opaque), luminous & non-luminous bodies, parallel, convergent & divergent of rays.
6.2 Show the travel of light in straight line.
6.3 Define photometry, luminous intensity, luminous flux, brightness and illuminating power.
6.4 Mention relation between luminous intensity & illuminating power.
6.5 Explain inverse square law of light.
6.6 Describe the practical uses of light waves in engineering.

7. REFLECTION OF LIGHT

7.1 Define mirror (plane & spherical), image (real & virtual) and magnification of images.
7.2 Describe the reflection of light.
7.3 State the laws of reflection of light.
7.4 Express the verification of laws of reflection.
7.5 Define pole, principal axis, center of curvature, radius of curvature, principal focus in case of concave & convex mirrors.
7.6 Find the relation between focal length & radius of curvature of a concave & convex mirror.
7.7 Express the general equation of concave and convex mirror.

8. REFRACTION OF LIGHT

8.1 Define refraction of light Give examples of refraction of light
8.2 State the laws of refraction and Express the verification of laws of refraction
8.3 Define absolute and relative refractive index and Relate absolute and relative refractive index
8.4 Explain the meaning of total internal reflection and critical angle and Relate total internal reflection and critical angle.
8.5 Give examples of total internal reflection.
8.6 Describe refraction of light through a prism.
8.7 Express the deduction of the relation between refractive index, minimum deviation and angle of the prism.
8.8 Define lens and mention the kinds of lens.
8.9 Identify and List uses of lens.
8.10 Express the deduction of the general equation of lens (Concave & convex).

9. ELECTRON, PHOTON AND RADIO-ACTIVITY

9.1 Describe Electrical conductivity of gases.
9.2 Describe Discharge tube.
9.3 Cathode ray : Definition and its properties
9.4 X-ray : Definition, properties & uses
9.5 Discuss Photo electric effect .
9.6 Derive Einstein's photo electric equation
9.7 Define and explain radio-activity.
9.8 Describe radio-active decay law.
9.9 Define half-life and mean-life of radio-active atoms.
9.10 Define nuclear fission and fusion.

10. THEORY OF RELATIVITY

10.1 Define Space, time and Mass.
10.2 Define rest mass.
10.3 Express the theory of relativity.
10.4 Explain special theory of relativity and its fundamental postulate.
10.5 Mention different Kinds of theory of relativity.
10.6 The Relativity of Length - Length contraction.
10.7 The Relativity of Time – Time dilation.
10.8 Deduce Einstein's mass -energy relation

PRACTICAL

1. Compare the operation of common thermometers.
2. Determine the co-efficient of linear expansion of a solid by Pullinger's apparatus.
3. Measure the specific heat capacity of various substances.(Brass, steel).
4. Determine the latent heat of fusion of ice.
5. Determine the water equivalent by calorimeter.
6. Compare the luminous intensity of two different light sources.
7. Verify the laws of reflection.
8. Find out the focal length of a concave mirror.
9. Determine the refractive index of a glass Slab.
10. Determine the angle of Minimum deviation and refractive index of a glass prism by using I-D graph.

REFERENCE BOOKS:

1. Higher Secondary Physics – Second Part - by Dr. Shahjahan Tapan
2. A Text Book of Heat and Thermodynamics - by N Subrahmanyam and Brij Lal
3. A Text Book of Optics - by N Subrahmanyam and Brij Lal
4. Higher Secondary Physics -Second Part - by Prof. Golam Hossain Pramanik
5. Higher Secondary Physics -Second Part - by Ishak Nurfungnabi
6. Thermodynamics - by K K Ramalingam

65722 **COMMUNICATIVE ENGLISH** **T P C**
1 3 2

Full Marks: 100 (Practical-50.Theoretical-50)

Introduction

This Course Will Provide A Unique Foundation In The Basic Level For Developing Listening, Speaking, Reading And Writing Skills Into Some Of More Specialized And Advanced Capabilities Of Basic Operation In Communication.

Theory Part

Total Mark: : 50
Continuous Assessment : 20
Final Exam : 30

Objectives:

After The Completion of the Module, Learners Will Be Able To Develop-

Creative Writing Ability
Transferring Information, Ideas And Knowledge
#Communicative Competence Effectively In The Workplace Situation.

1.Comprehension For Reading Task (Mark:10)

(Text May Be Taken From Contemporary Journals, Editorial of News Papers Or From Online Resources)

Test Items:

1. MCQ (Guessing Meaning from Context)
2. Rearranging
3. Gap-Filling (With Clues or Without Clues)
4. Answering Questions
5. Summarizing

2. Composition (Mark: 20)

The Following Are The Topic Title Introduced For Writing Task:

1. Introduce Formal/Informal Greeting &Farewell
2. Describe The Idea Of Communication & Presentation Skills
3. Write Paragraph On The Basis Of Comparison and Contrast
4. Narrate Process, Stories And Interpreted Charts, Graphs.
5. Write Letters to the Print and Electronic Media
6. Write Letters of Advice, Complaints, Inquiry, Order and Cancellation
6. Prepare Seven Days Weather Report.
7. Make An Attractive Poster For The People Giving Advice To Protect The Environment.
8. Prepare A Series Of Questions About Personal Information, Place Of Interest, Foods, Hobby And Employment Opportunity.

9. Write Dialogue On The Following Situations
   # About Exchanging Views With A Person And Introducing One Narrating Daily Activities
   # Meeting At The Train Station & Asking Question About The Departure And Arrival Of The Train To The Station Manager
   # Meeting at The Airport And Asking The Flight Schedule
   # Getting To The Hotel And Asking For A Reservation
   # Social Language for Telephonic Conversation
   # Talking About the Weather, Trips & Sight Seeing
   # Asking Permission and Making Request.
   # Talking About Office and Office Manner
   # Talking About Etiquette and Manner

10. Prepare Job Application With A Complete CV For Job Suitable For You.

Practical Part:

Objectives:

1.Communicate The Areas That Learners Encounter In Real Life Situation.

2.Reinforce The Basic Language Skills Of Listening And Speaking.

3.Integrate ICT As Tools In Learning Language.

Course Content

Unit	Lesson	Title
1. Use Of Dictionary	Define Dictionary	1.1 Know How To Use A Dictionary 1.2 Learn At Least 10 Words In A Day With Correct Pronunciation (Follow The Link : Www.Marriunm-Englishdictionary.Com)
2. Basic Vocabulary Practice	Basic Words For Communication By ODGENS	2.1 Use 10 Most Common Formulas (Structure) To Write Correct Sentence. (Follow The Link: Www.Odgensbasicvocabulary.Com Www.Grammarly.Com)
3.Listening Skill Practice	Listen To The Audio Video Presentation On Current Real Life Situation	3.1 Practice Audio Video Conferencing Activities. 3.2. Communicate With The English Speaking People Online (Link: Www.Speaking24.Com)
4. Speaking Skill Practice (Self Interpretation)	Introduce Yourself With The Vocabulary Prescribed By ODGENS	4.1 Browse Vocabulary Related Phrases To Introduce You. (Link : Www.Youtube.Com/ Let Me Introduce Myself)
5. Listening Skill Practice	Listen To The Weather Reports, Sports Commentary In The English TV Channels.	5.1 Prepare Seven Days Weather Report For The Place You Are Staying. 5.2. Make Some Attractive Poster To Protect The Environment.
6. Speaking Skill Practice	Identify Formal And Informal Social Language	6. 1 Practice Conversation Emphasizing On Greetings & Farewell (Link- Www.Esl.Guide@About.Com) 6.2 Take Part In Audio Video Conferencing Activities 6.3 Ask Questions About Personal Information, Place Of Interest, Food, Hobby, Employment Opportunity With Foreign Friends Using Social Media.
7. Writing Skill Practice	Develop Paragraph	7.1 Develop Paragraph On The Basis Of Comparison, Contrast And Analysis. Check Plagiarism Wordiness By The Correction Software (Www.Grammarly.Com) 7.2. Write E-Mail, Send And Reply E-Mail
8. Listening Skill Practice	Watch Short Films, Documentary And Listen To The English Music(With Lyric) To Practice In A Group	8.1 Listen To Hard Talk, Interview 8.2. Prepare A Series Of Questions To Interview A Celebrity 8.3. Down Load Documentary From Www.Youtube.Com/Education
9.Presentation	Define Presentation	9.1 Edutain/Entertain Yourself Preparing A Documentary In A Group With The Activities Done During The Period Of Class Hours In The Lab For Communicative English.

Evaluation:

Students Can Be Evaluated Individually Or In A Group On The Basis Of Performance Done In The Lab. Furthermore, They May Be Given Online Test Using Authenticated Websites Like

Www.Britishcoucil.Org/Education/Blog/Podcast/News/Weather,Www.Englishteststore.Com.Www.Ieltsexam.Com

Lab-Facilitator, 30 Students In A Group:

Physical Facility	Size (In Ft)	Area (In Sq Ft)
Class Room Cum Laboratory	1 5 × 20	300
Library	15 × 20	300
Wash Room	4 × 7	28

Lists Of Equipments And Resources For 30 Learners:

Personal Computers With Accessories	15
Projector Multimedia	01
Printer	01
Scanner	01
Modem	01
Essential Software	01 Set
Internet Connection For Each Computer	Broad Band/Dial Up
Camera (Digital)	01
Video Conferencing Equipments	01 Set
TV Card	01
Satellite Cable Connection	01
Head Phone	15
Related Books And Journals	01
First Aid Box	01

Reference:
Www.Britishcouncil.Org,Www.Marium-Websters.Com,Www.Compellingconversation.Com, Www.Esl.Guide@About.Com, Www.Bbc.Com/News, Www.Speaking24.Com, Www.Itutor.Com, Www.Ieltsexam.Com, Www.Englishteststore.Com, Www.Ginger.Com, Www.Grammarly.Com

(Note: This Course May Be Introduced After Fourth Semester Coz It Needs Some Maturity Of The Students To Adopt With The Course Materials And The Contents. These Themes Are Suggestive Not Prescriptive.)

BANGLADESH TECHNICAL EDUCATION BOARD

Agargoan, Dhaka-1207.

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

SYLLABUS (PROBIDHAN-2016)

COMPUTER SCIENCE & TECHNOLOGY

TECHNOLOGY CODE: **685**

4th SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

COMPUTER SCIENCE & TECHNOLOGY (685)

4th 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	68541	Operating System	2	6	4	40	60	50	50	200
2	68542	Web Programming	0	6	2	00	00	50	50	100
3	68543	Mathematics for Computing	2	0	2	40	60	00	00	100
4	66641	Object Oriented Programming	2	3	3	40	60	25	25	150
5	66642	Data Structure & Algorithm	2	3	3	40	60	25	25	150
6	66653	Sequential Logic Systems	3	3	4	60	90	25	25	200
7	65841	Business Organization & Communication	2	0	2	40	60	00	00	100
Total			**13**	**21**	**20**	**260**	**390**	**175**	**175**	**1000**

68541 Operating System

T	P	C
2	6	4

AIMS:

- To be able to develop the skill and attitude to direct, control and manage of computer using operating system.
- To be able to install the Windows Operating system.
- To be able to install the LINUX Operating system.
- To be able to develop skills to configure Windows Operating System.
- To be able to develop skills to configure and customize LINUX Operating.

SHORT DESCRIPTION:

Basic concepts of operating system; Process Management; CPU Scheduling, Deadlocks; I/O systems; Memory management; File system and Linux fundamentals; windows and Linux commands and utilities.

DETAIL DESCRIPTION:

Theory:

1. Understand the general features of operating system.

1.1 Define operating system, Kernel and monitor program.
1.2 Describe the functions (of kernel) and services of operating system
1.3 Describe the abstract view of the components of computer system.
1.4 Describe the evolution (history) of operating system.
1.5 Explain the role of operating system as an extended machine and as a resource manager.
1.6 Mention the important features of DOS, Windows, UNIX and LINUX.
1.7 Define the terms-Multiuser, Multitasking and GUI.

2. Understand the terms related to operating system.

2.1 Define batch processing system
2.2 Describe the method of batch processing system.
2.3 State the disadvantages of batch processing.
2.4 Describe the uses of job control language for operating system.
2.5 Describe the process of spooling.

3. Understand the basics of process management.

3.1 Define Process.
3.2 Describe the process state with diagram.
3.3 Mention the difference between process and program.
3.4 Describe the importance of process control.
3.5 Describe the function of Scheduler and traffic controller.
3.6 Explain the process Scheduling and scheduling queues.
3.7 Describe Synchronization (Re-condition, Reader-Writer problem, dining philosopher, Peterson solution)
3.8 Describe the manner in which multiple processors may be used for multiprogramming.

4. Understand the concept of CPU Scheduling.

4.1 Define Scheduling.
4.2 State the types of Scheduling
4.3 Describe the Scheduling criteria.
4.4 State the terms CPU and I/O burst cycle, CPU Scheduler, Dispatcher.
4.5 Describe Scheduling Algorithms. (FCFS – First come first serve, SJF – Shortest job first, RR- Round Robin, Priority)

5. Understand the concepts of deadlock.

5.1 Define Deadlock, Preempt able and Non-Preempt table resources.
5.2 Mention the Necessary conditions of Deadlocks.
5.3 Describe the Deadlock Prevention.
5.4 Explain the Deadlock avoidance and their algorithm.
5.5 Describe the Deadlock detection algorithm
5.6 Explain the way of recovery from Deadlock.

6. Understand the concept of I/O system.

6.1 State the Characteristics and principle of I/O hardware.
6.2 Describe the role of Operating system in I/O operation.
6.3 Describe the I/O aspects of Operating System.
6.4 Describe the goals of I/O software.
6.5 Describe the function of each layer of I/O system.

7. Understand the technique of memory management.

7.1 Mention the function of memory management.
7.2 Describe the Single / Multiple partition schemes.
7.3 Explain fixed memory partition with separate / single input queue.
7.4 Explain the external and internal fragmentation.
7.5 Describe re-locatable and dynamically re-locatable partitioned allocation.
7.6 Describe Swapping.
7.7 Describe the segmented allocation and segmented page.
7.8 Describe the concept of virtual memory and demand paging.

8. Understand the concept of file system.

8.1 Mention the concept and attributes of file.
8.2 Describe the basic file operation.
8.3 State the terms: the file pointer, file open count, disk location of file.
8.4 Mention the file types with common features.
8.5 Define file system.
8.6 Describe the organization of file system.
8.7 Describe the features of general file system.
8.8 Describe the free space management of disk space.
8.9 Describe the allocation methods of disk space.

9. Understand the features of Windows Operating system

9.1 Describe History and Design Principles
9.2 State System Components
9.3 Describe Terminal Services and Fast User Switching
9.4 State File System and Networking concept

10. Understand the features of Linux Operating system

10.1 State the background and importance of Linux.
10.2 Describe the features of Linux Kernel.
10.3 State the advantages of Linux Operating system.
10.4 State the features of GNOME and KDE desktop
10.5 Define Shell and Mention the name of different shell for different user.
10.6 State the f-unction of Linux Shell.

PRACTICAL

1. **Perform the task to install Windows Desktop Operating System**
   - 1.1 Follow workplace health and safety – OSH
   - 1.2 Install and configure Windows Operating System (Latest Version)
   - 1.3 Performs necessary steps to configure Basic Desktop Experience.
   - 1.4 Perform necessary steps to configure Network.
   - 1.5 Perform popular Windows Commands and configure network by CMD.
   - 1.6 Perform necessary steps to install and configure third party application.
   - 1.7 Perform necessary steps to analyze running processes and to kill any process.
2. **Perform the task to install VMWare and Create Virtual Machines**
   - 2.1 Install and configure VMWare Player/Workstation
   - 2.2 Perform necessary steps to configure Virtual Machines
   - 2.3 Configure multiple virtual machines
   - 2.4 Configure virtual network system
   - 2.5 Install Operating systems on virtual machines
3. **Perform the task to install Linux operating system.**
   - 3.1 Follow workplace health and safety – OSH
   - 3.2 Identify the purpose and functions of operating system
   - 3.3 Install and configure Operating system
   - 3.4 Set Boot sequence, Root password, Drive selection for installation, Drive partitioning, Necessary Packages
   - 3.5 Use Necessary command to up Network card, Configure Browsers.
   - 3.6 Use Basic Command for customization
   - 3.7 Create Partition as per requirements.
   - 3.8 Create Directories as per specifications.
   - 3.9 Set Directories and file permission
   - 3.10 Perform Copy and move operation.
   - 3.11 Mount External Drive as per specifications.
   - 3.12 Create Users and group as per instruction
   - 3.13 Identify and Unpack Utility package
4. **Perform the task to Make partition to a Hard disk (Linux Based) with fdisk.**
   - 3.1 Use fdisk command to list all partition, to see each partition is being used and to change the partition.
   - 3.2 Delete the partition.
   - 3.3 Create partitions.
   - 3.4 Change the partition type.
   - 3.5 Display the partition table and exit.
   - 3.6 Write a report.
5. **Perform the task to Use GRUB boot loader.**
   - 4.1 Boot the computer with GRUB.
   - 4.2 Change or Add boot options (Temporarily or permanently).
   - 4.3 Add a new GRUD boot image.
   - 4.4 Write a report
6. **Perform the task to work with Linux Desktop.**
   - 5.1 Log on into the Linux.
   - 5.2 Familiar with the Desktop.

5.3 Check the home folder.
5.4 Change the preferences.
5.5 Configure the panel/desktop.
5.6 Use the GNOME desktop.
5.7 Use the Metacity window manager
5.8 Use the GNOME Panel
5.9 Use menu
5.10 Add apllet, application launcher and drawer.
5.11 Change panel properties.
5.12 Choose and use KDE desktop.
5.13 Write a report.

7. Apply basic Linux commands and utilities.

7.1 Use the command options to modify the basic function of Linux commands.
7.2 Use two or more Linux commands in tandem by using input and output redirection.
7.3 Use the parameters with Linux commands.
7.4 Select and use the notational shorthand used in Linux documentation.
7.5 Use the Linux online man pages and help facilities.
7.6 Use the wildcards.
7.7 Check the environmental variables.
7.8 List the processes running on the Linux system.
7.9 Kill the processes.
7.10 Write a report.

8. Work with the Linux file system.

8.1 List the type of files and directories.
8.2 Move one directory to another.
8.3 Make a new file and directory.
8.4 Move and copy files.
8.5 Remove the files and directories.
8.6 Use chownand chgrpto change file and directory ownership.
8.7 Use chmodto change the file and directory permissions.
8.8 Use gunjip command to uncompress .gz files compressed by gzip.
8.9 Write a report.

9. Work with bash (shell system).

9.1 Select the most common shells used in Linux.
9.2 Enter commands into bash.
9.3 Use wildcards that bash shell supports.
9.4 Use the history command with or without options.
9.5 Use the aliases command.
9.6 Use the input/output redirection command.
9.7 Show the use of pipeline.
9.8 Modify the bash shell.
9.9 Write a report.

10. Use file systems, disks and other derives.

10.1 Mount the flash / optical drives
10.2 Make a new file system.
10.3 Unmount the flash / optical drives.
10.4 Use tar and gzip.

10.5 Use tar command to backup files in flash / optical drives

10.6 Write a report.

11. Manage the users account.

11.1 Make the root (superuser) suppresser accounts.

11.2 Make the user accounts.

11.3 Add and delete users.

11.4 Delete groups.

11.5 Write a report.

12. Work with text editors.

12.1 Select the text editor in Linux.

12.2 Use vi editor to enter & edit text.

12.3 Use emacs to enter & edit text.

12.4 Write a report

13. Work with the printer in Linux.

13.1 Select the printer to support in Linux.

13.2 Configure the printer.

13.3 Use the commands lpr, lpq, lprm and lpc for printing documents under Linux.

13.4 Write a report.

14. Work with Process System Calls

14.1 Write program to implement the Process System Calls

14.2 Start the Program

14.3 Declare PID and get the PID by using the getpid() method.

14.4 Create a child process by calling the fork() system call.

14.5 Check if(pid==0) then print the child process id and then print the parent process value Otherwise print.

14.6 Stop the program.

15. Work with I/O System Calls

15.1 Write program for I/O System calls.

15.2 Start the Program

15.3 Open a file for O_RDWR for R/W, O_CREATE for creating a file, O_TRUNC for truncate a file

15.4 Using getchar(), read the character and stored in the string[] array.

15.5 The string[] array is write into a file, close it.

15.6 Then the first is opened for read only mode and read the characters and displayed it and close the file.

15.7 Stop the program

16. Work with Scheduling (FCFS, SJFS)

16.1 Write a program to implement CPU & scheduling for scheduling

16.2 Start the program. Get the number of processes and their burst time.

16.3 Initialize the waiting time for process 1 as 0.

16.4 The processes are stored according to their busrt time.

16.5 The waiting time for the processes are calculated as follows:

Process for FCFS (i<2; i<=n;i++),wt.p[i]=p[i-1]+bt.p[i-1]

Process for SJFS (i<2;i<=n;n++),wt.p[i]=p[i=1]+bt.p[i-1]

16.6 The waiting time for all the processes is summed then average value time is calculated.

16.7 The waiting time of each process and average times are displayed

16.8 Stop the program

17. Work with PIPE Processing

17.1 Write a program to create a PIPE processing
17.2 Start the program. Declare variables.
17.3 Read the Choice.
17.4 Create a piping processing using IPC
17.5 Assign the variable lengths
17.6 “strcpy” the message lengths
17.7 To join the operation using IPC
17.8 Stop the program

18. Work with File Manipulation

18.1 Write a program for file manipulation for displays the file and directory in Memory
18.2 Start the program
18.3 Use the pre-defined function list out the files in directory
18.4 Main function is used to check the file present in the directory in root
18.5 Using the file pointer in the file to that the argument is less than a times means print
18.6 By using if loop check in file, open two means print error
18.7 Stop the program

19. Simulate for Deadlock Prevention

19.1 Start the program
19.2 Attacking Mutex condition.
19.3 Attacking preemption.
19.4 Attacking hold and wait condition: make a process hold at the most 1 resource
19.5 At a time. Make all the requests at the beginning.
19.6 Attacking circular wait: Order all the resources. Make sure that the requests are issued in the
19.7 Correct order so that there are no cycles present in the resource graph. Resources numbered 1 ... n.
19.8 Resources can be requested only in increasing
19.9 Order resources.
19.10 Stop the program

REFERENCE BOOKS:

1. Operating System Concepts - By - Silberschatz Galvin, Gagne
   Publication- John Wiley & Sons (Asia) Pte ltd.
2. Operating Systems - By - Achyut S. Godbole
   Publication - Tata McGraw-Hill
3. Modern Operating Systems - By - Andrew S. Tanenbaum
   Publication - Prentice Hall of India
4. Computer Fundamentals - By- P.K.Sinha
5. Red Hat Fedora Linux 2 bible- By – Christopher Negus
6. Learning Red Hat Linux - By – Bill Mc Carty

Reference Websites

1) www.denett.com
2) www.tatamcgrawhill.com
3) www.phindia.com
4)ww.wiley.com/college/silberschatz6e/0471417432/slides/ppt
5) www.en.wikipedia.org
6) www.computerworld.com
7) www.computer.howstuffworks.com
8) www.willamstallings.com/os4e.html
9) www.deitel.com/books/os3e/slides.html

68542 Web Programming

T	P	C
0	6	2

AIMS

- Able to develop knowledge, skills and attitude to create a dynamic website.
- Able to develop knowledge, skills and attitude about PHP and MySQL.

DESCRIPTION

Development of a dynamic website using PHP (Version 5.0 or above) and MySQL (Version 5.0 or above). In PHP, various topics are discussed and practiced such as variable, operators, conditional statements, looping, Arrays, functions and objects. In MySQL, connect with PHP form, create and modify database, tables, insert data into table and retrieve, update, delete data from table are practiced.

Evaluation of PHP

PHP was designed for the web, and it does the job well. This programming language is particularly popular for freelance work, since many small businesses or non-technical people would want to use WordPress, Joomla or other popular content management systems (CMS) to set up their websites or shopping carts. Now 80% of the top 10 million websites are using PHP. Facebook has made serious investments into PHP.

1. **Demonstrate Web Programming**
   - 1.1. Show differences between Web Design and Web Programming
   - 1.2. Show differences between Static webpage and Dynamic webpage
2. **Demonstrate Web Programming Tools**
   - 2.1. Use Text Editor - Notepad/Sublime Text/Notepad++
   - 2.2. Use XAMPP/WAMP
3. **Demonstrate PHP**
   - 3.1. Install a web server and PHP on Windows/Linux OS
   - 3.2. Install a web server and PHP using XAMPP/WAMP
   - 3.3. PHP File Structure
   - 3.4. Basic PHP Syntax
   - 3.5. Use of Comments in PHP
4. **Demonstrate PHP Variables**
   - 4.1. Identify types of PHP Variables
   - 4.2. Create (Declare) PHP Variables
   - 4.3. Scopes of PHP Variable
     - 4.3.1. Local Scope
     - 4.3.2.Global Scope
     - 4.3.3.Static Scope
     - 4.3.4.Parameter Scope
   - 4.4. String Variables in PHP
   - 4.5. PHP Concatenation Operator
   - 4.6. PHP strlen() and strpos() function
   - 4.7. Different types of Operators

5. **Demonstrate Date and Time Function**
    5.1. Use date() function
    5.2. Use getdate() function
6. **Demonstrate PHP Conditional Statements & Looping**

    Practice:

    6.1. if statement
    6.2. if...else statement
    6.3. if...else if....else statement
    6.4. switch statement
    6.5. PHP Loops
    6.6. while Loops
    6.7. do...while Loops
    6.8. "for" statement
    6.9. "foreach" statement
7. **Demonstrate PHP Arrays**

    Practice:

    7.1. Array
    7.2. Numeric Arrays
    7.3. Associative Arrays
    7.4. Multidimensional Arrays
8. **Demonstrate PHP Functions**
    8.1. Practice different types of Built-in Functions
    8.2. Crate PHP Functions
    8.3. Add parameters in function
    8.4. Practice Return values from function
9. **Demonstrate Html Form with PHP**
    9.1. Create Html Form with PHP
    9.2. Validate Form Field
    9.3. Use Data Dealing with Multi-value filed
    9.4. Generate File uploaded form
    9.5. Redirect a form after submission
    9.6. Use $_GET Variable
    9.7. Use $_POST Variable
    9.8. Use $_REQUEST Variable
10. **Work with file and Directories**
    10.1. Open and close a file
    10.2. Copy, rename and delete a file
    10.3. Work with directories
    10.4. Create and delete folder
    10.5. Upload & download files
11. **Demonstrate Session and Cookie**
    11.1. Introduce Session Control
    11.2. Practice Session Functionality
    11.3. Introduce Cookie
    11.4. Set Cookies with PHP
    11.5. Use Cookies with Sessions
    11.6. Delete Cookies

11.7. Register Session variables
11.8. Destroy the variables and Session

12. Demonstrate PHP MySQL

12.1. Introduce Database, Tables, Queries and phpMyAdmin
12.2. Use phpMyAdmin
12.3. Create a Connection to MySQL Database using PHP
12.4. Close a Connection
12.5. Create a Table in MySQL Database using PHP
12.6. Create Primary Keys and Auto Increment Fields

13. Demonstrate Insert, Retrieve, Update, Delete in PHP MySQL

13.1. Insert Data Into a Database Table
13.2. Insert Data From a Form Into a Database
13.3. Select Data From a Database Table
13.4. Display the Result in an HTML Table
13.5. Fetch data using WHERE clause
13.6. Use ORDER BY Keyword
13.7. Update Data In a Database
13.8. Delete Data In a Database

REFERENCES:

i. Learning PHP, MySQL, books by 'O' riley Press
ii. Beginning PHP – Matt Doyle
iii. www.w3schools.com/php
iv. www.w3schools.com/php/php_examples.asp
v. www.rashidul.com/php

68543 **Mathematics for Computing** **T P C**
2 0 2

AIMS

- To develop knowledge of mathematical logic applied in digital computers.
- To assist to acquire knowledge of mathematics in developing algorithms.
- To provide knowledge of mathematics in solving problems by computers.

SHORT DESCRIPTION

Basics of Sets, relations, Vector and Matrices, Counting, Probability theory, Graphs and Binary trees.

DETAIL DESCRIPTION:

Theory:

1. **Understand the basics of sets and set theory.**
   1.1 Describe basic set notation and types of sets.
   1.2 Describe Ven Diagrams.
   1.3 Define different set operations.
   1.4 Practice exercises on sets.
2. **Understand the fundamentals of relations.**
   2.1 Define relations.
   2.2 Mention the properties of relation.
   2.3 Describe the kinds of relations.
   2.4 Define inverse relation.
   2.5 Mention the representations of relations on finite sets.
   2.6 Describe the composition of relations.
   2.7 Describe the composition of relation and matrices.
3. **Understand the concept of vectors and matrices.**
   3.1 Define vectors and matrices.
   3.2 Define Echelon matrix .
   3.3 Describe the Gaussian elimination in matrix form.
   3.4 Describe the algorithm of matrix arithmetic.
   3.5 Matrix solution of a system of Linear Equation .
4. **Understand the concept of counting.**
   4.1 Define counting.
   4.2 Describe the binomial coefficients and Pascal's triangle.
   4.3 Describe the counting problems and tree diagram.
   4.4 Define Modular Arithmetic.
   4.5 Describe Modulo 2 binary division method
5. **Understand the probability theory.**
   5.1 Define simple space and events.
   5.2 Describe the finite probability spaces.
   5.3 Describe the theorems on finite probability spaces.
   5.4 Define conditional probability.
   5.5 Define independent events.
   5.6 Describe the repeated trials.

6. **Understand the features of graphs, directed graphs and machines.**
   6.1 Describe the graphs and multi graphs.
   6.2 Describe the degree of a vertex.
   6.3 State the meaning of connectivity.
   6.4 Define finite graphs and trivial graphs.
   6.5 Describe sub graph, isomorphic and homomorphic graph.

7. **Understand the features of binary trees.**
   7.1 Define binary trees.
   7.2 Describe the complete and extended binary trees.
   7.3 Mention the properties of trees.
   7.4 Describe the method of binary search trees.
   7.5 Describe the method of traversing binary trees.

REFERENCE BOOKS:

1. Discrete Mathematics
   BY- Seymour Lipschutz, Marc Lipson (Schaum's Outline Series)
2. Modern Computer Algebra
   BY – Joachim von zur Gathen
3. http://www.mathgoodies.com/lessons/sets/

66641	Object Oriented Programming	T	P	C
		2	3	3

OBJECTIVES

To develop knowledge and skill on Object Oriented Programming (OOP).
To develop knowledge and skill on C# language as OOP, it's syntax, keywords and programming.
To develop knowledge on the .Net Framework.

SHORT DESCRIPTION

Overview of C# Programming and The .net framework; Program structure and Basic syntax of C#; Data types, Variables, Constants and Literals of C#;Operators and expressions of C#; Decision making statements, Looping statements of C#; Arrays and strings; Methods; Classes and structures; Polymorphism; Inheritance; Interface and Delegates.

DETAIL DESCRIPTION

Theory:

1 Overview of C# programming and the .net framework
- 1.1 State Programming Features of C#
- 1.2 Overview the .NET Frameworks
- 1.3 Describe Common Language Runtime (CLR)
- 1.4 Explain Integrated Development Environment (IDE) for C#
- 1.5 Describe .NET Framework Class Library
- 1.6 Describe Common features of Object Oriented programming
- 1.7 Describe Comparison between C# and Java

2 Understand program structure and basic syntax of C#
- 2.1 Describe Program Structure of C#
- 2.2
- 2.3 Compile and Execute the C# Program
- 2.4 Uses of Input/output in C#
- 2.5 Explain the Variables in C#
- 2.6 Describe Namespaces
- 2.7 Define of C# Keywords

3 Understand data types, variables, constants and literals of C#
- 3.1 Describe Different kind of data types:
  Integer, Floating Point, Decimal, Characters & Strings, Boolean and Null able Types.
- 3.2 Define and Initialize Variables
- 3.3 Define constants

4 Understand operators and expressions of C#
- 4.1 Describe Arithmetic, Logical, Relational, Assignment, Bitwise and Miscellaneous Operators
- 4.2 Explain Operator Precedence
- 4.3 Define Checked and Unchecked Operators
- 4.4 Describe the Expressions of C#
- 4.5 Explain the Lvalue and Rvalue Expressions in C#

5 Understand decision making statements of C#
- 5.1 Explain if Statement
- 5.2 Explain if...else Statement
- 5.3 Describe The if...else if...else Statement
- 5.4 Explain Nested if Statements
- 5.5 Describe Switch Statement
- 5.6 Describe Conditional Operator

6 Understand looping statements of C#
- 6.1 Explain While Loop, For Loop, Do...While Loop and Nested Loops
- 6.2 Explain Loop Control Statements
- 6.3 Describe Infinite Loop

7 Understand arrays and strings
- 7.1 Declare and Initialize an Array
- 7.2 Explain Classifications of Arrays
- 7.3 Describe Jagged Arrays
- 7.4 Create a String Object
- 7.5 Describe the Properties of the String Class
- 7.6 Describe the Methods of String Class

8 Understand methods
- 8.1 Define Methods in C#
- 8.2 Explain the Calling Methods in C#
- 8.3 Describe the Calling of Recursive Method
- 8.4 Explain the method of passing Parameters to a Method
- 8.5 Explain the method of passing Parameters by Value
- 8.6 Explain the method of passing Parameters by Reference
- 8.7 Explain the method of passing Parameters by Output

9 Understand classes
- 9.1 Define C# Class
- 9.2 Explain Member Functions and Encapsulation
- 9.3 Mention the uses of Constructors and Destructors
- 9.4 Mention the uses of Static Members of a C# Class
- 9.5 Explain Class versus Structure

10 Understand polymorphism
- 10.1 Describe Polymorphism
- 10.2 Describe Types of Polymorphism
- 10.3 Explain Method overloading
- 10.4 Explain Operator Overloading

11 Understand inheritance
- 11.1 State Inheritance
- 11.2 Describe Base and Derived Classes
- 11.3 Describe Initialization of Base Class
- 11.4 Explain Single Inheritance
- 11.5 Describe Multilevel Inheritance
- 11.6 Explain Multiple Inheritance
- 11.6 Describe Hierarchical Inheritance

Practical: Perform skill to create, compile, debug & execute C# programs to solve specific problems.

1 Develop programs using basic structure of c# programming language

1.1 Prepare a C# program for printing a message.

1.2 Prepare a C# program for adding two integer numbers using Windows from.

2 Develop programs using different variable and operators

2.1 Prepare a C# program to swap two numbers

2.2 Prepare a C# Program to calculate Age in YY-MM-DD

2.3 Prepare a C# program that takes two numbers as input and returns true or false when both numbers are even or odd.

3 Practice programs using conditional statement exercises

3.1 Prepare a C# program to find the largest of three numbers.

3.2 Prepare a C# program to read mark of six subjects of a student and calculate the GPA according to BTEB Diploma in Engineering Probidhan 2016.

3.3 Prepare a C# program to check whether an alphabet is a vowel or consonant.

4 Exercise programs using loop exercises

4.1 Prepare a C# program to find the sum of first 10 natural numbers. (The first 10 natural number is : 1 2 3 4 5 6 7 8 9 10; The Sum is : 55)

4.2 Prepare a C# program to convert a decimal number to hexadecimal.

4.3 Prepare a C# program to calculate the factorial of a given number

4.4 Prepare a C# program to display first N prime numbers

4.5 Prepare a C# program to display the first N terms of Fibonacci series

5 Develop programs using arrays and strings

5.1 Prepare a C# program to store elements in an array and print it.

5.2 Prepare a C# program to find the sum of all elements of the array

5.3 Prepare a C# program to find maximum and minimum element in an array

5.4 Prepare a C# program to sort N numbers in ascending/descending order

5.5 Prepare a C# program to find the second largest element in an array

5.6 Prepare a C# program to separate the individual characters from a string.

5.7 Prepare a C# program to count a total number of alphabets, digits and special characters in a string

6 Practice programs using methods

6.1 Prepare a C# program to create a user define function.

6.2 Prepare a C# program to create a user define function with parameters

6.3 Prepare a C# program to create a function for the sum of two numbers

6.4 Prepare a C# program to create a function to swap the values of two integer numbers.

6.5 Prepare a C# program to create a recursive function to find the factorial of a given number.

7 Practice programs using classes and structures

7.1 Prepare a program for manipulating information of a student (Name, Roll, GPA) in using C# class.

7.2 Prepare a C# program using Constructor and destructor

7.3 Prepare a C# program using Structure.

8 Develop program using polymorphism

8.1 Prepare a C# program using function overloading.

8.2 Prepare a C# program using operator overloading.

9 Exercise programs using inheritance

9.1 Prepare a C# program using single inheritance.

9.2 Prepare a C# program using multilevel inheritance.

9.3 Prepare a C# program using multiple inheritances.

9.4 Prepare a C# program using hybrid inheritance.

10 Practice programs using interface and delegates

10.1 Prepare a simple program using C# Interface.

10.2 Prepare a simple program to implement delegate in C#.

Reference Books:

1. ***Programming in C# (3rd Edition) by E. Balagurusamy***
2. ***Head First C# by Andrew Stellman***
3. ***C# 5.0 in a Nutshell (5thEdition) by Ben Albahari, Joseph Albahari***

Online References:

1. https://www.tutorialspoint.com/csharp/index.htm
2. http://www.c-sharpcorner.com/beginners/
3. http://www.csharp-station.com/Tutorial.aspx/
4. http://stackoverflow.com/questions/294128/c-sharp-web-developmentlearning-strategy
5. http://www.sitepoint.com/vb-dot-net-c-sharp-programming/
6. http://www.csharp411.com/best-c-web-sites/
7. http://msdn.microsoft.com/en-us/library/67ef8sbd(v=vs.80).aspx
8. http://www.pgacon.com/csip21/default.htm
9. http://www.homeandlearn.co.uk/csharp/csharp.html

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66642 Data Structure & Algorithm

T	P	C
2	3	3

AIMS

- To provide the knowledge & skill on data structures.
- To provide the knowledge & skill on writing simple algorithms.
- To develop and test simple programs related to data structures.

SHORT DESCRIPTION

Data types, data structure and algorithm; Arrays, records, pointers and linked lists;
Stack, queue and recursion; Searching & sorting.

DETAIL DESCRIPTION

Theory:

1 Understand the idea of data structure.

1.1 Define data & information.
1.2 State data types.
1.3 Define Memory Location
1.4 Define data structure.
1.5 Mention Different types of data structure.
1.6 Describe different types of data operation.

2 Understand the basic concept of algorithm

2.1 State the characteristics of algorithm
2.2 Define the pseudo code & algorithmic notations.
2.3 Describe the structured programming and flowcharts.
2.4 Describe the Complexity of algorithm

3 Understand the concept of arrays, records and pointers.

3.1 Define linear array.
3.2 Write the algorithm for traversing linear arrays.
3.3 State the representation of linear array in Memory.
3.4 Write the algorithm for inserting and deleting elements into/from linear arrays.
3.5 Write the algorithm of matrix multiplication.
3.6 State the use of pointer arrays, Jagged array and records.

4 Understand the properties of the linked lists.

4.1 Define linked lists.
4.2 Describe the representation of linked lists in memory.
4.3 Write the algorithms to traverse a linked list.
4.4 Write the algorithms for searching a linked list.
4.5 Write the algorithms for inserting/deleting nodes into/from a linked list.

5. Understand the Operation of Stack

5.1 State the meaning of the terms PUSH, POP&LIFO.
5.2 Write the algorithm for adding or removing data into / from a Stack.
5.3 Describe the Polish and Reverse Polish Notation of arithmetic expression.
5.4 Describe the operation of Infix, Postfix & Prefix transformation.
5.5 Write the algorithms to transform Prefix expression into Prefix expression and vice versa.

6. Understand the Operation of Queue

6.1 Define Queue.
6.2 Describe Priority queues.
6.3 Mention differences between stack and queue
6.4 Write the algorithms for inserting/deleting data into/from queues.

7. Understand the Operation of Recursion.

7.1 Define Recursion
7.2 Explain the uses of recursive functions.
7.3 Write the algorithms to compute factorial N by recursive functions.
7.4 Explain Fibonacci number generation algorithm byrecursive functions.

8 Understand the Operation of searching.

8.1 State the different techniques of searching.
8.2 Describe the linear and binary search algorithm.
8.3 Write the algorithms for linear & binary search.
8.4 Compare the complexity of linear & binary search algorithms.

9 Understand the Operation of sorting.

9.1 State the different techniques of Sorting.
9.2 Describe the technique of bubble sort, quick sort, heap sort, insertion sort, selection sort and merge sort.
9.3 Write the algorithms for bubble sort, quick sort, heap sort, insertion sort, selection sort and merge sort.
9.4 Compare the complexity of different sorting algorithms.

10 Understand the basics of Storing string

10.1 Define String
10.2 State the types of structures for storing strings.
10.3 Describe the Record – oriented, Fixed-Length storage procedure of strings.
10.4 State the advantages and disadvantages of record oriented, fixed-length storage.

PRACTICAL:

1. Develop and Test a program for data insertion & Deletion in a Linear Array.
2. Develop and Test a program for Multiplication of two Matrices
3. Develop and Test a program for inserting/Deleting nodes into/from a Linked List.
4. Develop and Test a program using PUSH and POP Operation in Stack.
5. Develop and Test a program to convert an infix expression to postfix expression.
6. Develop and Test a program for Data insertion and Deletion from a Queue.
7. Develop and Test a program for calculating factorial N and Fibonacci number using Recursion.
8. Develop and Test a program to find out data using linear search and binary search.
9. Develop and Test a program to arrange Data Ascending and Descending using Bubble Sort algorithm.
10. Develop and Test a program to arrange Data Ascending and Descending using Quick Sort algorithm.

REFERENCE BOOKS:

1. Data Structures - BY- Seymour Lipchitz (Schaum's Outline Series)
2. Data Structure and Algorithm - By- Md. Mokter Hossain, Md. Masud Karim & Md. Moynul Hoque

66653 **Sequential Logic System** **T P C**
3 3 4

AIMS

- To be able to acquire the knowledge & skill on Flip Flop, counters, shift registers and their applications
- To be able to acquire the knowledge & skill on semiconductor memories & ALU
- To be able to acquire the knowledge & skill on A/D and D/A converters
- To familiarize with PLD & simple computer (SAP-1& SAP-2)

SHORT DESCRIPTION

Sequential system concept; Flip-flops; Registers & counters; Semiconductor Memories; A/D & D/A converters; PLD and SAP-1& SAP-2.

DETAIL DESCRIPTION

Theory:

1. **Understand the features of sequential logic circuits**
   - 1.1 Define Sequential logic circuit.
   - 1.2 Define the synchronous and asynchronous sequential logic circuit.
   - 1.3 Define Clock, Timing diagram, Latch & Flip-Flop.
   - 1.4 State the concept of level clocking and edge triggering.
   - 1.5 Describe the operation of sequential logic system with block diagram.
2. **Understand Flip Flops**
   - 2.1 Define Flip Flop &list the different types of Flip Flops.
   - 2.2 Explain the operation of clocked SR Flip Flop.
   - 2.3 State the advantages of edge triggering in Flip Flop.
   - 2.4 Explain the operation of clocked D, T, JK and Master-slave Flip Flops.
   - 2.5 Describe the operation of Flip Flop as a frequency division circuit.
   - 2.6 State the application field of Flip Flops.
3. **Understand Registers**
   - 3.1 Define register &list the different types of registers.
   - 3.2 Explain the operation of serial in - serial / parallel out shift registers.
   - 3.3 Explain the operation of parallel in- parallel / serial out shift registers.
   - 3.4 Describe the operation of shift left & shift right register.
   - 3.5 Describe the operation of buffer register and universal shift registers.
   - 3.6 Mention the uses of registers.
4. **Understand binary counter circuits**
   - 4.1 Define binary counter.
   - 4.2 State the difference between asynchronous and synchronous counter.
   - 4.3 Explain the operation of asynchronous, synchronous and decade counter.
   - 4.4 State the modulus of a counter & describe the principle of divide - by- n counter.
   - 4.5 Describe the operation of a binary up / down counter.
   - 4.6 State the principle of ring, Johnson & Cascaded counter.
   - 4.7 State the application of different types of counters.
5. **Understand semiconductor memories**
   - 5.1 List the type of memories.
   - 5.2 Describe the principle of serial and parallel access memory.

5.3 Explain the internal organization of semiconductor memory.
5.4 Describe the technique of memory addressing.
5.5 Explain the read and write operation of semiconductor memory.
5.6 Explain the principle of static and dynamic RAM.
5.7 Describe the principle operation of ROM, PROM, EPROM and EEPROM.
5.8 Mention the maximum clock speed, bus width and bandwidth of SDRAM, RDRAM, DDR SDRAM, DDR2 SDRAM, DDR3 SDRAM & DDR4 SDRAM.

6. Understand arithmetic logic circuit:

6.1 Mention the basic principle of ALU.
6.2 List the application of ALU.
6.3 Mention the principle of digital comparators.
6.4 List the application of digital comparators.
6.5 Mention the principle of binary rate multiplier with block diagram.

7. Understand D/A converter

7.1 Mention the principle of level conversion/A conversion.
7.2 Mention the types of D/A converter.
7.3 Explain the operation of a binary weighted D/A and R-2R ladder D/A converter.
7.4 State the terms – resolution, percentage of resolution, accuracy, offset error and settling time as specification of D/A converter.
7.5 State the application field of D/A converter.

8. Understand A/D converter.

8.1 State the general principle of A/D conversion and list the types of A/D converter.
8.2 State the working principle of 3-bit parallel A/D converter.
8.3 Describe the operation of Digital Ramp A/D converter
8.4 Explain the operation of successive approximation, dual slope and Flash A/D converter.
8.5 State the terms – resolution, accuracy, and conversion time as pecification of A/D converter.
8.6 Describe the operation of sample & hold circuits and its application.

9. Understand the programmable logic devices.

9.1 Defines PLD and the advantages of PLD.
9.2 Describe the principle of PLD.
9.3 Discuss simplified logic diagram of PLA, PAL and GAL.
9.4 State the basic feature of FPGA.
9.5 Describe the programming process SPDL
9.6 Describe the complex programmable logic device (CPDL).

10. Understand the organization of a SAP-1

10.1 State the meaning of SAP.
10.2 State the function of each stage of SAP-1 with block diagram.
10.3 State the function of control signals i.e. Enable, Load, Clock and Clear of each register.
10.4 State the instruction for accessing and storing data in RAM of SAP-1.
10.5 Describe the bus organization of SAP- 1.

11. Understand the organization of a SAP-2

11.1 State the function of each stage of SAP-2 with block diagram.
11.2 State the function of control signals of SAP-2
11.3 Describe the bus organization of SAP-2.
11.4 State the concept of Instruction Set of SAP-2.
11.5 Mention the differences between SAP-1 & SAP-2.

PRACTICAL:

1. Prepare the clocked RS flip-flops and check its truth table and operation.
2. Prepare the clocked D & T flip-flops and check its truth table and operation.
3. Prepare the clocked JK & Master-slave flip-flops and check its truth table and operation.
4. Prepare the serial / Parallel in - serial / parallel out shift registers and check its working operation.
5. Prepare the left shift &right shift register and check its working operation.
6. Prepare the Decade counter and check its operation with truth table.
7. Prepare the Ring counter and check its operation with truth table.
8. Prepare the Up/Down counter and check its operation with truth table.
9. Prepare a 4 bit ALU and check the operation of ALU
10. Show the read / write operation of a 4 bit memory chip.
11. Show the D/A conversion procedure of D/A converter.
12. Show the A/D conversion procedure of A/D converter.
13. Prepare a digital clock & observed the output.

REFERENCE BOOKS

1. Digital principles and application − Albert PaulMalvino
2. Digital Computer Electronics− Albert PaulMalvino
3. Digital Systems–Ronald J.Tocci
4. Modern Digital Electronics - R. P. Jain

65841 Business Organization & Communication

T	P	C
2	0	2

AIMS:

- To be able to understand the basic concepts and principles of business organization.
- To be able to understand the banking system.
- To be able to understand the trade system of Bangladesh.
- To be able to understand the basic concepts of communication and its types, methods.
- To be able to perform in writing, application for job, complain letter & tender notice.

SHORT DESCRIPTION:

Principles and objects of business organization; Formation of business organization; Banking system and its operation; Negotiable instrument; Home trade and foreign trade. Basic concepts of communication Communication model & feedback; Types of communication; Methods of communication; Formal & informal communication; Essentials of communication; Report writing; Office management; Communication through correspondence; Official and semi- official letters.

DETAIL DESCRIPTION:

Theory:

1 Concept of Business organization.

1.1 Define business.
1.2 Mention the objects of business.
1.3 Define business organization.
1.4 State the function of business organization.

2 Formation of Business organization.

2.1Define sole proprietorship, partnership, Joint Stock Company. and co-operative
2.2Describe the formation of sole proprietorship, partnership, joint stock Company, & co operative.
2.3Mention the advantages and disadvantages of proprietorship, partnership and Joint Stock Company.
2.4State the principles of Co operative & various types of Co operative.
2.5Discuss the role of co-operative society in Bangladesh.

3 Basic idea of Banking system and negotiable instrument.

3.1Define bank.
3.2State the service rendered by bank.
3.3Describe the classification of bank in Bangladesh.
3.4State the functions of Bangladesh Bank in controlling money market.
3.5State the functions of commercial Bank in Bangladesh
3.6Mention different types of account operated in a bank.
3.7Mention how different types of bank accounts are opened and operated.
3.8Define negotiable instrument.
3.9Discuss various types of negotiable instrument.
3.10 Describe different types of cheque.

4 Home & foreign trade

4.1 Define home trade.

4.2 Describe types of home trade.

4.3 Define foreign trade.

4.4 Mention the advantages and disadvantages of foreign trade.

4.5 Discuss the import procedure & exporting procedure.

4.6 Define letter of credit.

4.7 Discuss the importance of foreign trade in the economy of Bangladesh.

5 Basic concepts of communication

5.1 Define communication & business communication.

5.2 State the objectives of business communication.

5.3 Describe the scope of business communication.

5.4 Discuss the essential elements of communication process.

6 Communication model and feedback.

6.1 Define communication model.

6.2 State the business functions of communication model.

6.3 Define feedback.

6.4 State the basic principles of effective feedback.

7 Types and Methods of communication.

7.1 Explain the different types of communication;-

a) Two-way communication
b) Formal & informal communication
c) Oral & written communication
d) Horizontal & vertical communication
e) external & internal communication
f) Spoken & listening communication.

7.2 Define communication method.

7.3 Discuss the various methods of communication.

7.4 Distinguish between oral and written communication.

8 Essentials of communication.

8.1 Discuss the essential feature of good communication.

8.2 Describe the barriers of communication.

8.3 Discuss the means for overcoming barriers to good communication.

9 Report writing.

9.1 Define report, business report & technical report.

9.2 State the essential qualities of a good report.

9.3 Describe the factors to be considered while drafting a report.

9.4 Explain the components of a technical report.

9.5 Prepare & present a technical report.

10 Office management.

10.1 Define office and office work.

10.2 State the characteristics of office work.

10.3 Define filing and indexing.

10.4 Discuss the methods of filing.

10.5 Discuss the methods of indexing.

10.6 Distinguish between filing and indexing.

11 Official and semi-official letters.

11.1 State the types of correspondence.

11.2 State the different parts of a commercial letter.

11.3 Define official letter and semi-official letter.

11.4 Prepare & present the following letters: Interview letter, appointment letter, joining letter and application for recruitment. Complain letters, tender notice.

REFERENCE BOOK:

1.উচ্চ মাধ্যমিক ব্যবসায়নীতি ও প্রয়োগ -মোহাম্মদ খালেকুজ্জামান

2.উচ্চ মাধ্যমিক ব্যাংকিং ও বীমা -প্রফেসর কাজী নুরুল ইসলাম ফারুকী

3.আধুনিক কারবার পদ্ধতি -লতিফুর রহমান

4.কারবার যোগাযোগ ও সচিবের কার্যপদ্ধতি -প্রফেসর লতিফুর রহমান ও প্রফেসর কাজী নুরুল ইসলাম ফারুকী

5.ব্যবসায়িক যোগাযোগ এবং অফিসের কর্মপ্রণালী –ড. এম, এ, মান্নান

6.ব্যবসায় যোগাযোগ – মোহাম্মদ খালেকুজ্জামান ও মোঃ মুশাররফ হোসেন চৌধুরী

7. Business organization & management- M.C. Shukla

8. Business organization & management- R.N. Gupta

BANGLADESH TECHNICAL EDUCATION BOARD
Agargaon, Dhaka-1207

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

COMPUTER SCIENCE & TECHNOLOGY

TECHNOLOGY CODE: **685**

5th SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

COMPUTER SCIENCE & TECHNOLOGY (685)

5th 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	68552	Content Management System	0	3	1	0	0	25	25	50
2	66644	Data Communication System	2	6	4	40	60	50	50	200
3	66651	Programming in Java	2	3	3	40	60	25	25	150
4	66662	Microprocessor & Interfacing	2	3	3	40	60	25	25	150
5	66664	Database Management System	2	3	3	40	60	25	25	150
6	69054	Environmental Studies	2	0	2	40	60	0	0	100
7	65851	Accounting Theory & Practice	2	3	3	40	60	50	0	150
Total			**12**	**21**	**19**	**240**	**360**	**200**	**150**	**950**

68552 Content Management System

T	P	C
0	3	1

AIMS

- To be able to acquire the knowledge and skill in the Content Management System concept.
- To be able to familiarize with dash board & various tools in Content Management systems.
- To be able to acquire the knowledge and skill in the widgets, plugins, themes in CMS.
- To be able to acquire the knowledge and skill in the Integrity & security of website.
- To be able to acquire the knowledge and skill in the Web publishing, Backup &user control and Database management in web.

SHORT DESCRIPTION

Content Management System concept, CMS dashboard & tools, web media, web menu, page & post, widgets & Plugins, themes, user, comments, web database, web hosting, publishing & maintenance.

DETAIL DESCRIPTION

Practical:

1. **Familiar with Content Management System (CMS).**
   - 1.1 Study on CMS.
   - 1.2 Identify the functions of CMS.
   - 1.3 List of popular CMSs.
   - 1.4 Identify of features of WordPress, Joomla, Drupal.
2. **Work on Dashboard& CMS tools.**
   - 2.1 Identify Dashboard components including: Admin Bar, Sidebar Menu, Dashboard Widgets, lists and available links.
   - 2.2 Identify your site's status information.
   - 2.3 Recognize and use tabular lists that appear on many administrative pages.
3. **Work on text editor & media.**
   - 3.1 Identify text editor & its component.
   - 3.2 Write a paragraph using text editor.
   - 3.3 Insert an image into a body of text.
   - 3.4 Add a title, caption, alternative text, and description.
   - 3.5 Change what the image links to (media file, attachment page, custom URL, or none).
   - 3.6 Insert an audio file into a post or a page.
   - 3.7 Add a title, artist, album, caption, and description.
   - 3.8 Choose between "Embed Media Player", "Link to Media File" or "Link to Attachment Page".
   - 3.9 Insert a video file into a post or a page.
   - 3.10 Add a title, caption, and description.
   - 3.11 Choose between "Embed Media Player", "Link to Media File" or "Link to Attachment Page".
4. **Work on Menu management.**
   - 4.1 Describe how menus support website navigation.
   - 4.2 Manage the primary menu in WordPress.
   - 4.3 Create a custom menu.
   - 4.4 Modify a menu by adding and removing items.

4.5 Automate new menu items.
4.6 Organize menu items by order and level.
4.7 Place a menu in a secondary theme location.
4.8 Utilize the “Custom Menu” widget.

5. **Work on Page, Post & Category management.**
5.1 Study Posts & Pages.
5.2 Add your Site Content.
5.3 Add a New Page and New Post.
5.4 Set up a static home page.
5.5 Create a blog page to display all Posts (articles).
5.6 Add Content with the Visual Editor.
5.7 Switch to the Text Editor.
5.8 Change your Post Format.
5.9 Create category.
5.10 Add a post in a specific category.
5.11 Add Tags within Post.

6. **Work on widgets& Plugins.**
6.1 Identify the purpose and functions of widget areas.
6.2 Practice the steps of adding a widget area to a theme.
6.3 Add widgets and content to a new widget area in a site.
6.4 Identify the purpose and functions of plugins.
6.5 Practice the steps of adding some plugins to a theme.
6.7 Practice on updating and deletion plugins.
6.6 Practice the SEO plugin.
6.7 Add WordPress Security plugin.

7. **Work on Themes Management.**
7.1 Find and assess Themes.
7.2 Upload and Install Themes.
7.3 Configure installed Themes.
7.4 Update Themes.

8. **Work on User, Comments & Database.**
8.1 Create a new user account.
8.2 Enable/Disable the ability for users to register their own account.
8.3 Use the search, filter, and batch modification tools within the users table to find and/or modify existing users.
8.4 Add and remove permissions (via Roles and Capabilities) for individual users.
8.5 Reset a user’s password& update user profile.
8.6 Disable a user without deleting them.
8.7 Delete a user.
8.8 Reassign a deleted user’s content to another user.
8.9 Manage Comments.
8.10 Create a Database.

9. **Project work.**
9.1 Create a simple CMS based website project.

10. Work on Web Hosting-Local, remote& cloud.

10.1 Installing & configuration local web server.
10.2 Set up a domain and hosting account.
10.3 Set up a MySQL database on their server.
10.4 Install CMS on the MySQL database.
10.5 Select, install, and activate a theme.
10.6 Publish a website in a web server.
10.7 Create backup for a published web server.

11. Work on Updating & Maintenance.

11.1 Control spam.
11.2 Update WP and themes.
11.3 SEO.
11.4 Create Database backup.
11.5 Create whole website Backup.
11.6 Setup automated backup.
11.7 Migrate website to a new host.
11.8 Create database backup for cloud storage.

REFERENCE BOOK & Web Site

1. Content Management Bible, Bob Boiko, Wiley Publishing Inc, 2005. (ISBN: 0764573713).
2. WordPress for Dummies, *Lisa Sabin-Wilson*
3. WordPress. 1001 Trucos, Fernando Tellado
4. www.wordpress.com
5. https://www.joomla.org/
6. https://www.drupal.org/

66644 Data Communication System

T	P	C
2	6	4

AIMS

- To be able to acquire the knowledge on data communication Basics.
- To be able to provide the knowledge and to develop skill on signal and data transmission systems and transmission media.
- To be able to acquire the knowledge on Digital communication and computer networks.
- To be able to provide the knowledge and to develop skill on network topologies and protocols.
- To be able to provide the knowledge and to develop skill on MODEM, Hub, Switch, NIC and Repeater.
- To be able to establish and implement a LAN to provide Network services.

SHORT DESCRIPTION

Communication Basics; Analog and Digital Modulation and Demodulation; Analog and Digital communication; Transmission media and connectors; LAN, Network fundamentals; Peer-peer & Client-Server techniques; Topologies and protocols; NIC; Network Addressing; IP address and Subnet Mask.

DETAILS DESCRIPTION

Theory:

1. **Understand the communication basics.**
   - 1.1 Define Electronic Communication.
   - 1.2 Mention the basic elements of a communication system.
   - 1.3 Describe communication system with a simple block diagram.
   - 1.4 State the terms: Frequency, Wavelength, Spectrum, Bandwidth, Throughput, Propagation speed, Propagation time, Noise figure & SNR
   - 1.5 Mention the difference between bandwidth and data rate.
   - 1.6 Describe simplex, half-duplex and full duplex modes of communication.
   - 1.7 Describe synchronous and asynchronous communication techniques.
2. **2. Understand Analog Communication Systems**
   - 2.1 Define Modulation and Demodulation.
   - 2.2 State the necessity of modulation.
   - 2.3 Mention the types of modulation.
   - 2.4 Describe Amplitude, Frequency and Phase modulation with necessary waveform.
   - 2.5 State the difference between analog and digital modulation
   - 2.6 State the advantage and disadvantages of ASK, FSK and PSK (BPSK)
3. **3. Understand Digital Communication Systems**
   - 3.1 Define digital modulation.
   - 3.2 Describe Digital communication system with block diagram.
   - 3.3 Define Line Coding and Block Coding.
   - 3.4 Mention the Line Coding Schemes.
   - 3.5 State unipolar Line coding with timing diagram.
   - 3.6 Describe NRZ-I Line Coding scheme using 4B/5B Block Coding.
   - 3.7 Describe different types of polar encoding with necessary timing diagram.

4. **4. Understand the transmission media and connectors.**
   4.1 Mention the categories of transmission media
   4.2 Describe the construction of Twisted-pair (STP, UTP) Co-axial and Fiber optic cable.
   4.3 State the characteristics of Twisted-pair (STP, UTP), Co-axial and Fiber optic cable.
   4.4 State the advantage and disadvantages of each type of cables.
   4.5 Define Wireless Media and Propagation.
   4.6 Describe Wireless Propagation Modes with diagram.
   4.7 Describe the method of Radio, Microwave and Infrared communication system.
   4.8 State the characteristics of Radio, Microwave and Satellite communication system.

5. **5. Understand multiplexing techniques**
   5.1 Define Multiplexing and De-multiplexing process of communication system.
   5.2 State the necessity of multiplexing.
   5.3 Mention the categories of multiplexing.
   5.4 Define Frequency division multiplexing.
   5.5 Describe Frequency division multiplexing and de-multiplexing technique with block diagram
   5.6 Describe the Wave division multiplexing and De-multiplexing technique with block diagram
   5.7 Define Time division multiplexing and of Code division multiplexing system
   5.8 State difference between baseband and broadband transmission.

6. **6. Understand computer network basics.**
   6.1 Define Computer Network
   6.2 State the concept of computer Network.
   6.3 Mention elements of computer network.
   6.4 Describe the advantages of Computer network.
   6.5 Describe the application of computer network.
   6.6 Describe client / server and peer-to-peer network.
   6.7 Describe the general features of LAN, MANs and WANs.
   6.8

7. **7. Understand the network topologies.**
   7.1 Define network topology.
   7.2 Mention the difference between physical and logical topology.
   7.3 Describe the physical connection of bus, ring, star, mesh and hybrid topologies.
   7.4 Mention the advantages and disadvantages of bus, ring, star, mesh and hybrid topologies.
   7.5 Describe the factors to select a particular topology.
   7.6 Describe the logical topologies of a token ring network.

8. **8. Understand network protocols.**
   8.1 Define network protocol.
   8.2 Describe the main elements of protocol.
   8.3 Describe the characteristics of protocol.
   8.4 Describe the functions of protocol.
   8.5 List different types of network protocols.
   8.6 State the function of TCP/IP protocol.

9. **9. Understand IP addressing.**
   9.1 Define Network Addressing.
   9.2 Define IP and IPv4
   9.3 Describe the IP address formats of class A,B,C,D &E with example.

9.4 Describe subnet and subnet masks.
9.5 State CIDR format of subnet.
9.6 Define IPv6.
9.7 Describe the address format of IPv6.

10. 10. Understand Network Interface Cards (NIC)

10.1 State the role of NIC.
10.2 Describe the format of Physical address (MAC Address) of NIC.
10.3 Mention the points that agree both the sending and receiving NICs.
10.4 State the importance of base memory address for NIC.
10.5 Mention the important points to maintain the compatibility among NIC, bus and cables.
10.6 Describe the NIC related factors that enhanced the performance of network.

11. 11. Understand the connectivity devices

11.1 List the connectivity devices used in networking.
11.2 Describe function of MODEM.
11.3 Describe MODEM types and Standard.
11.4 Describe the features of ADSL and Digital MODEM.
11.5 Describe the functions of Hubs, Repeaters and switches in network.
11.6 Describe the important features of Repeaters and switches.
11.7 Describe the functions of Router and Gateway

PRACTICAL:

1. Identify different types of guided communication media.

1.1 Twisted Pair Cable- Unshielded Twisted Pair (UTP), Shielded Twisted Pair (STP)
1.2 Co-axial Cable- Thick net and Thin net
1.3 Fiber Optic Cable- Single mode and Multi mode
1.4 Constructional features of UTP, STP, Co-axial Cable and Fiber Optic Cable.

2. Identify different types of connectors

2.1 Twisted Pair Cable- RJ45 Connectors and their constructional features.
2.2 Co-axial Cable- BNC Connectors and their constructional features.
2.3 Fiber Optic Cable- MT-RJ and their constructional features.

3. Identify other Network hardware's

3.1 Network Interface Cards/LAN cards/ Network Adaptor.
3.2 Cable Tester, Crimper and Accessories
3.3 Modems, Hubs, Repeater, Switch & Router

4. Connect RJ45 Connector with UTP Cable

4.1 Make a straight through cable
4.2 Make a Cross over cable
4.3 Make a console cable

5. Establish a Peer to Peer/Workgroup LAN

5.1 Install Network Interface Card (NIC) into the PC
5.2 Check the MAC address of the Network Interface Card (NIC)
5.3 Connect straight cable or cross over cable among PCs, Hub or Switch
5.4 Configure the TCP/IP in each PC
5.5 Test the connectivity among PCs using Ping Command.

6. **Perform the task to Work with a Peer/Workgroup LAN environment for simple data communication.**
   - 6.1 Share the folders, Pen drive and Secondary memory.
   - 6.2 Share a printer, DVD Drive or any other resources.

7. **Establish a Client–Server Local Area Network**
   - 7.1 Install Windows server 2012 into a server PC
   - 7.2 Configure TCP/IP to server and client PCs
   - 7.3 Perform the task to configure the Active Directory
   - 7.4 Perform the task to configure The DNS.
   - 7.5 Perform the task to configure the DHCP
   - 7.6 Perform the task to Work with a Client–Server LAN environment for simple data communication and Administrative functions.

REFERENCE BOOKS

1. Data communications and Networking – Behrouz A. Forouzan.
2. Fundamentals of Communication-M. Shamim Kaiser and associates
4. Data and Computer Communications-William Stallings
5. Local Area Networking – S. K Basandra.
6. MCSE Windows & Networking Essential – Joe Casad

66651	Programming in Java	T	P	C
		2	3	3

OBJECTIVES

- To develop knowledge and skill on programming Basics in Java Language.
- To develop knowledge and skill to create, compile, debug & execute a java program.

SHORT DESCRIPTION

Basics of Java Language, Data Structures in Java, Object Oriented Concepts in Java, Build and Packaging Tools, Threading, Generics, Lambda, Collections, I/O operations, networking in Java, Database communication in Java, RMI package, web server in Java, servlet;

DETAIL DESCRIPTION

Theory:

1. Understand the concept of object oriented programming (OOP)

1.1 Describe the software evolution.
1.2 Mention the drawbacks of traditional programming.
1.3 State the terms used in OOP-objects, classes, data abstraction, encapsulation, inheritance, Polymorphism, message passing, and dynamic binding
1.4 Mention the list of OOP languages.
1.5 State the benefits of OOP.
1.6 Mention the application of OOP.

2. Understand the features of Java

2.1 Describe the history of Java.
2.2 Describe Java development environment steps.
2.3 Mention the applications of Java.
2.4 Describe programming style and convention of Java.
2.5 Describe white space, identifiers, literals, comments, separators and keywords of Java.
2.6 Write the structure of Java Program

3. Understand the use of Data types, Variables, Operators, Control Statements and Array in Java

3.1 State the data types (primitives, non-primitive and literals) of Java programs.
3.2 Describe the declaration and dynamic initialization of variables in java.
3.3 State the process of accepting input from a user and option panes
3.4 Describe the control flow statements in Java.
3.5 Describe various types of operators used in Java.
3.6 Describe Array dimensions, declarations and initializations.
3.7 Write Java programs using operators, control statements and Arrays.

4. Understand Classes, Objects, Methods, and Constructors in Java

4.1 Describe the declaration (syntax) of class and object in Java.
4.2 Define Method with syntax.
4.3 State the procedure of adding Method to class.
4.4 Describe the advantages of Method.
4.5 Describe the overloading Method in java.

4.6 Describe the constructor and overloading constructor in java.
4.7 Explain the instance variable hiding, and garbage collection.
4.8 Write java programs relating to class, object, method and constructor.

5. Understand the inheritance and polymorphism

5.1 Define super class and sub class.
5.2 Describe the multilevel hierarchy of inheritance.
5.3 Describe the overridden methods in java.
5.4 Describe dynamic run-time polymorphism in java.
5.5 Describe the abstract and object classes in java.
5.6 Mention the uses of *final* and *super* keyword.
5.7 Write java programs relating to inheritance and polymorphism.

6. Understand Packages and Interfaces

6.1 Define the packages with syntax
6.2 Describe the function of packages
6.3 Mention the different levels of class member access.
6.4 Define the interfaces with syntax.
6.5 Describe the implementation of interfaces.
6.6 Explain the nested interfaces.
6.7 Describe the variables in interfaces.
6.8 Write java programs that related to package and interface.

7. Understand multithreaded programming

7.1 Define multithreaded programming with syntax.
7.2 Mention the different between processed-based and thread-based multitasking
7.3 Mention the several methods of thread class with state diagram.
7.4 Describe the way to create the several types of thread.
7.5 Describe the minimum, default and maximum thread priorities.
7.6 Describe the synchronization inter-thread communication method.
7.7 Describe the suspending, resuming and stopping threads.
7.8 Write java programs using multithreaded programming method.

8. Understanding I/O Operations

8.1 Describe the Byte stream and Character Stream Classes.
8.2 Describe the Reading Console Input and Writing Console Output.
8.3 Mention the constructors for creating File objects.
8.4 Describe the Reading and Writing files in java.
8.5 Describe flowchart of a complete java streams.
8.6 Describe the Random Access File Streams.
8.7 Write java programs relating I/O operation.

9. Database Connectivity: JDBC

9.1 Define Java Database Client/Server methodology.
9.2 Describe Two-Tier and Three-Tier Database Design.
9.3 Describe JDBC API(API Components, Applications and Applets)
9.4 Mention security considerations of JDBC.
9.5 Describe JDBC Drivers, JDBC-ODBC Bridge and Current JDBC Drivers.
9.6 Write java programs relating to JDBC.

10. Client-Server Networking in Java.

10.1 Define network protocol

10.2 Describe TCP and UDP.

10.3 Describe Socket Programming and URL Processing.

10.4 Describe steps occur when establishing a TCP connection between two computers using sockets.

10.5 Describe Server Socket Class Methods (**java.net.ServerSocket)**

PRACTICAL:

1. Install a Java Development Kit /Net beans software
2. Write and execute java program for displaying text messages.
3. Write and execute java programs using arrays and control flow statements.
4. Write and execute java programs using class, object, method and constructor.
5. Compile and run your program using Ant, Maven, Gradle packaging tool in Java.
6. Write and execute java programs using inheritance and polymorphism.
7. Write and execute java programs using package.
8. Write and execute java programs using interface.
9. Write and execute java programs using multithreaded programming method.
10. Write and execute java programs using I/O operation.

REFERENCE BOOKS & URL.

1. The Complete Reference of Java- Herbert Schildt
2. JAVA How to Program- P.J. Deitel and H.M. Deitel
3. সান জাভা - ২ জাহিদ খান; মিন্টু লাল সাহা; জয়ন্ত কুমার সাহা; আব্দুল আহাদ মুরাদ
4. জাভা প্রোগ্রামিং - এএনএম বজলুর রহমান রোকন

Related URL links:

http://www.informit.com/library/content.aspx?b=STY_Java2_24hours&seqNum=24

http://java.sun.com/developer/onlineTraining/JavaIntro/contents.htmlinks

http://www.homeandlearn.co.uk/java/java.html

http://java.sun.com/ : Java Development Kit, Development tools, Java Tutorial

http://www.eclipse.org/ : A vendor-neutral open development platform and application frameworks for building software

http://www.uml.org/: UML resources

http://www.bruceeckel.com/ : Free electronic version of the book

http://www.javatpoint.com/java-tutorial

66662 **Microprocessor & Interfacing** **T P C**

2 3 3

AIMS

- To be able to acquire the knowledge on microprocessor, microcomputer.
- To be able to develop the knowledge and skill on the architecture and assembly language programming of 16- bit microprocessor
- To be able to acquire the knowledge and skill on memory, interrupt and I/O interfacing.

SHORT DESCRIPTION

Basic conception of microprocessor and microcomputer; Architecture and addressing mode of Intel 8086μp; Instruction timing of Intel 8086 μp; Memory, input /output and interrupt interfacing of Intel 8086 μp; Interfacing principle and peripheral devices; programming of Intel 8086/8088; Intel x86 family, multi-core processor idea;

DETAIL DESCRIPTION

Theory:

1. Understand the concept of microprocessor and microcomputer.

1.1. Define the microprocessor and microcomputer.
1.2. Distinguish between microprocessor and microcomputer.
1.3. Distinguish between microprocessor and microcontroller.
1.4. Describe the block diagram of simple microcomputer.
1.5. Evaluation of microprocessor (4, 8, 16, 32 & 64 bit microprocessor)

2. Understand the architecture of 8086 microprocessor.

2.1. Mention the general features of 8086/8088 microprocessor.
2.2. Describe the pin and signal diagram of 8086/8088 microprocessor.
2.3. Distinguish between maximum and minimum mode of 8086/8088 microprocessor
2.4. Describe the architecture of 8086 microprocessor.
2.5. Describe the register structure of 8086 microprocessor.
2.6. Mention the difference between 8086 and 8088 microprocessor.

3. Understand the memory interface of the 8086 microprocessor.

3.1. Sketch the 8086 system memory interface.
3.2. State the meaning of even & odd address boundaries.
3.3. Describe the hardware organization of the memory address space of 8086.
3.4. Describe the memory read and write bus cycle of 8086 microprocessor. Explain the technique to de-multiplex the system bus.

4. Understand the 8086 addressing mode and programming concept.

4.1. Describe the addressing mode of 8086 microprocessor.
4.2. Describe the software model of the 8086 microprocessor.
4.3. Describe the 8086 instruction set.
4.4. Explain the instruction format of 8086 microprocessor.

5. Understand the input / output interface and peripheral devices of the 8086 microprocessor.

5.1. Describe the 8086 system I/O interface.

5.2. Describe the I/O address space of the 8086 system.
5.3. Describe the I/O read and I/O write bus cycle of 8086 microprocessor.
5.4. Define programmable peripheral Interface.
5.5. Mention the commonly used support chips and purpose of those.
5.6. Describe the operation of PPI with block diagram.
5.7. Configure the control word of the control register of PPI for simple I/O operations.

6. Understand the interrupt interface of the 8086 microprocessor.

6.1. Mention the types of interrupts.
6.2. Describe the common features of different types of interrupts.
6.3. Sketch the map of interrupt vector table.
6.4. Describe the external hardware interrupt interface of the 8086 microprocessor.

7. Understand the assembly language programming of 8086 family.

7.1. Define the assembler pseudo instructions.
7.2. Describe the use of assembler directives (i. e. SEGMENT, ENDS, ASSUME, DUP, etc.)
7.3. Describe the use of program development tools (i.e. editor, assembler, linker, locator debugger and emulator.)
7.4. Explain the sequential, IF-THEN-ELSE, WHILE-DO and REPEAT-UNTILL structure in 8086 assembly language with pseudo code and flow chart.
7.5. Write assembly language programs.

8. Understand the features of advanced microprocessors.

8.1. List the names of other x86 family processors including Pentium series and state the brief specification.
8.2. Describe the real and protected mode memory addressing technique.
8.3. State the function of BIST in Pentium processor.
8.4. State multiprocessing and parallel processing.
8.5. Define multi-core processors (i.e. Dual core, Quad core, core ix).
8.6. Write down the advantages of multi-core processors.

9. Understand the real world interfacing

9.1. Describe the interfacing of LED Display with program to the microprocessor.
9.2. Describe the interfacing of seven segment LED display with program to the microprocessor.
9.3. Describe the interfacing of Multiple Digit Display with program to the microprocessor.
9.4. Describe the method of interfacing of stepper motor to the microprocessor.

Practical:

1. Perform the task to develop and execute an assembly language program for solving arithmetic problems using 8086/88μp trainer or MASM type tools or software simulator.
2. Perform the task to develop and execute an assembly language program for solving logical problems using 8086/88μp trainer or MASM type tools or software simulator.

3. Perform the task to develop and execute an assembly language program to compute 1's or 2's complement of binary number using 8086/88μp trainer or MASM type tools or software simulator.
4. Perform the task to transmit data from a microprocessor to an I/O using Intel 8086/8088 based microprocessor trainer or MASM type tools or simulator software.
5. Perform the task to receive data from an I/O to the microprocessor using Intel 8086/8088 based microprocessor trainer or MASM type tools or simulator software.
6. Perform the task to develop and execute an assembly language program/ Subroutine to produce time delays of different durations using 8086/88μp trainer or MASM type tools or software simulator.
7. Perform the task to develop and execute assembly language programs that implement the branching and looping structures using 8086/88μp trainer or MASM type tools or software simulator.
8. Build a simple computer prototype using 8086/8088 processor with memory, I/O interface and simple I/O devices

Reference Books:

1. Digital Computer Electronics - Malvino- Brown
2. Microprocessor And Microcomputer Based System Design - Mohamed Rafiquzzaman..
3. Microprocessors and Interfacing: Programming and Hardware - Douglas V. Hall
4. The Intel Microprocessors - Barry B. Brey
5. Microprocessor & Interfacing - A.P. Godse & D.A. Godse
6. The 8086 and 80286 Microprocessor - Avatar Singh

66664 Database Management System

T	P	C
2	3	3

AIMS

- To be able to acquire the knowledge and skill in the database system concept.
- To be able to familiarize with data models in database systems.
- To be able to acquire the knowledge and skill in the Relational databases
- To be able to acquire the knowledge and skill in the Integrity & security.
- To be able to acquire the knowledge and skill in the Data storage, Transactions & concurrency control and Database system architecture.

SHORT DESCRIPTION

Database system concept; Data models; Relational databases, Integrity & security, Data storage, Transactions & concurrency control, cursor and Database system architecture.

DETAIL DESCRIPTION

Theory:

1. Understand the basic concept of database system.

1.1 Define database management system.
1.2 Explain the purpose of database management system.
1.3 Mention the difference between conventional file system and database management system.
1.4 Mention the advantages & disadvantages of database management system.
1.5 Define data abstraction, instances and schemas.
1.6 Mention the types of schema.
1.7 Data type concept.

2. Understand the concepts of database languages, users, manager and administrator.

2.1 Describe the database languages with examples.
2.2 Describe the basic operation of DDL, DML and data dictionary.
2.3 Describe the different types of database system users.
2.4 Example the different tasks of database manager.
2.5 Describe the functions of a database administrator.
2.6 Describe the functional components of a database system.

3. Understand the data models.

3.1 Define the entity, entity set and data model.
3.2 Mention the meaning of E-R diagram symbol.
3.3 Describe the E-R diagram for different mapping constrains.
3.4 State different types of attribute uses in E-R diagram.
3.5 State the techniques to convert E-R diagram to table.
3.6 Describe the different types of data models with examples.
3.7 Describe the constraints in entity-relationship (mapping, cardinalities and existences) with diagrams..
3.8 State the meaning of different types of keys in RDBMS (primary key and foreign key, super key, candidate key).
3.9 Distinguish between strong and weak entity sets.

3.10 Describe the schema diagram with example.

4. **Understand the relational database Query language.**
   - 4.1 Define query language.
   - 4.2 Mention the different among SQL, QBE and Datalog.
   - 4.3 Describe the fundamental operations of relational algebra(**select, project, union, set difference, Cartesian product, rename, set intersection, natural joint, division** and **assignment**).

5. **Understand the SQL and PL/SQL.**
   - 5.1 Mention the several parts of SQL and PL/SQL.
   - 5.2 Explain five clauses of SQL expression (**select, from, where, group by and having**).
   - 5.3 Describe the uses of SQL set operations (**union, intersect,** and **except**).
   - 5.4 Describe the uses of SQL aggregate functions (**avg, min, max, sum**, **count, upper, lower, initcap, string operation etc.**).
   - 5.5 Describe the technique to add, remove and change information with SQL (**delete, insert,** and **update**).

6. **Understand the integrity and security.**
   - 6.1 Define integrity constraint.
   - 6.2 Describe the referential integrity in SQL.
   - 6.3 Describe the assertions in RDBMS.
   - 6.4 Define the triggers and need for triggers in RDBMS.
   - 6.5 Define the security in RDBMS.
   - 6.6 Describe the protection of database.
   - 6.7 Define encryption and authentication in database.
   - 6.8 Mention the technique of encryption.

7. **Understand the relational database design.**
   - 7.1 Define the normalization.
   - 7.2 Mention the need for normalization.
   - 7.3 Describe the term redundancy in RDBMS.
   - 7.4 Explain the three stages/rules of normalization in database management system (1NF, 2NF, and 3NF)
   - 7.5 Describe the overall database design process.

8. **Understand the data-storage media.**
   - 8.1 List the physical storage media.
   - 8.2 Describe the storage-device hierarchy used for database storage.
   - 8.3 Define the RAID.
   - 8.4 Describe the different levels of RAID.
   - 8.5 Describe the choice of RAID levels.

9. **Understand the Transactions and concurrency controls.**
   - 9.1 Define transaction and concurrent execution in DBMS.
   - 9.2 Mention the properties of the transaction.
   - 9.3 Explain the transaction state with diagram.
   - 9.4 Mention the reasons for allowing concurrency.

10. **Understand the database system architecture.**
   - 10.1 Define centralized, parallel and distributed database system.

10.2 Explain the homogeneous and heterogeneous databases.

10.3 Explain the structure of server (Centralized and client server), parallel and distributed database system architecture.

10.4 Describe the advantages and disadvantages of server, parallel and distributed database system architecture.

11. Understanding the cursor statement

11.1 Declare a cursor that defines a result set in a stored procedure

11.2 Open the cursor to establish the result set.

11.3 Fetch the data into local variables as needed from the cursor, one row at a time.

11.4 Close the cursor when done.

12. Database Backup and Restoring System.

PRACTICAL:

1. Arrange the necessary hardware and operating system for installing MS-Access, SQL Server or Oracle.
2. Create a new database for the result process application using MS-Access, SQL server or Oracle.
3. Create tables such as Student Information, Department Information, Subject Information, Year information and Mark Information (including):
   I. Create a new user/database and permission assign.
   II. Create a table space.
   III. Create a new table with appropriate data types.
   IV. Define primary key, Foreign key, candidate key and different constraints.
   V. Drop primary key and foreign key.
   VI. Save the table structure
   VII. Edit a table structure
   VIII. Insert a record, Update the record and Delete the row.
   IX. Alter a field with Field Name, DataType, Length etc.
   X. Change or remove a key field
4. Create relationship among tables using inner join or outer join.
   I. Create a query involving only one table.
   II. Query linked tables and create a form from a query.
   III. Create a total query to find the GPA of each student of particular year.
5. Create data entry form for entering data in Student Information, Department Information, Subject Information, Year Information and Mark Information tables.

Then apply Normalization (1NF, 2NF and 3NF) on result process database.

6. Use Auto Report to create table reports of result process. Use the report wizard to create a grade sheet /mark sheet/transcript, Merit list and tabulation sheet.
7. Perform the task to install Oracle Database Language and Invoking SQL Plus.
8. Perform the task to manipulate data in data base management system (select, project, union, set difference, cartesian product, rename, set intersection, natural joint, division and assignment).
9. Perform the task to view, delete and update data into a table (delete, insert, and update) and perform the task to modify the structure of a table.
10. Perform the task to work with grouping data from tables and manipulate dates by SQL in Oracle
11. Perform the task to work with Sub Queries, JOINS, Indexes, Trigger, transaction, process, Parameterized cursor, 'DUAL' and SYSDATE, functions, different Type of constraints in PL/SQL.

12. Perform the task to work with View, sequences and Security in SQL including user and administrative level.
13. Create a stored procedure, declare some variables, create a cursor and use it by writing some query statement in the looping area after open the cursor. Then close the cursor.
14. Perform the task to work with Concurrency Control (Implicit and explicit lock) and error handling in PL/SQL
15. Backup a database and Restore it after taking the backup.

REFERENCE BOOK

1. Database System Concepts – Henry F. Korth.
2. Successful projects in ACCESS - P.M Heathcote
3. SQL, PL/SQL
4. Introduction To Oracle 10g SQL Volume-1
5. Introduction To Oracle 10g SQL Volume-2
6. Introduction To Oracle 10g PL/SQL Volume-1
7. Introduction To Oracle 10g PL/SQL Volume-2

References Web Site:-

www.java2s.com/Tutorial/Oracle/CatalogOracle.htm
www.docs.oracle.com

69054 Environmental Studies

T	P	C
2	0	2

AIMS

- To be able to understand the basic concepts of environment and environmental pollution.
- To be able to understand the concepts of ecology and ecosystems
- To be able to understand the basic concepts of environmental degradation relating to industrial production.
- To be able to understand the major environmental issues and problems.
- To be able to understand legislative measures to protect environment.

SHORT DESCRIPTION

Basic concepts of environment; natural resources; biogeochemical cycling; ecology and ecosystem; air; water; soil; solid waste management; development and environment; global environmental challenges; legislative protection of environment.

DETAIL DESCRIPTION

1. Understand the multidisciplinary nature of environmental studies.

1.1. Define environment, nature, pollution, pollutant, contaminant.
1.2. Describe the scope of environmental studies.
1.3. Describe the importance of environmental studies.
1.4. Describe the formation and structure of the Earth.
1.5. Describe the earth's natural system.
1.6. Describe the changing attitudes to the natural world.
1.7. Mention the main components of environment.
1.8. Define natural and man-made environment.
1.9. Distinguish between natural and man-made environment.

2. Understand the natural resources.

2.1. Define natural resources.
2.2. Classify natural resources.
2.3. Describe forest resources.
2.4. Describe water resources.
2.5. Describe mineral resources.
2.6. Describe food resources.
2.7. Describe energy resources.
2.8. Describe land resources.
2.9. Describe environmental problem relating to resources use.
2.10. Describe the role of an individual in conservation of natural resources.

3. Understand the biogeochemical cycling.

3.1. Define biogeochemical cycle.
3.2. Describe hydrologic cycle.
3.3. Describe carbon cycle.
3.4. Describe nitrogen cycle.
3.5. Describe oxygen cycle.

3.6. Describe phosphorus cycle.
3.7. Describe sulfur cycle.
3.8. Describe nutrient cycle.

4. Understand the ecology and ecosystem.

4.1. Define ecology and ecosystem.
4.2. Structure and function of an ecosystem.
4.3. Describe the components of ecosystem.
4.4. Explain the stability of ecosystem.
4.5. Describe ecological factors.
4.6. Describe interdependency between abiotic and biotic component.
4.7. Describe the meaning of following terms: species, population, community, ecological succession, community periodicity, climax community, ecological niche, habitat, plankton, nekton, ecological indicator, evolution, adaptation, producers, consumers, decomposers, food chains, food webs, ecological pyramids, bio-concentration, bio-magnification, biodiversity, threatened species, endanger species, extinct species, exotic species, biodiversity conservation and biogeography.
4.8. Describe energy flow in the ecosystem.
4.9. Describe the ecosystem of pond, ocean, estuary, grassland, cropland, forest, desert and mangrove.

5. Understand the air as a component of environment.

5.1. Define air.
5.2. Describe the composition of the clean dry atmospheric air at ground level.
5.3. Describe the atmospheric structure.
5.4. Define air pollution.
5.5. Describe major air pollutants and their impacts.
5.6. Describe the sources of air pollutants.
5.7. Explain the formation of photochemical smog and its effects.
5.8. Describe the effects of air pollution on vegetation, animal, human health and materials and resources.
5.9. Define sound and noise.
5.10. Describe the classification of sound.
5.11. Describe the effects of noise.

6. Understand the water as a component of environment.

6.1. Define water.
6.2. Describe the characteristics of water.
6.3. Describe the sources of water.
6.4. Describe the uses of water.
6.5. Explain that the water is a universal solvent.
6.6. Define water pollution, biological oxygen demand (BOD), effluent treatment plant (ETP).
6.7. Describe the sources of water pollution.
6.8. Describe the effects of water pollution.

7. Understand the soil as a component of environment.

7.1. Define soil.
7.2. Describe the constituents of soil.
7.3. Define soil pollution.
7.4. Describe causes soil degradation.

7.5. Describe the sources of soil pollution.
7.6. Describe the effects of soil pollution.

8. Understand the concept of solid waste management.

8.1. Define solid waste, refuse, garbage, rubbish, trashes, demolition and construction waste, e-waste, agricultural waste, pathological waste, radioactive waste, hazardous waste, 3R, 4R.
8.2. List the sources of solid waste.
8.3. Mention the classification of solid waste.
8.4. Mention the methods of collection of solid waste.
8.5. Describe the recycling of solid wastes.
8.6. Describe resource recovery from solid waste.
8.7. Describe the potential method of disposal of solid waste.
8.8. Describe control measures of urban and industrial wastes.

9. Understand the development and environment.

9.1. Define environmental ethics and environmental stress.
9.2. Describe environmental stress.
9.3. Define sustainable development.
9.4. Define urbanization.
9.5. Describe the causes of urbanization.
9.6. Describe the effects of urbanization on environment.
9.7. Define industrialization.
9.8. Describe the causes of industrialization.
9.9. Describe the effects of industrialization on environment.

10. Understand the global environmental challenges.

10.1. Define greenhouse gas and greenhouse effects.
10.2. Make a list of greenhouse gases and their contribution on greenhouse effects.
10.3. Describe the causes and consequences of greenhouse effects.
10.4. Describe acid rain.
10.5. Describe importance of ozone layer.
10.6. Define ozone depleting substances (ODS).
10.7. Describe ozone layer depletion mechanism.
10.8. Describe hazardous waste.
10.9. Describe chemicals pesticides.
10.10. Describe radioactive pollution.
10.11. Describe natural disaster.

11. Understand the legislative protection of environment.

11.1. Define environmental impact assessment (EIA) and environmental auditing (EA).

11.2. Mention environmental act and legislations prescribed for air, noise, water, soil and wild life protection.

11.3. Describe environmental conservation act 1995 in Bangladesh.

11.4. Describe the environment conservation rule 1997 in Bangladesh.

11.5. Describe the environmental framework in Bangladesh.

11.6. Describe The Montreal Protocol and The Kyoto Protocol.

11.7. Describe role of an individual in prevention of pollution.

REFERENCES:

1. Fundamentals of Environmental Studies, Mahua Basu and S. Xavier, Cambridge.
2. Ecology and Environment, P.D. Sharma, Rastogi Publications.
3. Basics of Environmental Science, Michael Allaby, Routledge.
4. Environmental Science, Jonathan Turk and Amos Turk, Sauders golden sunburst series.

65851 Accounting Theory & Practice

T	P	C
2	3	3

AIMS

- To be able to understand the principles and practices of book keeping and accounting.
- To be able to understand the procedures of general accounting, financial accounting and their applications.
- To be able to understand the concept of income tax, VAT & Public works accounts.

Course Outlines

Concept of book keeping and accounting; Transactions; Entry systems; Accounts; Journal; Ledger; Cash book; Trial balance; Final accounts; Cost account & financial accounting; Income Tax; Public works accounts.

DESCRIPTION;

Theory

1. Concept of book keeping and accounting.

1.1 Define book keeping and accountancy.
1.2 State the objectives & of book keeping.
1.3 State the advantages of book keeping.
1.4 Differentiate between book keeping and accounting.
1.5 State the necessity and scope of book keeping and accounting.

2. Transactions Analysis.

2.1 Define transactions and business transaction.
2.2 Describe the characteristics of transaction.
2.3 Discuss the classification of transaction.

3. Entry system of Accounting.

3.1 State the aspects of transactions.
3.2 Define single & double entry system.
3.3 Discuss the principles of double entry system.
3.4 Distinguish between single entry and double entry system of book keeping.
3.5 Justify whether double entry system is an improvement over the single entry system.

4. Classification of accounts.

4.1 Define accounts.
4.2 State the objectives of accounts.
4.3 Illustrate different type of accounts with example.
4.4 Define “Golden rules of Book keeping”.
4.5 State the rules for “Debit” and “Credit” in each class of accounts.
4.6 Define accounting cycle.

5. Journal.

5.1 Define Journal.
5.2 State the functions of Journal.
5.3 Mention the various names of Journal.
5.4 Interpret the form of Journal.

6. Ledger.

6.1 Define ledger.
6.2 Interpret the form of ledger.
6.3 State the functions of ledger.
6.4 Distinguish between Journal and Ledger.
6.5 Explain why ledger is called the king of all books of accounts.
6.6 Explain the following terms: Balance, Balancing; Debit balance; credit balance.

7. Cash book & Its Classification.

7.1 Define cash book.
7.2 Classification of cash book.
7.3 Explain cash book as both Journal and Ledger.
7.4 Define discount.
7.5 Explain the different types of discount.

8. Trial balance.

8.1 Define trial balance.
8.2 State the object of a trial balance.
8.3 Discuss the methods of preparation of a trial balance.
8.4 Explain the limitations of a trial balance.
8.5 Prepare trial balance from given ledger balance. (practical)

9. Final accounts.

9.1 State the components of final account.
9.2 Distinguish between trial balance and balance sheet.
9.3 Select the items to be posted in the trading account, profit & loss account and the balance sheet.
9.4 State the adjustment to be made from the given information below or above the trial balance.
9.5 Explain the following terms: revenue expenditure; capital expenditure; depreciation; annuity method diminishing balance method, machine hour method

10. Cost and financial accounting.

10.1 Define financial accounting.
10.2 State the objectives of financial accounting.
10.3 Define cost accounting.
10.4 State the elements of direct cost and indirect cost.
10.5 Discuss the capital budgeting
10.6 Explain the following terms:
a. Fixed cost b. Variable cost c. Factory cost d. overhead cost e. Process cost
f. Direct cost g. Operating cost h. Standard cost

11. Income Tax

11.1 Define Income Tax.
11.2 State the objects of Income Tax.
11.3 Classification of assesses.
11.4. Taxable income of assesses.
11.5 Tax rebate.
11.6 Explain the following terms: Income tax year; assessment year, NBR.

12. Public works accounts.

12.1 State the important aspects of public works accounts.

12.2 Describe the main features of public works accounts.
12.3 Define Value Added Tex (VAT)
12.4 State the merits and demerits of VAT.
12.5 Explain the following terms: Revenue; Grant; Bill; Voucher.

PRACTICAL

1. Identify the transaction from given statements stating reasons.
2. Determine Debtor (Dr) and Creditor (Cr.) from given transactions applying golden rules.
3. Journalize from given transactions.
4. Prepare ledger from given transactions.
5. Prepare double column cash book from given transactions showing balances.
6. Prepare triple column cash book from given transaction and find out the balances.
7. Prepare analytical and imprest system of cash book.
8. Prepare trial balance from the given ledger balance.
9. Prepare trading account, profit & loss account and balance sheet from the given trial balance & other information.
10. Prepare cost sheet showing prime cost, factory cost, cost of production, total cost and selling price.

REFERENCE BOOKS

1. Book-keeping & Accounting - Prof. Gazi Abdus Salam
2. Principles of Accounting - Hafiz uddin
3. Cost Accounting - Prof. Asimuddin Mondol
৪. হিসাবরক্ষণ ও হিসাববিজ্ঞান - পরেশ মন্ডল
৫. উচ্চ মাধ্যমিক হিসাববিজ্ঞান - হক ও হোসাইন
৬. আয়কর - ড. মনজুর মোরশেদ

BANGLADESH TECHNICAL EDUCATION BOARD
Agargaon, Dhaka-1207

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

COMPUTER SCIENCE & TECHNOLOGY

TECHNOLOGY CODE: **685**

6th SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

COMPUTER SCIENCE & TECHNOLOGY

6th 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	68561	MVC Framework Development	0	6	2	00	00	50	50	100
2	68562	Software Testing	0	3	1	00	00	25	25	50
3	66678	Advanced Database Management System	2	3	3	40	60	25	25	150
4	66668	Multimedia & Animation	2	6	4	40	60	50	50	200
5	66669	Programming in Advanced Java	2	3	3	40	60	25	25	150
6	66672	Network Administration & Services	2	6	4	40	60	50	50	200
7	65852	Industrial Management	2	0	2	40	60	00	00	100
Total			**10**	**27**	**19**	**200**	**300**	**225**	**225**	**950**

6 8 5 6 1 MVC Framework Development **T P C**
0 6 2

Objectives:

- To acquire transparent knowledge on MVC Design Pattern.
- To able to implement application in MVC Framework.
- To understand various aspects of MVC Framework and how it works.

1. Introducing MVC Framework

1.1 Define MVC Framework

1.2 Discuss the features of MVC

1.3 Demonstrate MVC Architecture.

1.4 Identify Popular MVC frameworks
ASP.NET, Django, Laravel, CodeIgniter, Rails etc.

1.5 Advantages and Disadvantages of using MVC Framework.
[Instructions of instructor: As students learned the languages like Python, C#, Java and PHP in previous semesters (3^{rd}, 4^{th}, 5^{th}) , instructor may allow various MVC framework like ASP.NET, Django, Laravel etc. according to student's interest. ASP.NET MVC framework is demonstrated in this course as an example.]

2. Explore ASP.NET MVC

[Objective of this Practice: To be familiar with MVC Pattern and basic understanding on Purpose of Controller, Model, View and how a request is handled by ASP.NET MVC Application]
[This is an instructor driven practice, Instructor should provide a sample project and help student to identify various component as per objective of this practice module]

2.1 Review how web works with client and server relationship and understand what is GET and POST Request in Web application.

2.2 Demonstrate MVC Design Pattern

2.3 Identify and interpret what is Controller and what the responsibility of Controllers in ASP.NET MVC Application is.

2.4 Identify and interpret what is Model and what the responsibility of Models in ASP.NET MVC Application is.

2.5 Identify and interpret what View is and what the responsibility of Views in ASP.NET MVC Application is.

2.6 Identify and interpret an overview idea of Request Life Cycle of ASP.NET MVC Application, Get a basic idea on how a request URL is identified by ASP.NET MVC default routing and request is redirected to a particular Controller and response occurred to client.

3. Practice to Implement Controller

[Practice Objective: Implementing Controller and Action, to familiar with Controller and Action also Action Parameter]
[Instructor should brief about Controller and Action (what and why) in ASP.NET MVC]

3.1 Create a Controller and output a sample string from the default Action.
For an example, create a Hello World Controller with proper naming convention and return a string "Hello Welcome to ASP.NET MVC" run and see from browser the output.

3.2 Create a Controller and create an Action in that Controller and output a sample string from that Action.

For an Example, Create a Student Controller and create an Action for Entry and return string "Welcome to Student Entry Page" from the Entry Action.

3.3 Create a Controller and Create two or more Actions in that Controller and get output of different action on the basis of URL request for that Action.
For Example, Create Action named Search and Entry in Student Controller and return string "Welcome to Student Search" from Search Action and "Welcome to Entry Page" from Entry Action.

3.4 Create a Controller and Create Action with some parameters and request to the Action with sending data from URL by query string and output the parameter data as string from Action.
For Example, On Entry Action use parameter (Name, RegNo, Address) for Entry Action, request using query string and return string Student Name, RegNo, Address as output.

4. Practice For Model Creating

[Practice Objective: To able to create Models and establish association relationship between models.]
[Instructor Note: Review Object Oriented Programming C# - class, properties and association relationship between two objects]

4.1 Create a class with at least 5 properties in Models folder.

4.2 Create a class with Properties and implement Data Annotation on Properties as per relevance on data fields of Model.

4.3 Create two classes in Models folder and implement one to one association relationship between those Models.

4.4 Create two classes in Models folder and implement one to many association relationship between those Models.
For an Example. Create a Student class in Models folder with Properties (Id:int, Name:string, RegNo:string, Address:string), use Required Data Annotation for Name and RegNo. Create a Department class in Models Folder with Properties (Id:int, Name:string, Location:string, Students:List<Student>) use Required Data Annotation on Name.

4.5 Create two classes in Models folder and implement one to many association relationship between those models.

5. Practice To Implement Controller Action Parameter and Model Binding

[Practice Objective: To able to acquire knowledge on Action and Action Parameter binding, Requesting to a action with query string data, using action parameter data in controller]

5.1. Create a Controller, create an Action in that Controller with Action Parameter with a Model and request for that action from browser URL and return output of that Models property as string.
For Example, Create a Student Controller with Entry Action with Action parameter with Student Model, i.e. Entry (Student student) and request for Entry action with query string and output the properties of Student models as string.

5.2 Create a Model with data annotation and use that Model as Action Parameter in a Controller and request on that Action with query string, use Model State. Is Valid in Action and check if Model bound properly and return output “Success” while Model State. Is Valid true and “Failed” when Model State. Is Valid false?

5.3 Create a Controller and Action with Action parameter as List of Model and bind the model by request URL.
For an Example, in Entry Action of Student Controller use List of Student i.e. Entry (List<Student> students) and bind students model from request URL.

5.4 Use Bind Attribute for Model Binding in Action.

6. Practice for Anonymous Type in C#.

[Practice Objective: To acquire clear understanding on Anonymous Type, Declaring Anonymous typed variable, using anonymous typed variable]
[Further Application of this topic: While in ASP.NET data needed to be passed from HTML Helper, data is sent as anonymous type object, also for various attribute declaration on HTML Helper anonymous type is used]

6.1 Create a C# variable with var keyword.
6.2 Create a Model class and create an instance of that model with var keyword.
For example, var student = new Student ();

6.3 Create an instance variable of an Anonymous type and output the properties of Anonymous Type. For example, create an anonymous type with properties (Name, Price, Item Type etc) and use var keyword to that anonymous object.
6.4 Create a instance variable of array of Anonymous typed object and use for each to traverse each element of that array.

6. Practice for Lambda Expression in C#

[Instructor Note: Review delegate discussed in Object Oriented in C# 4th Semester]

6.1 Declare a delegate variable using delegate type Func<>.

6.2 Declare a delegate variable using delegate type Action.

6.3 Declare a delegate of Fun<> and declare a Lambda Expression which will take a input and return input+1.

6.4 Declare a delegate of type Func<> and declare a Lambda Expression which will take two input and return sum result of that two input.

6.5 Declare a delegate of type Action and declare a Lambda Expression which will output a string on Console Screen.

6.6 Declare a delegate of type Func<> and declare a Lambda Expression which will take a instance of a class as input and output calculated data from the property of that instance. For an Example, Func<Person, string> fullName = (person)=>person.FirstName+” ”+person.MiddleName+” ”+person.LastName.

7. Practice For writing Views in ASP.NET MVC

[Practice Objective: To be able to Create Views; GET, POST request handling against form submission in Views]

7.1 Create a Controller and Action and add a view in the Views folder for that action and add a Hello World in the body section of the view and output Hello World in your browser.

7.2 Create a <form> </form> tag and in that form tag use some input fields in view and bind the inputs in Model of Action Parameter in controller. (Hint: use name attribute for element to use

7.3 Create a view and send a single instance object from controller to view by ViewBag and display the properties data using ViewBag

7.4 Create a View and send a collection of data (List, Array or any collection) to view by ViewBag and show the collection's data in table using foreach loop in view.

7.5 Create a <form method="POST"> </form> tag with some input text elements in the form tag and a submit button, on submit of the form handle the request in HttpPost Action. (hint: use [HttpPost] action on top of particular Action)

7.6 Identify and practice using [HttpPost] and [HttpGet] attribute for Action in Controller.

7.7 Demonstrate Model binding on posting a form in View.

7.8 Demonstrate GET Action and view representation on that action.

7.9 Demonstrate POST Action Model Binding on view and represent on that action.

8. Practice for using Views with Html Helpers.

8.1 Use specific model for a view and demonstrate using that model to represent using html helpers.

8.2 Create View for a Controller in Action Bind the relevant Model, use Html Helpers to create form, text field, label for a specific model and submit the form to get model in action.

8.3 Create View for a Controller Action and use Html Helpers for creating label, textbox in view and use bootstrap classes in html helpers.

8.4 Create View for a Controller Action and use Html Helper to demonstrate dropdown and bind the dropdown with data post a selected value of dropdown to Action Model.

9. Practice For creating Layouts

9.1 Demonstrate Layout and Design guideline of Layout in web application.

9.2 Create a Shared Folder in Views Folder and Create a Layout View where Layout related html tags will be organized.

9.3 In Layout Page Create a Render Section and implement Layout for View.

9.4 In Layout Page add Render Sections and implement Layout for View.

9.5 Demonstrate adding css external files in Layout View

9.6 Demonstrate adding js external files in Layout View

10. Practice For creating Partial Views

10.1 Demonstrate Partial View and Necessity for partial view.

10.2 Create a Partial View to demonstrate a portion of data and Render Partial View in View.

10.3 Demonstrate Render Action, Render Partial

10.4 Create a Partial View for Nav Menu and Render the Partial View in Layout Page.

11. Practice on Using LINQ

11.1 Demonstrate on what is LINQ and why LINQ should be used.

11.2 Create a List of Employee with Properties Id, Name, Designation, Salary and populate the list with various Name, Designation and Salary ranging from 10000-100000 and retrieve those employees who has salary more than 15000 and less than 50000 using LINQ with classical style (from-in syntax approach).

11.3 Do 11.2 with LINQ with Lambda Style.

11.4 Use LINQ Select to get a particular property list of data for a particular Model.

11.5 Use LINQ to Select a anonymous object from a list of data for a particular Model.

12. Practice for Database Creation with Entity Framework using Model in ASP.NET MVC

12.1 Interpret ORM Concept.

12.2 Interpret Entity Framework Code First Concept.

12.3 Design a Custom DbContext and create DbSet for Models.

12.4 Add Code First Migration DbContext and show migration file for that migration has been created.

12.5 Add Code First Migration File and Update Migration for the DbContext and show database and table has been created database system.

12.6 Add connection String for DbContext in Web.Config File in particular connection strings section and use code first migration for updating database for that connection string and show database and table has been created on that database.

13. Practice for Database Operation with Entity Framework using Model in ASP.NET MVC

13.1 Perform Insert Operation in Database for an Entity using Controller, Action and View and show Success/Fail Message through View.

13.2 Perform Update of an Entity by using Controller, Action and View using Entity Framework.

13.3 Perform Delete Operation of an Entity by using Controller, Action, View using Entity Framework.

14. Practice Loading Models from Database using Entity Framework in ASP.NET MVC

14.1 Load all data for a particular Model from Database using EF.

14.2 Demonstrate various approach for Loading Related Data – Lazy loading, Eager Loading, Explicit Loading.

14.3 Make a Student Class and Department Class with one to many association relationship in Models Folder keep a List<Student> property in Department Model, Load all Department with Related Students of that department using Lazy Loading.

14.4 Load all Department with Related Students using Eager Loading.

14.5 Add a Property IsDeleted to Student and Update some data for students to IsDeleted true in Database manually, Now Load All Department with Related Students only those students will be loaded who are not use Explicit Loading.

14.6 Demonstrate Difference Between IQueryeable and IEnumerable

14.7 Demonstrate immediate execution and deferred execution in entity framework.

14.8 Make a Action StudentSearch and Bind a Model which has property to various search criteria on student, i.e. user can search by student's Name(partial) or/and student's Reg No or/and student's Address(partial) implement deferred execution to generate query using IQueryeable and return relevant students by search criteria and show those students in StudentSearch view.

15. Configure Routing in ASP.NET MVC

15.1 Demonstrate default routing mechanism from Route.config file

15.2 Develop a Custom Route and see the action is called according your route configuration.

15.3 Implement how to Enable Attribute Routing in ASP.NET MVC

15.4 Declare a Attribute route with route parameter and constraint, confirm if request URL is calling the action as configured by attribute route.

16. Build Responsive web pages in ASP.NET MVC using javascript and jquery ajax

16.1 Demonstrate jquery selector and selecting html elements using jquery script.

16.2 Demonstrate jquery ajax calling approach for a particular action by clicking a button and show output html in a div.

16.3 Create two dropdownlist, while selecting first dropdown value, second dropdown value will be loaded, implement using jquery ajax in ASP.NET MVC View.

16.4 Demonstrate AjaxBeginForm in ASP.NET MVC and how it will be used to post data.

16.5 Suppose a Model Order contains a property of named OrderItems of type List<OrderItem>, implement this master child in a Entry View for Entry Action in Order Controller, while user will provide Order information user will provide as many Order items without loading the page and while submit the page Order Model will bind with Order information as well as OrderItems informations.

17. Optimizing ASP.NET MVC Project

17.1 Demonstrate Bundling and Minification through Bundle.config file.
17.2 Make js bundles in bundle.config file and use them in Layout Page.
17.3 Make js bundles and use them in View.
17.4 Make css bundles and use them in Layout Page.
17.5 Make CSS bundles and use them in View.
17.6 Demonstrate on OutputCache and usage of it.

18. Access Control in ASP.NET MVC Application

18.1 Implement Authentication and Authorization.
18.2 Create User and Roles in Database
18.3 Assign Authorization to Action in Controller.

19. Practice Application Development in ASP.NET MVC

19.1 Make a small application which will use ASP.NET MVC and Database.
19.2 Make a small application which will use Authentication and Authorization and Database
19.3 Make a small application which will consists of AJAX operation and Database.

REFERENCE BOOKS

1. Professional ASP.NET MVC 5 John Galloway, Brad Willson, K. Scott Allen, David Matson.
2. Pro ASP.NET Core MVC2 Adam Freeman
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68562 Software Testing

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OBJECTIVE:

On completion of this course student will be able to-

- Work on Manual Software Testing
- Work on Selenium Script Generate for Software Testing

PRACTICES

1. Explore Software Testing

1.1 Interpret Software Testing and Types of Software Testing.
1.2 Interpret Software Testing Seven Principles
1.3 Interpret and Illustrate SDLC (Software Development life cycle) and STLC (Software Test Life Cycle)

2. Test Scenario and Test Case Generate

2.1. Interpret Test Formality and Necessity of Documenting of Test
2.2. Identify Test Basis, Interpret Application under Test, System Under Test Terms
2.3. Design a Test Scenario and Document a Test Scenario.
2.4. Design Test Cases against a Test Scenario and Document those Test Cases.
2.5. Design and Document Test Steps under each Test Case.
2.6. Manual Test and Document Test Result Pass/Failed against Test Scenario, Test Case following its Test Steps.

3. Requirement Traceability Matrix (RTM) Generate

3.1. Interpret Requirement Traceability and Types of Requirement Traceability
3.2. Identify Parameters for RTM.
3.3. Create RTM on BRD (Business Requirement Definition), TR(Technical Requirement), Test Case

4. Black Box Testing

4.1. Illustrate and Interpret Black Box Testing and Black Box Testing Technique.
4.2. Write Test Cases for System Under Test (SUT) against its User Stories.
4.3. Identify some input to test SUT and provide inputs to SUT and see if expected output is correct.

5. White Box Testing

5.1. Illustrate and Interpret white Box Testing and white box testing types
5.2. Understand a Sample Source Code for an application and Design Test Cases to Test for the Code to Test.
5.3. Write Unit Test according to Test Case and run the Unit Test to identify if the source code is working correct.

6. Software Defects

6.1. Illustrate and Interpret Software Defects.
6.2. Demonstrate what a Defect Report should contain, Design a Bug Report for Software.
6.3. Illustrate Defect Management Cycle, Create some Defect and find the right category for the defect, document the defect with right format.

7. Software Testing using Selenium IDE

7.1. Install Selenium IDE and FireBug
7.2. Create Test Case and write script in Selenium IDE for testing the test case.
7.3. Use Locators in Selenium IDE.

8. Web Driver Installation and Using

8.1. Install Web Driver
8.2. Create Test Case and write script in Web Driver using Selenium.
8.3. Access Forms in Web Driver.
8.4. Accessing Links & Tables using Selenium Web driver, Keyboard Mouse Events , Uploading Files

9. Software Life Cycle Testing

9.1. Demonstrate SDLC
9.2. Create Test Case for Testing Life Cycle of Software using Black Box Testing implementing STLC.
9.3. Create Test Case for Testing Life Cycle of a Software using Selenium.

10. Performance Testing

10.1. Illustrate and Interpret performance Testing
10.2. Install and configure Jmeter
10.3. Familiarize with Jmeter, Create Test Plan, Work Bench, Add Element, Save Element
10.4. Create and Run a Test Plan in Jmeter.
10.5. Use Assertions in Jmeter.
10.6. Use Controller in Jmeter.
10.7. User Processor in Jmeter.

BOOK REFERENCES:

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2. Lessons Learned in Software Testing: A Context-Driven Approach (Cem Kaner)
3. How to Break Software: A Practical Guide to Testing (James Whittaker)
4. The Art of Software Testing (2nd Edition, Glenford Myers)
5. Agile Testing: A Practice Guide for Testers and Agile Teams (1st Edition, Lisa Crispin)

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66668	Multimedia & Animation	T	P	C
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AIMS

To provide the students with an opportunity to acquire knowledge, skill and attitude in the field of multimedia and applications with a special emphasis on:

- Basics of multimedia.
- Applications, benefits and problems of using multimedia.
- Multimedia hardware/software essentials.
- System components, development tools and image used in multimedia.
- Audio in multimedia.
- Video in multimedia.
- Basics of Graphics.
- Image Processing.
- Two &Three-dimensional transformation.
- Concept of Projection.
- Concept of Animation.
- Applications of animation.

SHORT DESCRIPTION

- Basics of multimedia; Application, benefits and problems of using multimedia; Multimedia hardware and software essentials; System components in developing multimedia; Development tools for multimedia application; Text & Image used in computer application; Techniques and processes of image conversion; Basics of sound in multimedia; Sound recording; Sound processing; Basics of video in multimedia; Video recording; Video processing; Basics of Graphics; Image Processing; Scan Converting Process; Two dimensional transformation; Concept of Projection, Concept of Animation, Types of animation
  Applications of animation, Techniques behind animation.

DETAIL DESCRIPTION

Theory:

1 Understand the basics of multimedia.

1.1 State multimedia and multimedia systems.
1.2 Describe the history of multimedia.
1.3 Classify multimedia.
1.4 Mention the field of application of multimedia.
1.5 Describe the benefits of multimedia in key areas (Training, sales, communications, medical).
1.6 Describe the problems of multimedia (based on investment cost, technical barriers, social & psychological barriers and legal problems).

2 Understand the multimedia hardware/software.

2.1 List the Hardware & Software used in a Multimedia System.
2.2 Define multimedia studio.

2.3 Describe the industrial standards and specifications of a typical multimedia configuration.
2.4 Describe the importance of “Plug and Play” revolution and MMX (Multimedia extension) technology.
2.5 Describe the important features of different categories of multimedia Software.
2.6 Describe different types of development tools for multimedia applications.
2.7 Describe the architecture of a multimedia system
2.8 Describe the function of basic delivery system of multimedia platforms.
2.9 Describe the input subsystem functions with block diagram.
2.10 Describe the output processing subsystem with block diagram.

3 Understand different Media and media process system in multimedia.

3.1 Define discrete and continuous media.
3.2 Describe the discrete media process system in multimedia.
3.3 Define sampling, sampling interval, quantization and quantization error.
3.4 Describe the digitizing process of audio & video signal.
3.5 Define Vectorization.
3.6 Describe the steps of vectorization.

4 Understand the Text, images & processes of images used in Multimedia

4.1 Define Text & Image
4.2 Mention the general features of different types of images used in computer application.
4.3 Describe the image data representation in multimedia system
4.4 Describe RGB and CMY color model.
4.5 State compression & image compression.
4.6 Describe the lossless image compression technic (Run length coding)
4.7 Describe the lossy image compression technic (Cosine Transform based coding)
4.8 Describe Basic Computer Graphics Two-dimensional Geometric transformations,
4.9 Explain Matrix representations and Homogeneous coordinates,
4.10 Describe Two-Dimensional Composite Transformations and Other Two-Dimensional transformations.

5 Understand the basics of sound, sound processing and recording in multimedia.

5.1 Describe the file formats to store digital audio and MIDI data.
5.2 Describe the audio data representation in multimedia system
5.3 Describe the configuration of sound system with block diagram.
5.4 Describe the function of Musical Instrument Digital Interface (MIDI) in multimedia system.
5.5 Describe the important aspects of audio compression.
5.6 Mention the imperfections of sound processing.
5.7 State the important aspects of hardware and software for sound recording.
5.8 Differentiate between monophonic and stereo recording.
5.9 Mention the problems in digital recording process.
5.10 Describe the disk space requirements for digital recording.

6 Understand the basics of video in multimedia.

6.1 Mention the importance of video data in multimedia application.

6.2 Describe the planning stages for video incorporation into a multimedia project.
6.3 Describe the important aspects of converting video for the computer.
6.4 Describe the configuration for video system with block diagram.
6.5 Describe different types of video compression technic.
6.6 Mention the important features of MPEG.

7 Understand the video processing & video recording.

7.1 List the multimedia equipment for video processing.
7.2 Describe video capture and playback system.
7.3 List different video recording equipment & video recording software.
7.4 State the important features of hardware and software for video recording.
7.5 Describe the file formats for saving video information.

Animation

8 Understand Animation and techniques behind Animation.

8.1 Describe Computer Animation.
8.2 Describe primary types of animation.
8.3 Describe the history of animation.
8.4 Define Line Art and Animation.
8.5 Describe the difference between film and animation.
8.6 Describe the Principles of animation.
8.7 Define approaches of animation.
8.8 Describe the basic techniques of animation.

9 Understand classification of Animation.

9.1 Describe the classification of animation.
9.2 Describe the difference between conventional method of animation anddigital animation.
9.3 Describe different types of animation such as 2D, 3D and stop motion.

10 Understand animation and file formats.

10.1 Describe animation file formats
10.2 Describe Hardware and software requirements for animation.
10.3 Describe the difference between 2D and 3D animation film, cartoon movie.

11 Understand authoring tool, presentations, applications, interaction.

11.1 Describe types of animation named after a software.
11.2 Describe about authoring tool.
11.3 Describe applications, interaction.

12 Understand 2D and 3D animation applications.

12.1 Describe uses of Video and Animation.
12.2 Describe complex presentations, applications.
12.3 Describe 2D and 3D animations- projects simple animations.
12.4 Describe terms of 3D animation.
12.5 Describe about 3D applications - pictures, sound, video, and special effects.

Practical:

1 Identify the hardware of multimedia systems.

1.1 Prepare the general specifications of a typical multimedia system.

1.2 Identify the hardware with external features, settings and connections of sound equipment.

1.3 Write a report.

2 Process Sound file.

2.1 Use software package to process sound file.

2.2 Input and use sounds in multimedia application.

2.3 Manipulate sound files.

3 Process Video file.

3.1 Work with digital video recording and editing from VCRs/Laser disk player/Video camera.

3.2 Apply appropriate multimedia software.

3.3 Work with digital video playbacks, recording and editing software for multimedia.

3.4 Write a report.

4 Create a Motion Tween.

4.1 Open flash software and create a new document.

4.2 Import Object.

4.3 Inset key frame.

4.4 Test animation.

5 Create a movie clip.

5.1 Open flash software and create a new document.

5.2 Import Object.

5.3 Convert into movie clip.

6 Create a Frame by Frame Animation.

6.1 Open flash software and create a new document.

6.2 Draw an Object.

6.3 Inset key frame.

6.4 Test animation.

7 Create an animation to represent the growing moon.

7.1 Open flash software and create a new document with white background.

7.2 Create a white circle and convert to movie clip.

7.3 Use glow and adjust blur.

7.4 Insert keyframe.

7.5 Make animation.

8 Create an animation to indicate a ball bouncing.

8.1 Open flash software and create a new document.

8.2 Draw the steps and color it.

8.3 Create circle from the tool fill the color.
8.4 Insert key frame.
8.5 Make animation.

9 Create a simulate movement of a cloud.

9.1 Open flash software and create a new document.
9.2 Create blue background with layer.
9.3 Draw the cloud and apply glowing effect.
9.4 Make animation.

10 Draw the fan blades and to give proper animation.

10.1 Open flash software and create a new document.
10.2 Create a background with layer.
10.3 Insert another layer and draw fan stand.
10.4 Insert key frames.
10.5 Select the fan blade's layer and rotate the circle a little bit.
10.6 Make animation.

11 Simulate a ball hitting another ball.

11.1 Open flash software.
11.2 Choose the circle option displayed in the toolbar.
11.3 Create two circles at the opposite ends.
11.4 Insert key frames.
11.5 Select the 1st ball and make it to move towards the other till it touches.
11.6 Change the shape of the ball as soon as the two ball touches each other.
11.7 Make them to move towards opposite direction.

12 Change a circle into a square using flash.

12.1 Open flash software and create a new document.
12.2 Draw a circle on the work area and color it.
12.3 Insert new key frame.
12.4 Draw a rectangle.
12.5 Click on the last frame.
12.6 change the option shape from none.
12.7 Make animation.

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4. Visual Thinking: for Design by Colin Ware
5. Real-Time Video Compression: Techniques and Algorithms By Raymond West water Publisher: Springer 1997

66669 Programming in Advanced Java

T	P	C
2	3	3

OBJECTIVES

- To develop knowledge and skill on java language platform independence
- To develop knowledge and skill to differentiate between Java ME, Java SE and Java EE Platforms
- To develop knowledge and skill on Database Applications with JDBC

SHORT DESCRIPTION

Concept of java Platform Overview, Java Syntax Class & Sub Class, Nested Class, Overriding Methods, Encapsulation, Polymorphism, Interfaces and Lambda Expressions, Collections Generics, Streams and Filters, Lambda Built-in Functional Interfaces and Operations, Exceptions and Assertions, Java Date/Time API, Concurrency, Parallel Streams, Database Applications with JDBC, Localization.

DETAIL DESCRIPTION

Theory:

1. Understand the concept of java Platform Overview

1.1 Define how the Java language achieves platform independence.
1.2 Distinguish between the Java ME, Java SE and Java EE Platforms.
1.3 Evaluate Java libraries, middle-ware and database options.
1.4 Describe how the Java language continues to evolve.

2. Java Syntax and Class Review

2.1 Define Java classes.
2.2 Describe primitive variables.
2.3 Classify operators.
2.4 Create and manipulate strings.
2.5 Use if-else and switch statements.
2.6 Use Iterative Constructs: while, do-while, for, enhanced for.
2.7 Create arrays.
2.8 Prepare programs using Java fields, constructors, and methods.

3. Multithreading

3.1 Define threads.
3.2 Describe Life cycle of thread.
3.3 Discuss Running and starting thread using Thread class.
3.4 Explain Thread priorities.
3.5 Show multiple threads.
3.6 Discuss Runnable interface.
3.7 Explain Synchronization and inter thread communication.

4. Applet& Servlet

4.1 Define Applet Life Cycle, Servlet Life Cycle, Viewer tool, HTML Tags.
4.2 Describe Passing parameters to Applet.
4.3 Explainrepaint() and update() method.
4.4 Distinguish Servlet and Hierarchy of Servlet.
4.5 Describe Handling get and post request (HTTP).

4.6 Explain handling data from HTML to servlet.
4.7 Describe Retrieving a data from database to servlet.
4.8 Operate Session tracking – User Authorization, URL rewriting, hidden form fields.
4.9 Demonstrate Tomcat configuration (Note: Only for Lab Demonstration).

5. Interfaces and Lambda Expressions

5.1 Define a Java interface.
5.2 Distinguish between interface inheritance and class inheritance.
5.3 Extend an interface.
5.4 State Default methods.
5.5 Describe Anonymous inner classes.
5.6 Illustrate Lambda Expression.

6. Lambda Built-in Functional Interfaces and Operations

6.1 List the built-in interfaces included in java.util.function.
6.2 Illustrate Core interfaces - Predicate, Consumer, Function and Supplier.
6.3 Identify primitive & binary versions of base interfaces.
6.4 Extract data from an object using map.
6.5 Classify the types of stream operations.
6.6 Describe the Optional class & lazy processing.
6.7 Apply sorting a stream.
6.8 Calculate results to a collection using the collect method.
6.9 Categorize Grouping and partition data using the Collectors class.

7. Collections Generics, Streams and Filters

7. 1Identify the Collection framework.
7.2 Define pipelines in terms of lambdas and collections.
7.3 Create a collection by using generics.
7.4 Apply an Array List, Tree Set, Hash Map, Deque.
7.5 Illustrate through a collection using lambda syntax.
7.6 Describe the Stream interface.
7.7 Predict a collection using lambda expressions.
7.8 Explain–Array List, Linked List and Vector, Stack, Queue.
7.9 Illustrate Interfaces such as Comparator, Iterator, List Iterator and Enumeration.

8. Exceptions and Assertions

8.1 Define the purpose of Java exceptions.
8.2 Use the try and throw statements.
8.3 Use the catch, multi-catch and finally clauses.
8.4 Use Auto close resources with a try-with-resources statement.
8.5 Explain common exception classes and categories.
8.6 Create custom exceptions.
8.7 Test invariants by using assertions.

9. Java Date/Time API

9.1 Create and manage date-based events.
9.2 Create and manage time-based events.
9.3 Show date and time into a single object.
9.4 Work with dates and times across time zones.
9.5 Manage changes resulting from daylight savings.

9.6 Define and create timestamps, periods and durations.
9.7 Apply formatting to local and zoned dates and times.

10. Concurrency

10.1 Describe operating system task scheduling.
10.2 Create worker threads using Runnable and Callable.
10.3 Use an Executor Service to concurrently execute tasks.
10.4 Identify potential threading problems.
10.5 Use synchronized and concurrent atomic to manage atomicity.
10.6 Use monitor locks to control the order of thread execution.
10.7 Use the java.util.concurrent collections.

11. Parallel Streams

11.1 Review the key characteristics of streams.
11.2 Describe how to make a stream pipeline execute in parallel.
11.3 List the key assumptions needed to use a parallel pipeline.
11.4 Define reduction.
11.5 Describe why reduction requires an associative function.
11.6 Calculate a value using reduce.
11.7 Describe the process for decomposing and then merging work.
11.8 List the key performance considerations for parallel stream.

12. Database Applications with JDBC

12.1 Define the layout of the JDBC API.
12.2 Types of drivers.
12.3 Understand Metadata & Transaction such as Database Metadata, ResultSetMetadata, Commit(), rollback (), Save point.
12.4 Connect to a database by using a JDBC driver.
12.5 Submit queries and get results from the database.
12.6 Scrollable and updatable result sets.
12.7 Specify JDBC driver information externally.
12.8 Perform CRUD operations using the JDBC API.

13. Localization

13.1Define what a locale represents.
13.2 Read and set the locale by using the Locale object.
13.3 Describe the advantages of localizing an application.
13.4 Build a resource bundle for each locale.
13.5 Call a resource bundle from an application.
13.6 Change the locale for a resource bundle.

14. Networking

14.1 Define The java.net package – InetAddress, URL, URLConnection class.
14.2 Explain Socket Server and Socket class.
14.3 Create a Socket to a remote host on a port (creating TCP client and server).
14.4 Perform Simple Socket Program Example.

PRACTICAL

1. Write a java program using generic classes& method.
2. Write a java program for controlling main thread.
3. Write a java program for creating new thread by extending thread class.
4. Write a java program for creating new thread by implementing runnable interface.
5. Write a java program for thread synchronization.
6. Write a java program to create following AWT components: Button, Checkbox, Choice and List.
7. Write a java program to create following AWT application using containers and layouts.
8. Write a java program to create a simple Applet and servlet.
9. Write a java program to create swing based Applet.
10. Write a java program to handle different types of events in a swing application.
11. Write a java program to create a swing application using swing components and layouts.
12. Write a java program to store and retrieve data from database using JDBC.
13. Write a java program using simple text editors (not IDE), compile and run from command prompt.
14. Write a java application using socket programming.

REFERENCE BOOKS AND URL.

1) Complete reference Java by Herbert Schildt(5th edition)
2) Java 2 programming black books, Steven Horlzner
3) Programming with Java, A primer,Forth edition, By E. Balagurusamy
4) Core Java Volume-I-Fundamentals, Eighth Edition, Cay S. Horstmann, Gary Cornell,
Prentice Hall, Sun Microsystems Press
5) Core Java Volume-II-Advanced Features, Eighth Edition, Cay S. Horstmann, Gary
Cornell, Prentice Hall, Sun Microsystems Press
Related URL links:

http://www.informit.com/library/content.aspx?b=STY_Java2_24hours&seqNum=24
http://java.sun.com/developer/onlineTraining/JavaIntro/contents.htmlinks
http://www.homeandlearn.co.uk/java/java.html
http://java.sun.com/: Java Development Kit, Development tools, Java Tutorial
http://www.eclipse.org/: A vendor-neutral open development platform and application frameworks for building software
http://www.uml.org/: UML resources
http://www.bruceeckel.com/: Free electronic version of the book
http://www.javatpoint.com/java-tutorial

66672 Network Administration & Services T P C
2 6 4

AIMS

- To be able to design computer network system
- To be able to acquire the knowledge on Network Administration.
- To be able to provide the knowledge and to develop skill on Different routing protocol.
- To be able to acquire the knowledge on learning, forwarding and filtering decision.
- To be able to provide the knowledge and to develop skill on network Security.
- To be able to provide the knowledge and to develop skill on Router, Switch, NIC and Cabling.
- To be able to establish and implement Link Redundancy.

SHORT DESCRIPTION

Network Basics; Sub-netting, VLSM, Summarization; Internet Routing Protocol, Open Shortest Path First (OSPF), Enhanced Interior Gateway Routing Protocol (EIGRP), Spanning Tree Protocol (STP), VLANs and Inter-VLAN routing, network address translator (NAT), network security, Internet Protocol Version 6 (IPv6), Link and Gateway Redundancy.

DETAILS DESCRIPTION

Theory:

1. **Review the network theories.**
   1.1. Describe OSI, TCP/IP model
   1.2. Identify collision and broadcast domain.
   1.3. Describe Ethernet cabling straight-through, crossover, and console.
   1.4. Data encapsulation of TCP/IP layer
   1.5. Understand three layer's Hierarchical model.

2. **Understand Sub-netting, VLSMs, and Summarization.**
   2.1. Define Sub-netting Basics.
   2.2. Define Classless inter domain routing (CIDR), including class A, class B, class C.
   2.3. Define Variable length subnet mask (VLSMs)
   2.4. Describe VLSM design and implementing VLSM Network
   2.5. Define Summarization

3. **Understand Internet Protocol Routing.**
   3.1. Define Routing basics
   3.2. Configure IP Routing in network.
   3.3. Define Static routing
   3.4. Define default routing.
   3.5. Define dynamic routing
   3.6. Describe Routing information protocol.

4. **Open Shortest Path First (OSPF).**
   4.1. Define OSPF basics.
   4.2. Describe OSPF terminology.
   4.3. Define OSPF operation

4.4. Describe Loopback interface
4.5. Describe OSPF areas
4.6. Describe virtual link

5. Enhanced Interior Gateway Routing Protocol (EIGRP)

5.1. Define Introduction to EIGRP
5.2. State the configuration of EIGRP
5.3. State EIGRP Neighbor Adjacency
5.4. Describe EIGRP Neighbor and topology table
5.5. Describe EIGRP Unequal Cost Load Balancing
5.6. State EIGRP K values.

6. Understand Spanning Tree Protocol (STP).

6.1. Define Spanning Tree.
6.2. Describe Spanning Tree cost calculation.
6.3. Define Spanning Tree port states.
6.4. Define Spanning Tree portfast.
6.5. Define Rapid Spanning Tree.
6.6. Define Spanning Tree BPDU Guard.
6.7. Define Spanning Tree BPDU Filter.
6.8. Define Spanning Tree Root guard.
6.9. Define Ether-channel.

7. Understand VLANs and Inter-VLAN routing.

7.1. Define VLANs
7.2. State 802.1Q and ISL Encapsulation.
7.3. Define Trunk link
7.4. Describe Router on a Stick.
7.5. Describe Inter-VLAN routing by multilayer switch
7.6. State the configuration of VLAN Trunking protocol (VTP)

8. Understand the network address translator (NAT).

8.1. State Network Address Translator (NAT).
8.2. Distinguish static and Dynamic NAT.
8.3. Demonstrate PAT (overloading).

9. Understand the network security

9.1. Define User security level, login security (SSH, Telnet).
9.2. Demonstrate standard Access list.
9.3. Define Extended Access list.
9.4. State Port Security.
9.5. State Protected port.
9.6. Demonstrate DHCP Snooping.
9.7. State Cyber Security.

10. **Understand Internet Protocol Version 6 (IPv6).**

10.1 Describe the benefits and uses of IPv6
10.2 Define IPv6 addressing and expression
10.3 State how IPv6 works in an Inter-network.
10.4 Define IPv6 Routing protocol (RIP, EIGRP,OSPF).

11. **Understand Link and Gateway Redundancy**

11.1. Define Redundancy
11.2. State Static Routing Redundancy
11.3. Define Hot Standby Router Protocol (HSRP)
11.4. Define Virtual Router Redundancy Protocol (VRRP)

11.5. Demonstrate Gateway Load Balancing Protocol (GLBP).

12. **Understand Fourth Industrial Revolution (IR 4.0)**

a. State Internet of Things (IoT).
b. Explain Big Data.
c. State Cloud Computing.
d. Explain System Integration.
e. State Autonomous Vehicles System & Autonomous Robots
f. Explain augmented reality.
g. Explain 3D Printing
h. Explain Additive Manufacturing.

Practical:

1. **Perform the Design, Develop and Simulation of Enhanced Interior Gateway Routing Protocol (EIGRP)**
   1.1 Design network diagram using packet tracer
   1.2 Design proper IP address with network devices.
   1.3 Configure EIGRP as per requirement.
   1.4 Ensure reachability

2. **Perform the Design, Develop and Simulation of Open Shortest Path Routing Protocol (OSPF)**
   2.1 Design network diagram using packet tracer
   2.2 Design proper IP address with network devices.
   2.3 Configure OSPF as per Instruction.
   2.4 Ensure reachability

3. **Perform the Design, Develop and Simulation of Virtual Link.**
   3.1. Design network diagram using packet tracer
   3.2. Design proper IP address with network devices.
   3.3. Configure Virtual Link as per Instruction.
   3.4. Ensure reachability

4. **Perform the Design, Develop and Simulation of Routing Information Protocol (RIP)**
   4.1. Design network diagram using packet tracer
   4.2. Design proper IP address with network devices.
   4.3. Configure RIP as per requirement.
   4.4. Ensure reachability

5. **Perform the Design, Develop and Simulation of Static Routing**
   5.1. Design network diagram using packet tracer
   5.2. Design proper IP address with network devices.
   5.3. Configure Static Routing as per requirement.
   5.4. Ensure reachability

6. **Perform the Design, Develop and Simulation of Default Routing**
   6.1. Design network diagram using packet tracer
   6.2. Design proper IP address with network devices.
   6.3. Configure Default Routing as per requirement.
   6.4. Ensure reachability

7. **Perform the Design, Develop and Simulation of Hot Standard Router Protocol (HSRP)**
    - 7.1 Design network diagram using packet tracer
    - 7.2 Design proper IP address with network devices.
    - 7.3 Configure HSRP as per requirement.
    - 7.4 Ensure reachability

8. **Perform the Design, Develop and Simulation of Virtual Router Redundancy Protocol (VRRP)**
    - 8.1 Design network diagram using packet tracer
    - 8.2 Design proper IP address with network devices.
    - 8.3 Configure VRRP as per requirement.
    - 8.4 Ensure reachability

9. **Perform the Design, Develop and Simulation of Network Address Translator (NAT)**
    - 9.1 Design network diagram using packet tracer
    - 9.2 Design proper IP address with network devices.
    - 9.3 Configure NAT as per requirement.
    - 9.4 Ensure reachability

10. **Perform the Design, Develop and Simulation of Standard Access List (ACL)**
    - 10.1 Design network diagram using packet tracer
    - 10.2 Design proper IP address with network devices.
    - 10.3 Configure ACL as per requirement.
    - 10.4 Ensure reachability

11. **Perform the Design, Develop and Simulation of Extended Access List (ACL)**
    - 11.1 Design network diagram using packet tracer
    - 11.2 Design proper IP address with network devices.
    - 11.3 Configure ACL as per requirement.
    - 11.4 Ensure reachability

12. **Perform the Design, Develop and Simulation of Login using Telnet**
    - 12.1 Design network diagram using packet tracer
    - 12.2 Design proper IP address with network devices.
    - 12.3 Configure Telnet as per requirement.
    - 12.4 Ensure Login operation by username and password.

13. **Perform the Design, Develop and Simulation of Ether-channel**
    - 13.1 Design network diagram using packet tracer
    - 13.2 Design proper IP address with network devices.
    - 13.3 Configure Ether-channel as per requirement.
    - 13.4 Ensure reachability by single link and group link

14. **Perform the Design, Develop and Simulation of Portfast properties of Spanning Tree**
    - 14.1 Design network diagram using packet tracer
    - 14.2 Design proper IP address with network devices.
    - 14.3 Configure Portfast as per requirement.
    - 14.4 Ensure reachability

15. **Perform the Design, Develop and Simulation of Port Security properties of Spanning Tree**
    - 15.1 Design network diagram using packet tracer
    - 15.2 Design proper IP address with network devices.
    - 15.3 Configure Port Security as per requirement.
    - 15.4 Ensure reachability

16. **Perform the Design, Develop and Simulation of Router on a Stick of Inter- VLAN Routing**
    - 16.1 Design network diagram using packet tracer
    - 16.2 Design proper IP address with network devices.
    - 16.3 Configure Router on a Stick as per requirement.
    - 16.4 Ensure reachability

17. **Perform the Design, Develop and Simulation of Inter-VLAN Routing using Multilayer Switch**
    - 17.1 Design network diagram using packet tracer
    - 17.2 Design proper IP address with network devices.
    - 17.3 Configure Inter- **VLAN** routing as per requirement.
    - 17.4 Ensure reachability

18. **Perform EIGRP Load Balancing**
    - 18.1 Design network diagram using packet tracer
    - 18.2 Design proper IP address with network devices.
    - 18.3 Configure Load Balance as per requirement.
    - 18.4 Ensure reachability

Project:

19. **Establish a Computer Physical Network and Demonstrate Administrative Operation and Services (EIGRP, OSPF, NAT, Inter- VLAN Routing, Portfast).**

REFERENCE BOOKS

1. Data communications and Networking – Behrouz A. Forouzan.
2. Fundamentals of Communication-M. Shamim Kaiser and associates
3. Data and Computer Communications-William Stallings
4. Local Area Networking – S. K Basandra.
5. MCSE Windows & Networking Essential – Joe Casad
6. CCNA Routing and Switching – Todd Lammle.
7. How to Master CCNA- Rene Molenaar
8. Principles of Networkand System Administration - Mark Burgess

65852 **INDUSTRIAL MANAGEMENT** **T P C**
2 0 2

AIMS

- To be able to develop the working condition in the field of industrial or other organization.
- To be able to understand develop the labor management relation in the industrial sector.
- To be able to develop the management techniques in the process of decision making.
- To be able to manage the problems created by trade union.
- To be able to understand Planning
- To be able to perform the marketing.
- To be able to maintain inventory.

Course Outline

Basic concepts of management; Principles of management; Planning, Organization, Scientific management; Span of supervision; Motivation; Personnel management and human relation; Staffing and manpower planning ; Training of staff; Concept of leadership; Concepts and techniques of decision making; Concept of trade union; Inventory control; Economic lot size ; Break even analysis; Trade Union and industrial dispute, Marketing;

1 Basic concepts & principles of management.

1.1 Define management and industrial management.
1.2 State the objectives of modern management.
1.3 Describe the scope and functions of management.
1.4 State the principles of management.
1.5 State the activity level of industrial management from top personnel to workmen.
1.6 Describe the relation among administration, organization & management.

2. Concept of Planning

2.1 Define Planning
2.2 Discuss the importance of Planning
2.3 Discuss the Types of Planning.
2.4 Discuss the steps in Planning

3 . Concepts of organization and organization structure.

3.1 Define management organization.
3.2 State the elements of management organization.
3.3 Describe different forms of organization structure.
3.4 Distinguish between line organization and line & staff organization.
3.5 Distinguish between line organization and functional organization.
3.6 Describe the features, advantages and disadvantages of different organization structure.

4. Concept of scientific management.

4.1 Define scientific management.
4.2 Discuss the basic principles of scientific management.
4.3 Explain the different aspects of scientific management.
4.4 Discuss the advantages and disadvantages of scientific management.
4.5 Describe the difference between scientific management and traditional management..

5. Concept of span of supervision.

5.1 Define span of supervision and optimum span of supervision.
5.2 Discuss the considering factors of optimum span of supervision.
5.3 Discuss advantages and disadvantages of optimum span of supervision.
5.4 Define delegation of authority.
5.5 Explain the principles of delegation of authority.
5.6 Explain the terms: authority, responsibility and duties.

6 . Concept of motivation.

6.1 Define motivation.
6.2 Discuss the importance of motivation.
6.3 Describe financial and non-financial factors of motivation.
6.4 Special Motivational Techniques.
6.5 Discuss the motivation theory of Maslow and Harzberg.

6.6 Differentiate between theory-X and theory-Y.

7. Concept of leadership.

7.1 Define leadership.
7.2 Discuss the importance and necessity of leadership.
7.3 Discuss the functions of leadership.
7.4 Describe the qualities of a leader.

8. Basic concepts and techniques of decision making.

8.1 Define decision making.
8.2 Discuss the importance and necessity of decision making.
8.3 Discuss different types of decision making .
8.4 Describe the steps in decision making.

9 .Concept of personnel management and human relation.

.9.1 Define personnel management.
.9.2 Discuss the functions of personnel management.
9.3 Define staffing.
9.4 Define recruitment and selection of employees.
9.5 Describe various sources of recruitment of employees.
9.6 Describe the methods of selection of employees.
9.7 Define training and orientation of employee.
9.8 Discuss the importance and necessity of training.
9.9 Discuss the various methods of training of workmen, technicians and executive personnel.

10. Concept of inventory control & Economic lot size

10.1 Define inventory.& inventory control.
10.2 Describe the function of inventory control.
10.3 Define Economic lot size and the Method of determination of economic lot size.
10.4Discuss the effects of over supply and under supply.
10.5 Explain the following terms :

- Bin card or Bin tag.
- Purchase requisition.
- Store requisition.
- Material transfer note.
- First in first out (FIFO).
- Last in first out(LIFO).
- Safety stock
- Lead time

11. Concept of Break Even Point(BEP)

11.1 Define Break Even Point and Break Even Chart.
11.2 Describe the method of determination of BEP
11.3 Explain the terms :

- Break even analysis.
- Fixed cost.
- Variable cost

12 . Concept of Marketing

12.1 Define marketing.
12.2 Discuss the function of marketing.
12.3 State the objectives of marketing.
12.4 Explain the terms :

- Purchase
- Brand
- Producer
- Consumer
- Customer
- Copyright
- Trade mark

12.5 Discuss product life -cycle and marketing strategies in different stages of a product life-cycle

13. Concept of trade union and industrial dispute

13.1 Define trade union.
13.2 Mention the objectives of trade union.
13.3 Discuss the function of trade union.
13.4 Describe different types of trade union.

13.5 Define industrial dispute
13.6 Discuss different type of industrial dispute

REFERENCE BOOKS

1.Dr. Md. Mainul Islam and Dr. Abdul Awal Khan-Principles of Management, Bangladesh Open University.2. Mohammad Mohiuddin-Personnel Management and Industrial Relation, NIDS Publication Co. Dhaka. 3.সুফিয়া বেগম, মো: জাহেদুল হক ও সুপ্রিয়া ভট্টাচার্য্য-ব্যবস্থাপনা এর মৌলিক ধারণা,ব্যতিক্রম প্রকাশনী ঢাকা।Matz Usry-Cost Accounting: Planning & Control.