BANGLADESH TECHNICAL EDUCATION BOARD

Agargaon, Dhaka-1207.

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

COMPUTER TECHNOLOGY

TECHNOLOGY CODE: 666

FIRST SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

Computer 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	65711	Bangla	3	3	4	60	90	50	-	200
2	65712	English	2	0	2	40	60	-	-	100
3	65812	Physical Education & Life Skill Development	0	3	1	-	-	25	25	50
4	65911	Mathematics-I	3	3	4	60	90	50	-	200
5	65912	Physics-I	3	3	4	60	90	25	25	200
6	66611	Computer Application	0	6	2	-	-	50	50	100
7	66712	Electrical Engineering Fundamentals	3	3	4	60	90	25	25	200
Total			**14**	**21**	**21**	**280**	**420**	**225**	**125**	**1050**

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:

ভাষার সংজ্ঞা, বাংলা ভাষা রীতি - সাধু, চলিত, আঞ্চলিক বা উপভাষা (সংজ্ঞা, বৈশিষ্ট্য, পার্থক্য ও উদাহরণ)

২। বাংলা বানান রীতি ও শব্দ প্রয়োগ:

২.১। বাংলা একডেমির প্রমিত বানান রীতি, ণ-ত্ব ও ষ-ত্ব বিধি

২.২। শব্দ ও শব্দের শ্রেণি বিভাগ (সংজ্ঞা, শব্দের গঠন, উৎস বা উৎপত্তি ও অর্থগত)

২.৩। বাক্য প্রকরণ ও গঠন রীতি (সংজ্ঞা, বাক্য গঠন এবং প্রকার)

৩। পত্র রচনা অনুশীলন:

৩.১। আবেদন পত্র (চাকুরি, ছুটি),

৩.২। চাকুরিতে যোগদান পত্র,

৩.৩। মানপত্র,

৩.৪। স্মারকলিপি,

৩.৫। সংবাদপত্রে প্রকাশের জন্য পত্র

৪। কবিতা চর্চা:

৪.১। বঙ্গভাষা –মাইকেল মধুসূদন দত্ত

৪.২। সোনার তরী – রবীন্দ্র নাথ ঠাকুর

৪.৩। উমর ফারুক –কাজী নজরুল ইসলাম

৪.৪। বাংলার মুখ আমি– জীবনানন্দ দাশ

৪.৫। আসাদের শার্ট – শামসুর রাহমান

৪.৬। স্বাধীনতা শব্দটি কি করে আমাদের হলো? – নির্মলেন্দু গুণ

৫। প্রবন্ধ জানা :

৫.১। অর্ধাঙ্গী –রোকেয়া সাখাওয়াত হোসেন

৫.২। বইকেনা – সৈয়দ মুজতবা আলী

৬। একাঙ্কিকা (নাটিকা):

৬.১। মানুষ –মুনীর চৌধুরী

৭। উপন্যাস:

৭.১। লালসালু – সৈয়দ ওয়ালী উল্লাহ

৮। ছোট গল্প:

৮.১। হৈমন্তী – রবীন্দ্র নাথ ঠাকুর

৮.২। একুশের গল্প – জহির রায়হান

৮.৩। পাতালেহাসপাতালে – হাসান আজিজুল হক

ব্যবহারিকঃ

১। নির্ধারিত বক্তৃতা অনুশীলনঃ

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 বক্তৃতায় অংশগ্রহণ: বিষয়বস্তু উন্মুক্ত

৩. আবৃত্তি অনুশীলন : 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 প্রতিযোগীতা (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 উপস্থাপনঃ

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 skills with understanding
- The fluency of speech
- Grammatical accuracy with emphasis on spelling, punctuation and pronunciation
- Creative writing for communication in real life situation
- Integrating reading, listening, writing & speaking skills

DETAIL DESCRIPTION:

Reading Skill:

1. Demonstrate the ability to use reading skill.

1.1 Read the mentioned text and take notes covering the main points, facts from passage read.

1.2 Recognize how ideas relate to communicative competence.

1.3 Use digital dictionaries to discover pronunciation, spelling, meaning and uses.

1.4 Identify main points and summarize the text.

Contexts and Situations- (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 Habits 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.

Listening Skill:

2. Demonstrate the ability to use listening skill.

2.1 Listen to instructions and follow them.

2.2 Take notes from a short talk, story or explanation.

2.3 use e-book or reading software to follow the accent and pronunciation of the native speaker.

Speaking Skill:

3. Demonstrate the ability to use speaking skill.

3.1 Ask and answer questions about objects/events/processes.

3.2 Ask and answer questions about what they have read, listened and written.

3.3 Participate in controlled conversations in various social situations.

Writing Skill:

4. Demonstrate the control of writing skill.

4.1 Develop paragraphs from points/outlines

4.2 Write guided paragraph about people, places, events and day -to-day life.

4.3 Write guided letter and applications.

4.4 Describe objects , events, status and process.

Functions:

1. Writing dialogues with teacher, principal, shopkeeper, hotel manager, station master, newcomer, buyers, doctor, friend, colleagues.
2. Writing reports on different events/occasions/accidents.
3. Writing situational personal and official letters
4. Writing job applications with CV/appointment letter/joining letter
5. Writing guided paragraphs with clues

Grammar: Marks-20 (Context & Situations)

(Grammatical items, structures and vocabulary relevant to notions and contexts given bellow will be followed)

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. <u>Sentence Analysis:</u>

a. Study of part of Speech (Type of verbs-Regular and Irregular verbs, Auxiliary and Principal verb)

b. Study of Phrases and Clauses (noun/adjective/verb/participle/adverbial/prepositional phrases and principal/sub ordinate /co ordinate clauses)

65812	PHYSICAL EDUCATION & LIFE SKILL DEVELOPMENT	T	P	C
		0	3	1

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 $\tan(A \pm B)$, $\cot(A \pm B)$.

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 $\cos 5\theta$ in terms of $\cos\theta$.

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

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

65912	PHYSICS-I	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 the 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. Understand 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. Understand 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. Understand 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. Show 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. Understand 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 the angle of repose
4.11. State the merits and demerits of friction.

5. Understand 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. Understand 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. Explain the motion of a simple pendulum and determine its time period.

7. Understand 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. Understand 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. Understand Hydrostatics.

9.1. Define pressure as force per unit area and state that it is measured in N/m2 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. State surface tension and surface energy, Angle of contact.
9.5. Define capillarity and theory of capillarity.
9.6. Explain viscosity and co-efficient of viscosity.
9.7. Mention the necessity of viscosity.

10. Understand Wave and sound.

10.1. Define wave and wave motion.
10.2. Differentiate transverse wave and longitudinal wave.
10.3. Define some terms relating waves.
10.4. Compare progressive wave and stationary waves.
10.5. Mention equation of progressive wave.
10.6. Define sound and production of sound.
10.7. Explain 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. Understand 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
11.4. Define Infrasonic sound and Ultrasonic (supersonic) sound.
11.5. Explain how sound is absorbed, reflected & refracted by different types of surface.
11.6. Describe the practical uses of echo sounding devices.
11.7. Define velocity of sound.
11.8. State the velocity of sound at NTP in still air.
11.9. 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 the parallelogram of forces by a force board.
5. Draw L-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 - Dr. Shahjahan Tapan
2. A Text Book of Properties of matter - N Subrahmanyam and Brij Lal
3. A Text Book of Sound - N Subrahmanyam and Brij Lal
4. Higher Secondary Physics- First Part - Prof. Golam Hossain Pramanik
5. Higher Secondary Physics- First Part - Ishak Nurfungnabi

66611	COMPUTER APPLICATION	T	P	C
		0	6	2

OBJECTIVES

- **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 WPM) 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 WPM) in English and (20 WPM) 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 Different Tab 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.

Reference:

It is recommended to follow the Competency standard of Computer Operation NTVQF Level 1.

http://www.btebcbt.gov.bd/utility/searchUser?sector=8&occupation=76&level=&btnSearch=Search

66712 ELECTRICAL ENGINEERING FUNDAMENTALS

T	P	C
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 TECHNOLOGY
TECHNOLOGY CODE: **666**

2nd SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

COMPUTER TECHNOLOGY (666)

2nd 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	66621	Database Application	0	6	2	-	-	50	50	100
2	66622	IT support System-I	0	6	2	-	-	50	50	100
3	66623	Graphics Design-I	0	6	2	-	-	50	50	100
4	66823	Analog Electronics	3	3	4	60	90	25	25	200
5	65921	Mathematics-2	3	3	4	60	90	50	-	200
6	65922	Physics-2	3	3	4	60	90	25	25	200
7	65722	Communicative English	1	3	2	20	30	50	00	100
Total			**10**	**30**	**20**	**200**	**300**	**300**	**200**	**1000**

66621	DATABASE APPLICATION	T	P	C
		0	6	2

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 is 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 is 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 is 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 is 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 is 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

Reference:
It is recommended to follow the Competency standard of Computer Operation NTVQF Level 2.
http://www.btebcbt.gov.bd/utility/searchUser?sector=8&occupation=76&level=&btnSearch=Search

66622	IT Support System-1	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 Wi-Fi 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 dispose 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 existing
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.

Reference:

It is recommended to follow the Competency standard of IT Support Technician, NTVQF Level 1.
http://www.btebcbt.gov.bd/utility/searchUser?sector=8&occupation=22&level=&btnSearch=Search

66623	GRAPHICS DESIGN-1	T	P	C
		0	6	2

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

3.8. Follow OSH practices

3.8.1. Safe work practices are observed according to workplace procedures

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

3.9. Create basic designs

3.9.1. Required designs are specified.

3.9.2. Appropriate shape and size are identified

3.9.3. Content area is defined

3.9.4. Contents are inserted and composed

3.9.5. Shapes are modified as per requirements.

3.9.6. Typographical design is applied as per requirements.

3.9.7. Font attributes are applied per requirements.

3.9.8. Design and colour are applied per requirements.

3.9.9. Design is saved in appropriate file format

3.10. Create Outline and transfer.

3.10.1. Design is reviewed and finalized

3.10.2. Outline is created and grouped

3.10.3. Final design is saved in appropriate file format

3.10.4. Final design is transferred to the recipients

3.11. Develop conceptual skills and ideas

3.11.1. Working with others to develop basic design ideas is demonstrated.

3.11.2. Ability to gain experience in a range of genres and interpretation of basic design guidelines is demonstrated.

3.11.3. Ability to gain experience in a range of genres and interpretation of basic design guidelines is demonstrated.

3.11.4. A range of opportunities to develop own practice and keep informed about current design practice are identified and used for basic design guidelines.

3.12. Evaluate own work

3.12.1. Constructive criticism from others is applied to improve own work.

3.12.2. Own work is evaluated against planned strategy for own practice.

3.12.3. 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.

3.13. Follow OSH practices
- 3.13.1. Safe work practices are observed according to workplace procedures
- 3.13.2. OSH hazards and incidents are reported to appropriate personnel according to workplace procedures.

3.14. Prepare design
- 3.14.1. Required Professional Design works are selected.
- 3.14.2. Appropriate Tools, Palette and arrange them as needed are identified.
- 3.14.3. Ruler/unit/Grids/Guides/Smart Guides as per requirement are set
- 3.14.4. Key Drawing / Design Layout are prepared
- 3.14.5. Various Marks.
- 3.14.6. Layer lock is applied

3.15. Create Design
- 3.15.1. Insert Contents are inserted.
- 3.15.2. Colour/Design/Pattern is applied.
- 3.15.3. Pathfinder to create complex Objects are used
- 3.15.4. Font Attributes as per requirement Applied
- 3.15.5. Zoom In-Out and Panning are used
- 3.15.6. Design for further use is saved

3.16. Review and Finalize
- 3.16.1. Artwork and Preview is used
- 3.16.2. Layer Hide-Unhide option is used
- 3.16.3. Outline and Group Created
- 3.16.4. Appropriate File Format Saved
- 3.16.5. The image to recipient Transferred

Reference:

It is recommended to follow the Competency standard of Graphics Design, NTVQF Level 1
http://www.btebcbt.gov.bd/utility/searchUser?sector=8&occupation=23&level=&btnSearch=Search

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, Multi-vibrator; 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 $I_{E,}$ $I_{C,}$ $I_{B,}\alpha$, 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. Multi-vibrator 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 muti-vibrator 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 ofmonolithic 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.

10.7 Select component, AVO meters, circuit board and required materials.
10.8 Construct the circuit.
10.9 Adjust the biasing voltage to appropriate point.
10.10 Record input and output voltage and current.
10.11 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. Study the 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

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 $e^x = 1 + \frac{x}{L^1} + \frac{x^2}{L^2} + \frac{x^3}{L^3} + \frac{x^4}{L^4}$ ..... to ∞
- 3.4 Solve problems of the followings types :

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

ii) $\frac{1}{L^2} + \frac{1+2}{L^3} + \frac{1+2+3}{L^4} + \frac{1+2+3+4}{L^5}$ + ... 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

65922	PHYSICS-2	T	P	C
		3	3	4

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 TECHNOLOGY
TECHNOLOGY CODE: **666**

3rd SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

COMPUTER TECHNOLOGY (666)

3rd 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	66631	Programming Essentials	2	3	3	40	60	25	25	150
2	66632	Web Design	0	6	2	-	-	50	50	100
3	66633	Graphics design-II	0	6	2	-	-	50	50	100
4	66634	IT support-II	0	6	2	-	-	50	50	100
5	65931	Mathematics-3	3	3	4	60	90	50	-	200
6	65913	Chemistry	3	3	4	60	90	25	25	200
7	65811	Social Science	3	0	3	60	90	-	-	150
Total			**11**	**27**	**20**	**220**	**330**	**250**	**200**	**1000**

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 software's

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

3.1.1. Plan a website to meet client requirements.

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

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

3.1.4. Required design is developed.

3.1.5. 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.

Reference:
It is recommended to follow the Competency standard of Web Design NTVQF Level 2.
http://www.btebcbt.gov.bd/utility/searchUser?sector=8&occupation=24&level=&btnSearch=Search

66633	Graphic Design II	T	P	C
		0	6	2

Objectives

To be able to perform Design.

.....

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

Reference:

It is recommended to follow the Competency standard of Graphics Design NTVQF Level 2.
http://www.btebcbt.gov.bd/utility/searchUser?sector=8&occupation=23&level=&btnSearch=Search

66634	IT Support II	T	P	C
		0	6	2

Objectives

To be able to perform hardware troubleshooting

To be able to perform setup network environment and maintenance

Short Description

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

- **Apply the awareness of career opportunities in computer hardware & networking field**
- **Use electronic parts and Components for making circuits in PCB**
- **Use testing and measuring instruments for electronic servicing**
- **Install and use open source operating system and optimize utilities**
- **Maintain standalone security**

1. Apply the awareness of career opportunities in computer hardware & networking field

1.1 Assess personal strengths and weaknesses

1.1.1 ***Personal strength*** and weakness in hardware and networking sector is assessed
1.1.2 Attitudes needed for career success is determined

1.1.3 Demonstrate the steps involved in resolving a conflict/stress situation in hardware and networking sector.

1.2 Increase knowledge, skills and experience

1.2.1 Communication skills, honesty, integrity, teamwork, interpersonal skills, motivation, leadership skills, ability to work with diverse people, work experience, and a strong work ethic are demonstrated
1.2.2 Ability to accept and use of new technology in hardware and networking field is observed

1.3 Develop self-marketing skills to help implement career goals

1.3.1 Resume writing, job application, interviewing, and job search strategies are observed
1.3.2 Networking with people working with hardware and networking sector are demonstrated

1.3.3 Maintain equipment and software in working order

1.4 Explore carrier options
1.4.1 On line carrier-exploration site is used to search carrier options
1.4.2 Carrier opportunities from friends, family, alumni, colleagues and other people of the community are investigated
1.4.3 A plan is developed to obtain carrier goals in hardware and network sector

1.5 Apply knowledge to a comprehensive set of goals and an individual carrier plan

1.5.1 Knowledge and intelligence is defined for a comprehensive set of goals and carrier plan

1.5.2 Knowledge and intelligence is applied on various carrier for a comprehensive set of goals and carrier plan

1.6 Develop strategies to make an effective transition to work Equipment and software maintenance specification is reviewed

1.6.1 Strategies for ***effective transition to work*** is developed
1.6.2 Strategies for effective transition to work is documented

2 Use electronic parts and Components for making circuits in PCB

2.1 Follow OSH practices, 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 at all times
- 2.1.3 Safe work practice observed and personal protective equipment (PPE) worn as Electrical safety standard

2.2 Identify Electrical and electronic components
- 2.2.1 ***Electrical components*** are identified
- 2.2.2 ***Electronic components*** are identified

2.3 Identify Electrical and electronic components in a computer
- 5.1.2. Electronic components in a computer motherboard are identified
- 5.1.3. Electronic components of power supply unit are demonstrate

2.4 Demonstrate Block diagram and schematic diagram computer
- 5.1.2. Block diagram and schematic diagram of mother boards are demonstrated.
- 5.1.3. Block diagram and schematic diagram of power supply unit are demonstrated.

2.5 Demonstrate soldering and de-soldering of an electronic circuit
- 5.1.2. Soldering **materials** are selected
- 5.1.3. Soldering on electronic components are demonstrated
- 5.1.4. Disordering on electronic components are demonstrated

3 Use testing and measuring instruments for electronic servicing

3.1 Follow OSH practices
- 3.1.1 Safe work practice observed
- 3.1.2 PPE worn as required for the work is performed

3.2 Identify and calibrate electrical or electronic measuring instrument
- 3.2.1. Appropriate (precision and measurement range) electrical or electronic measuring instrument is identified
- 3.2.2. The calibration of the instrument is examined
- 3.2.3. Instrument is calibrated if required

3.3 Perform electrical or electronic measurement
- 3.3.1 ESD (electrostatic discharge) precaution is demonstrated
- 3.3.2 Instrument is connected as instructed and measurement is performed
- 3.3.3 *Measurement* result is documentation

3.4 Identify and calibrate electro-mechanical instrument for the task
- 3.4.1 Electro-mechanical task is determined
- 3.4.2 Electro-mechanical instrument is identified required for the ***task***
- 3.4.3 Examine the calibration of the instrument If require instrument is calibrated

3.5 Perform the task
- 3.5.1 Electro-mechanical instrument is collected as per requirement
- 3.5.2 Using the electro-mechanical instrument task is performed

3.6 Document the steps to use the instrument
- 3.6.1 Steps to use the instrument are followed
- 3.6.2 Steps to use the instrument are documented

4 Install and use open source operating system and optimize utilities

4.1 Identify the purpose and functions of operating system
- 4.1.1 Basic purpose of ***operating system*** is identified and defined
- 4.1.2 Operating system basic functions are identified and defined.

4.2 Determine the components of operating system
- 4.2.1 Operating system components are determined
- 4.2.2 Functionality of the components is defined

4.3 Install and optimize operating system
- 4.3.1 Types of operating system are identified.
- 4.3.2 Use of each type of operating system is defined.
- 4.3.3 Operating system is determined
- 4.3.4 Operating system software is installed according to instructions given in the manual
- 4.3.5 Operating system and its ***components*** are configured and optimised according to the workplace requirement
- 4.3.6 ***User management*** is performed

4.4 Install and optimize utility software
- 4.4.1 Utilities are identified according to the workplace requirement
- 4.4.2 ***Utility software*** is installed

4.4.3 Utility software is configured and optimised to meet the client or workplace requirement
4.4.4 Instruction of new software installation requirement is documented

5 Maintain standalone security

5.1. Check antivirus software
5.1.1 Safe work practice observed and PPE worn as required for the work performed.
5.1.2 Operating system license is checked and verified
5.1.3 Antivirus software is installed
5.1.4 Antivirus software licence is checked and update database
5.1.5 Appropriate person is reported to take necessary actions to update or renew licenses

5.2. Protect standalone system from security threat
5.2.1. Antivirus guard started/activated
5.2.2. System recovery disk is created and preserved
5.2.3. Important directory and files are backed up regularly and preserved

5.3. Protect important user account
5.3.1. System administrator accounts are determined
5.3.2. Administrator accounts password are verified according to the standard password rule
5.3.3. Administrator accounts passwords are preserved in a secured place
5.3.4. Administrator accounts are protected

5.4. Apply security update of operating system, other software and install only trusted software
5.4.1. Security updates of OS and other software are downloaded/collected and applied
5.4.2. Before installing any new software license is verified
5.4.3. Installation source disk, directory or file signature is verified
5.4.4. Installing trusted software

5.5. Observe security status of the standalone system regularly and record security incident and possible actions taken
5.5.1. Full system is scanned and observed for possible vulnerabilities in regular basis
5.5.2. Identified security incident and its details is documented
5.5.3. Possible actions and remedy is recorded

5.6. Identify, analyse and nullify possible security threat and recover system from possible damage
5.6.1. Possible security threat of standalone system is identified
5.6.2. Possible cause of infection is determined from the analysis
5.6.3. Security threat (Identified) is analysed to find out its characteristics
5.6.4. Capability of the security threat is determined from the analysis
5.6.5. Affected files are nullified
5.6.6. Security threat is removed or from the system using antivirus software

5.7. Recover system from possible damage
5.7.1. Damage done by security threat is determined clearly
5.7.2. Antivirus software is used to recover affected files
5.7.3. If some files are need to be deleted, possible effect is identified
5.7.4. If boot sector of the standalone system is damaged, recovery disk is used to recover boot sector
5.7.5. Deleted files are restored from the backup

Reference:

It is recommended to follow the Competency standard of IT Support, NTVQF Level 2, http://www.btebcbt.gov.bd/utility/searchUser?sector=8&occupation=22&level=&btnSearch=Search

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

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.

Section - 01 (Physical and Inorganic Chemistry)

1. Atomic Structure and Chemical Bond

1.1 Definition of Element, Atoms, Molecules, Fundamental Particle of Atom, Their Mass, Charge, Location.
1.2 Definition of Atomic Number, Mass Number, Isotope, Isotone and Isobar.
1.3 Electronic Configuration Based on Hunds Rule, Aufbau's Principle, Paulis Exclusion Principle
1.4 Definition Of 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. Ionic Equilibrium

2.1 Concept of Acid, Base, Salt and Types Of Salts.
2.2 Ph, Poh, Ph Scale.
2.3 Basicity of An Acid and Acidity of A Base.
2.4 Normality, Molarity, Molality, Volumetric Analysis.
2.5 Titration and Indicator.
2.6 Buffer Solution and Its Mechanism.

3. Chemical Reaction, Oxidation and Reduction.

3.1 Define Chemical Reaction And Explain The Various Type Of Chemical Reaction.
3.2 Explain The Full Meaning Of A Chemical Equation.
3.3 Concept of Catalyst.
3.4 Modern Concept of Oxidation and Reduction.
3.5 Simultaneous Process of Oxidation and Reduction.
3.6 Explain The Oxidation Number.

4. Water Treatment

4.1 Concept of Hard And Soft Water
4.2 Hardness of Water
4.3 Describe The Softening Method Of Permuted Process And Ion Exchange Resin Process.
4.4 Advantage and Disadvantage of Hard Water in Different Industries.
4.5 Water Treatment Plant Visit and Reporting.

5. Corrosion And Alloy

5.1 Types of Corrosion. (Dry and Wet Corrosion)
5.2 Atmospheric Corrosion, Types Of Atmospheric Corrosion And Their Mechanism, Oxide Films Factors Affecting Atmospheric Corrosion.
5.3 Electrochemical Corrosion, Mechanism of Electrochemical Corrosion.Types of Electrochemical Corrosion. Factors Affecting Electrochemical Corrosion.
5.4. Protective Measures Against Corrosion: Coating (Galvanic and Zinc, Organic Coating Coating Agents, Electroplating, Metal Cladding)
5.5 Concept of Alloy.

Section -2 (Organic Chemistry)

6. Organic Chemistry and Introduction to Polymers:

6.1 Types of Chemistry.
6.2 Catenation Property of Carbon.
6.3 Organic Compounds, Its Properties and Applications.
6.4 Classification of Organic Compound By Structure and Functional Group: Definne: Homologous Series, Alkanes, Alkenes and Alkynes; Properties And Uses of General Formula ; Names and Structure of First Five Members Hydrocarbons .
6.5 Polymer, Monomer, Classification of Polymers, Polymerization, Addition and Condensation Polymerization.
6.6 Plastics: Definition, Its Types and Uses.

Section -3 (Industrial Chemistry)

7. Glass and Ceramic:

7.1 Concept of Glass and Its Constituents, Classification and Uses of Different Glass, Elementary Idea of Manufacturing Process of Glass.
7.2 Introduction to Ceramic Materials, Its Constituent.
7.3 Industrial Application of Glass and Ceramic.
7.4 Industry Visit and Reporting.

8. Soap and Detergent:

8.1 Introduction - A. Lipid B. Fats and Oils
8.2 Saponification of Fats and Oils, Manufacturing Of Soap.
8.3 Synthetic Detergent, Types of Detergents and Its Manufacturing.
8.4 Exclusives: TNT, RDX, Dynamite.
8.5 Paint and Varnish
8.6 Adhesives.

9. Cement, Pulp And Papers:

9.1 Concept of Cement and Its Constituents, Classification and Uses of Different Cement, Manufacturing Process 0f Cement.
9.2 Manufacturing Process of Pulp and Papers.
9.3 Industry Visit and Reporting.

Section - 4 (Practical Chemistry)

1. Use Of Laboratory Tools And Safety Measures

2. 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. Qualitative Analysis Of Known And Unknown Salts :

3.1 Identification of Known Salt (Sample Copper, Iron, Aluminum, Led, Ammonium and Zinc Salt.)

3.2 Identification of Unknown Basic Radical (E.G. Led, Copper, Iron, Zinc, Aluminum, Ammonium)

3.3 Identification of Unknown Acid Radicals (E.G. Chloride, Nitrate, Sulphate, Carbonate)

Source or Reference Book

1. Higher Secondary Chemistry (Paper 1st And 2nd)- Writer Dr.Gazi Md.Ahsanul Karim. And Md.Robiul Islam
2. Higher Secondary Chemistry (Paper 1st And 2nd)- Writer Dr.Soroz Kanti Singha Hazari .
3. An Introduction To Metallic Corrosion And Its Prevention- Writer Raj Narayan.
4. Organic Chemistry- Writer Morrisson And Boyad.
5. Inorganic Chemistry - Writer Ali Haider

65811	SOCIAL SCIENCE	T	P	C
		3	0	3

OBJECTIVE

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 teem.

Part-1 (Civics)

1. **Understand the meaning and scope of civics and inter relations of social sciences.**
   - 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** Meaning the 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 the Constitution.
   - 4.2 Explain the deferent form of Constitution
   - 4.3 Explain state the salient feature of Bangladesh constitution.
   - 4.4 Define the fundamental rights of Bangladesh constitution.
   - 4.5 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.
6.4 Discuss the role of Bangladesh in the 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

Part-2 (Economics)

1. Understand the fundamental concepts of economics.

1.1 Define the Microeconomics and Macroeconomics.
1.2 Discuss the definition of Economics as given by eminent economists.
1.3 Describe the importance of economics for Technical Student.
1.4 Define commodity, utility, value, wealth, consumption, income, savings, wages, value in use, value in exchange and salary.
1.5 Differentiate between value in use and value in exchange.
1.6 Explain wealth with its characteristics.

2. Understand the production process and the concept of the law of diminishing returns in the production process.

2.1 Discuss production mode and process
2.2 Explain the nature of different factors of production.
2.3 Discuss production function.
2.4 Discuss the law of diminishing returns.
2.5 State the application and limitations of the law of diminishing returns.
2.6 Describe the law of production (increasing constant and diminishing).

3. Understand the concept of demand, supply and utility.

3.1 Define the term, "demand and supply".
3.2 Explain the law of demand and supply .
3.3 Draw the demand and supply curve.
3.4 Discuss Market equilibrium.
3.5 Define the utility, total and marginal utility
3.6 Illustrate the law of diminishing utility.
3.7 Explain the law of diminishing marginal utility

4. Understand national income.

4.1 Define nation income.
4.2 Explain how to measure national income.
4.3 Discuss GNP, GDP and NNP.
4.4 Discuss economic development and growth

5. 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.

6. 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, 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.

Part-3 ((Bangladesh: History& Culture)

সংক্ষিপ্ত বিবরণী

ইতিহাস

- ইতিহাসের সংজ্ঞা।
- বাংলাদেশের আবহাওয়া ও অধিবাসী।
- বাংলায় ইংরেজ শাসন ক্ষমতালাভ ও প্রতিষ্ঠা।
- ব্রিটিশ বিরোধী সশস্ত্র প্রতিরোধ আন্দোলন; সংস্কার আন্দোলন ও জাতীয়তাবাদেও বিকাশ এবং বাংলার নবজাগরণ; বঙ্গভঙ্গ ও বঙ্গভঙ্গ উত্তরকালে বাংলার রাজনীতি ও দেশ বিভাগ।
- পাকিস্তান আমলে বাংলাদেশ, বঙ্গবন্ধুর নেতৃত্বে বাংলাদেশের মুক্তি সংগ্রাম ও স্বাধীনতালাভ।

সংস্কৃতি

সংস্কৃতি, সভ্যতার সংজ্ঞা, সংস্কৃতির প্রকরণ, ভাষা আন্দোলন উত্তর বাংলার সংস্কৃতি, স্বাধীনতা উত্তর বাংলাদেশের সংস্কৃতির বিবর্তন, বাংলাদেশের সংস্কৃতিতে প্রত্নতার্ত্ত্বিক নিদর্শন ও ক্ষুদ্র নৃতাত্ত্বিক গোষ্ঠীসমূহ।

সহায়ক পুস্তক

হক, মোজাম্মেল "পৌরনীতি"– হাসান বুক হাউস
প্রফেসর এমাজউদ্দিন "রাষ্ট্রবিজ্ঞান" আজিজিয়া লাইব্রেরী
আলী, মাসুম "অর্থনীতি"
চক্রবর্তী, মনতোষ– "প্রিন্সিপলস অব ইকোনোমিক্স"
মার্শাল, আলফ্রেড,–" প্রিন্সিপলস অব ইকোনোমিক্স"
রহমান, আনিসুর –"অর্থনীতি"
রহিম, চৌধুরী, মাহমুদ ও ইসলাম, "বাংলাদেশের ইতিহাস (পরিবর্ধিত ও পরিমার্জিত)" ; নওরোজ কিতাবিস্তান, আগস্ট, ১৯৯৯।
কে, আলী"বাংলাদেশের ইতিহাস"; আজিজিয়া বুক ডিপো, ২০০১।
সিরাজুল ইসলাম, "বাংলাদেশের ইতিহাস-১৭০৪-১৯৭১"; ১ম, ২য় ও ৩য় খন্ড; বাংলাদেশ এশিয়াটিক সোসাইটি, ফেব্রুয়ারি ২০০০।
কো-আন্তোনভা, প্রি, কতোভস্কি, "ভারত বর্ষের ইতিহাস"; প্রগতি প্রকাশন, ১৯৮৮।
গোপাল হালদার; "সংস্কৃতির রূপান্তর"; মুক্তধারা, মে ১৯৮৪।
মোতাহের হোসেন চৌধুরী, "সংস্কৃতি কথা"; নওরোজ কিতাবিস্তান, জানুয়ারি ১৯৯৮।
গোপাল হালদার, "বাংলা সাহিত্যের রূপরেখা-১ম ও ২য় খন্ড"; মুক্তধারা।

BANGLADESH TECHNICAL EDUCATION BOARD

Agargoan, Dhaka-1207.

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

SYLLABUS (PROBIDHAN-2016)

COMPUTER TECHNOLOGY

TECHNOLOGY CODE: **666**

4th SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

COMPUTER TECHNOLOGY (666)

Sl. No.	Subject Code	Name of the Subject	T	P	C	Marks				
						Theory		Practical		Total
						Cont. Assess	Final Exam	Cont. Assess	Final Exam	
1	66641	Object Oriented Programming	2	3	3	40	60	25	25	150
2	66642	Data Structure & Algorithm	2	3	3	40	60	25	25	150
3	66643	Web Development	0	6	2	-	-	50	50	100
4	66644	Data Communication System	2	6	4	40	60	50	50	200
5	66645	Computer Peripherals	1	6	3	20	30	50	50	150
6	66842	Principle of Digital Electronics	3	3	4	60	90	25	25	200
7	65841	Business Organization & Communication	2	0	2	40	60	-	-	100
7										
Total			**12**	**27**	**21**	**240**	**360**	**225**	**225**	**1050**

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

Participant:

1. Md. Monjurul Islam
   Chief Instructor(Computer)
   Faridpur Polytechnic Institute
   01715098868
2. Md. Bulbul Ahmed
   Chief Instructor(Computer)
   Mymensingh Polytechnic Institute
   01711789276

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 by recursive 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

66643	Web Development	T	C	P
		0	6	2

Short Description:

This unit covers knowledge, skills and attitudes required to -

- Create and manage rich web content including jQuery plugins, images, CSS3 animation, audio and video within a website.
- To enter dynamic features for the Client Side Dynamic Web page using jQuery and check the completed website for accuracy using common browsers.
- get the benefits of reusability in design and development and understand how grid works and how to use them in mobile and responsive web design and development
- understand the design of single-page applications and how AngularJS facilitates their development and elegantly implement Ajax in AngularJS applications
- Properly separate the model, view, and controller layers of your application and implement them using AngularJS
- Gain the PHP programming skills needed to successfully build interactive, data-driven sites

1. Develop a Client Side Dynamic Webpage using jQuery

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. 2. Plan the dynamic features to be added to a website to meet client requirements.
- 1.2.1. Plan 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. Add jQuery to the website in accordance with the design specifications.
- 1.3.1. JQuery plugin is added and attributes are assigned to meet client requirements in terms of the layout and formatting of the pages and enhancements.
- 1.3.2. Interactivity is added, edited and formatted to the website in accordance with client requirements.
- 1.3.3. Dynamic content is added in each and every page, if required, in accordance with client requirements.
- 1.3.4. 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 theme is tested to ensure compatibility, functionality, correct any errors and log in according to the testing procedures in the plan.
- 1.4.2. The theme 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 theme is evaluated for fitness for purpose in terms of the purpose, target audience and specifications of client requirements.

2. Separate the model, view, and controller layers of an application (and implement them using AngularJS)

2.1. Introduction to AngularJS
- 2.1.1. Understand What AngularJS does
- 2.1.2. Understand Who controls AngularJS
- 2.1.3. Know How to get AngularJS

2.2. Create the first AngularJS application
- 2.2.1. Create a basic application
- 2.2.2. Use angular-seed
- 2.2.3. Understand the pieces of the puzzle
- 2.2.4. Observe how it fits together
- 2.2.5. Use Model, View, Controller from the AngularJS Perspective

2.3. Single Page Applications
- 2.3.1. Understand the Single Page Application
- 2.3.2. Creating Angular Modules
- 2.3.3. Use Angular's Routing Service

2.3.4. Create a Skeleton Single Page Application

2.4. Controllers

2.4.1. Find out where Controllers fit in, and what they do, from Angular's perspective

2.4.2. Manage Scope

2.4.3. Set up Behavior

2.4.4. Build a basic controller

2.4.5. Use advanced controller

2.5. Models

2.5.1. Create a model

2.5.2. Explicit models

2.5.3. Implicit models

2.6. Views

2.6.1. take on the View of AngularJS

2.6.2. Tie a View to a Controller

2.6.3. Tie a View to a model

2.7. Expressions

2.7.1. Understand Expressions that are lightweight code snippets

2.7.2. Find out Expression capabilities

2.7.3. Find the Limitations

2.7.4. Draw the border between expressions and $eval

2.8. Filters

2.8.1. Use standard filters

2.8.2. Write your own filter

2.8.3. Tie filters together

2.9. Scopes

2.9.1. Understand what scopes are

2.9.2. Find out what scopes can provide

2.9.3. Understand Scope lifecycle

2.9.4. Use Scopes as glue between controller and view

2.9.5. Understand Scope hierarchies

2.9.6. Understand Scope and events

2.10. Angular Forms

2.10.1. Find the difference between Angular forms vs HTML forms

2.10.2. Use Angular form controls

2.10.3. Use Form events

2.10.4. Use The form controller

2.10.5. Perform Form validation

2.11. Ajax, Data, and Angular

2.11.1. Understand High level interactions with servers

2.11.2. Understand Low-level server interactions with $http

2.11.3. Use The deferred/promises API

2.11.4. Make RESTful Service calls with $resource

2.12. Directives

2.12.1. Learn and apply HTML new tricks

2.12.2. Bind text and attributes

2.12.3. Use Directive for processing lifecycle

2.12.4. Use a basic directive

2.12.5. Find the difference between Directives and scopes

2.12.6. Create reusable directives

2.12.7. Turn directives into components

2.13. Testing in Angular

2.13.1. Perform unit testing

2.13.2. Perform End-to-end testing

3. Design and development of responsive web site (using open source framework, Bootstrap)

- 3.1. Bootstrap Scaffolding
  - 3.1.1. Mobile first design
  - 3.1.2. Understand why Bootstrap
  - 3.1.3. Include Bootstrap
  - 3.1.4. Customize installation
  - 3.1.5. Understand Responsive Design
  - 3.1.6. Use The "container" class
  - 3.1.7. Understand How Grids work in Bootstrap
    - 3.1.7.1. Use Grid classes (.col-xs-, .col-sm-, .col-md-, .col-lg-)
    - 3.1.7.2. Add offsets to columns
    - 3.1.7.3. Push and pull columns
    - 3.1.7.4. Use Nested columns
  - 3.1.8. Navigation components
    - 3.1.8.1. Use Navs
    - 3.1.8.2. Use Navbars
  - 3.1.9. Use Jumbotron component
- 3.2. Page Components
  - 3.2.1. Use Headers
  - 3.2.2. Use Panels
  - 3.2.3. Use ListGroup
  - 3.2.4. Use Breadcrumbs
  - 3.2.5. Use Labels
  - 3.2.6. Use Buttons
  - 3.2.7. Use Glyphicons (with buttons, toolbars and form inputs)
  - 3.2.8. Use Wells
- 3.3. Page Components: Forms
  - 3.3.1. Create forms
  - 3.3.2. Use Inline and horizontal forms
  - 3.3.3. Perform Form validation
- 3.4. Bootstrap Plugins
  - 3.4.1. Use Alert Messages
  - 3.4.2. Use Buttons and button groups
  - 3.4.3. Use ScrollSpy
  - 3.4.4. Use Tabs
  - 3.4.5. Use Collapse
  - 3.4.6. Use Carousel
  - 3.4.7. Use Modal
- 3.5. Extending Bootstrap with Custom Plugins
  - 3.5.1. Use Bootbox.js
  - 3.5.2. Use DateTime Picker
  - 3.5.3. Use Font Awesome
  - 3.5.4. Use Off-Canvas
  - 3.5.5. Use Image Gallery
  - 3.5.6. Use Social Buttons
  - 3.5.7. Use SweetAlert
  - 3.5.8. Use Yamm3 Mega Menu
- 3.6. Review and More Practice
  - 3.6.1. Review the Bootstrap CSS source code
  - 3.6.2. Build another Bootstrap web page from scratch

4. Develop website using PHP and MySQL (Basic Level)

- 4.1. Introduction to web development with PHP
  - 4.1.1. Understand The architecture of a web application
  - 4.1.2. Find out how to edit and test a PHP application
- 4.2. How to code a PHP application
  - 4.2.1. Apply Basic PHP skills
  - 4.2.2. Code the control statements
  - 4.2.3. Use the PHP documentation
- 4.3. Introduction to relational databases and MySQL
  - 4.3.1. Understand the Relational Databases
  - 4.3.2. Use the SQL statements for data manipulation
  - 4.3.3. Understand MySQL
  - 4.3.4. Use phpMyAdmin
- 4.4. Use PHP with a MySQL database
  - 4.4.1. Use MySQL with the help of PHP
  - 4.4.2. Get data from a result set
  - 4.4.3. Develop a Product Viewer application
  - 4.4.4. Develop Product Manager application
- 4.5. Test and debug a PHP application
  - 4.5.1. Test and debug a PHP application
- 4.6. work with form data
  - 4.6.1. Get data from a form
  - 4.6.2. Display data on a web page
- 4.7. Use code control statements
  - 4.7.1. Use code for conditional expressions
  - 4.7.2. Use code for selection structures
  - 4.7.3. Use iteration structures
- 4.8. work with strings and numbers
  - 4.8.1. Use strings
  - 4.8.2. Use numbers
  - 4.8.3. Develop skills for working with strings and numbers
- 4.9. work with dates
  - 4.9.1. Use timestamps to work with dates
  - 4.9.2. Use objects to work with dates
- 4.10. create and use arrays
  - 4.10.1. Create and use an array
  - 4.10.2. Create and use an associative array
  - 4.10.3. Use functions to work with arrays
  - 4.10.4. Work with arrays of arrays
- 4.11. Work with cookies and sessions
  - 4.11.1. Use cookies
  - 4.11.2. Apply sessions
- 4.12. How to create and use functions
  - 4.12.1. Develop basic skills for working with functions
  - 4.12.2. Create and use a library of functions
  - 4.12.3. Use functions
- 4.13. How to use regular expressions, handle exceptions, and validate data
  - 4.13.1. Use regular expressions
  - 4.13.2. Handle exceptions
- 4.14. Review and Practice
  - 4.14.1. Review all the developed code and application
  - 4.14.2. Practice for further skill development on PHP & MySql

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. 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. 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. 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. 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. 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.

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. 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. 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. 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. 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:

- **Identify different types of guided communication media.**

1. Twisted Pair Cable- Unshielded Twisted Pair (UTP), Shielded Twisted Pair (STP)
2. Co-axial Cable- Thick net and Thin net
3. Fiber Optic Cable- Single mode and Multi mode
4. Constructional features of UTP, STP, Co-axial Cable and Fiber Optic Cable.

- **Identify different types of connectors**

5. Twisted Pair Cable- RJ45 Connectors and their constructional features.
6. Co-axial Cable- BNC Connectors and their constructional features.
7. Fiber Optic Cable- MT-RJ and their constructional features.

- **Identify other Network hardware's**

8. Network Interface Cards/LAN cards/ Network Adaptor.
9. Cable Tester, Crimper and Accessories
10. Modems, Hubs, Repeater, Switch & Router

- **Connect RJ45 Connector with UTP Cable**

11. Make a straight through cable
12. Make a Cross over cable
13. Make a console cable

- **Establish a Peer to Peer/Workgroup LAN**

14. Install Network Interface Card (NIC) into the PC
15. Check the MAC address of the Network Interface Card (NIC)
16. Connect straight cable or cross over cable among PCs, Hub or Switch
17. Configure the TCP/IP in each PC
18. Test the connectivity among PCs using Ping Command.

- **Perform the task to Work with a Peer/Workgroup LAN environment for simple data communication.**

19. Share the folders, Pen drive and Secondary memory.
20. Share a printer, DVD Drive or any other resources.

- **Establish a Client–Server Local Area Network**

21. Install Windows server 2012 into a server PC
22. Configure TCP/IP to server and client PCs
23. Perform the task to configure the Active Directory
24. Perform the task to configure The DNS.
25. Perform the task to configure the DHCP
26. 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

66645	COMPUTER PERIPHERALS	T	P	C
		1	6	3

AIMS

- To be able to interface and maintain Key-board, Mouse, Monitor, Printer etc. along with the computer system.
- To be able to develop the knowledge & skills regarding working construction and interfacing aspects of peripherals.
- To be able to acquire the knowledge and skills on working principle & operation of peripheral devices.

SHORT DESCRIPTION

Peripheral interface and peripherals; Input-Output devices; Display devices; Special I/O devices; disk drives.

DETAIL DESCRIPTION

Theory:

1. Understand the basics of interfacing.

1.1 Define peripheral and interfacing with example.
1.2 State the functions and necessity of interfacing.
1.3 State the Categories of interface.
1.4 Mention the methods of peripheral interfacing.
1.5 State the steps of analog and digital interfacing in a computer system.
1.6 State the elements of interface.
1.7 Describe the function of a general purpose parallel interface with block diagram.

2. Understand the operation of serial interfaces.

2.1 State the necessity of serial interfacing.
2.2 Mention the asynchronous character and synchronous block data format for a serial interface.
2.3 Describe the operation of an USART with block diagram.
2.4 Describe the operation of RS 232.C/v.24 standard serial interface with block diagram.

3 **Understand the operation of keyboard and mouse.**

3.1 Describe the construction and operation of mechanical, membrane, capacitive and Hall effect key switches.
3.2 State the terms: bouncing, de-bouncing, n-key rollover and n-key lockout.
3.3 State the function of Keyboard Encoder.
3.4 Describe the working principle of an optical and wireless mouse.

4 Understand the basic operation of displays and adapters.

4.1 Classify the display devices.
4.2 Describe the working principle of LCD and LED display unit using Block diagram.
4.3 State the meaning of the terms-pixel, scanning, Horizontal and Vertical scanning, interlace and non-interlace scanning.
4.4 Describe the general structure of a modern video display adapter/ graphics adapter.
4.5 Prepare the specification of a LCD and LED monitor.

5 Understand the constructional and operational feature of dot matrix printers.

5.1 Classify printers (dot-matrix, Inkjet, Laser)
5.2 State the feature of a dot-matrix, Inkjet, Laser printer.

5.3 Describe the operation of a dot matrix, Inkjet, Laser printer.

5.4 List the Major parts and components of a dot matrix, Inkjet, Laser printer.

5.5 Prepare the specification of a dot matrix, Inkjet, Laser printer.

6 Understand the characteristics of special type I/O devices.

6.1 List the special types of I/O devices.

6.2 State the characteristics of Joystick, digitizer, Touch Screen, Plotter, Line Printer and light pen.

6.3 Classify and define different type of scanner.

6.4 State the use of Multimedia projector.

6.5 Define OMR, OCR, ICR and MICR.

7 Understand the operation of Hard disk and Optical disk drives.

7.1 List the Types of Hard Disk Drives (EIDE, SATA, SCSI, And SAS External Hard Disk).

7.2 Describe the working principle of a Hard disk drive with block diagram.

7.3 Describe the recording principle and operation of optical (CD, DVD, Blue Ray) disk drive.

7.4 Describe USB flash memory and portable hard disk.

Practical:

1. Identify the external and internal parts and components of a Keyboard and Mouse.
2. Identify the external and internal parts and components of a mouse.
3. Repair and / or replace external and internal parts and components of a scanner.
5. Repair and / or replace the mechanical assembly and the electronic part of a LCD/LED monitor.
6. Install and configure printers.
7. Perform routine maintenance of printers (LASER, DOT and Inkjet).
8. Repair and / or replace the Mechanical Assembly of LASER printer.
9. Repair and /or replace the fixing unit of LASER printer.
10. Repair and /or replace optical/scanning unit of LASER printer.
11. Repair and / or replace power board of printers (LASER, DOT and Inkjet).
12. Repair and /or Replace the formatter System \ Logic Controller Board of printers (LASER, DOT and Inkjet).
13. Repair and /or Replace of Mechanical Assembly of dot matrix printers.
14. Repair and /or Replace of Mechanical Assembly of Inkjet printers.
15. Identify the major parts of a display adapter/ Video graphics adapter.
16. Identify the external and internal parts and components of a plotter.
17. Identify the external and internal parts and component of a Multimedia Projector.
18. Identify the parts and components of a Hard Disk Drive.
19. Identify the parts and components of a DVD drive.
20. Identify the parts and components of a Blue ray drive.

REFERENCE BOOKS

1. Computer Peripherals − Barry Wilkinson and David Horocks.
2. Microprocessors and Interfacing − Douglas V Hall: McGraw Hill
3. Inside the PC by Peter Norton; Tech Media Publication, New Delhi
4. Microprocessors and Interfacing by Uffenbeck.
5. Hardware and Software of Personal Computers by SK Bose; Wiley Eastern Limited, New Delhi.
6. Upgrading and Repairing PCs By Scott Muller

66842 PRINCIPLES OF DIGITAL ELECTRONICS T P C
3 3 4

AIMS

- To develop knowledge & skill on number systems, codes and binary arithmetic operation.
- To provide knowledge & skill on logic gates, logic circuits, Boolean algebra and logic families.
- To assist to acquire the knowledge & skill on combinational logic circuit.

SHORT DESCRIPTION

Basic concept of digital electronics; Number system & codes; 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.

2 Understand the number system and binary arithmetic operation.

2.1 Define decimal, binary, octal and hexadecimal number system
2.2 Describe decimal, binary, octal and hexadecimal number system.
2.3 Convert one number system to another.
2.4 Compute binary arithmetic & . Complement subtraction Technique.
2.5 State the applications of different number system.

3 Understand the arithmetic codes and code conversion.

3.1 Define 8421, Excess–3code, Gray code, BCD code, Hamming code, Unicode, and ASCII code.
3.2 Describe 8421, Excess–3code, Gray code, BCD code, Hamming code, Unicode, and ASCII code.
3.3 Practice the conversion of one code to another.
3.4 Describe the addition and subtraction of 8421, Excess-3 and BCD coded number.
3.5 State parity checked code and Hamming code.
3.6 Describe the error detection and correction with Hamming code. And parity checked code.

4 Understand the concept of Logic gates.

4.1 Define logic gate.
4.2 Classify logic gate.
4.3 Explain logical statement, truth table, Boolean equation and symbol of AND, OR, NOT, NOR, NAND, EX-OR and EX-NOR gates.
4.4 Shoe NAND & NOR gates used as Universal logic gates.
4.5 State the applications of logic gates.

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

5.1 Classify logic families.
5.2 Define SSI, MSI, LST and VLSI.
5.3 Describe Transistor logic families (DTL & TTL).

5.4 Describe MOS logic families (P-MOS, N-MOS & C-MOS)
5.5 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.
5.6 State the characteristics of digital IC's.

6 Understand the concepts of electronic circuit of logic gates.
6.1 Describe the operation of standard TTL NAND gate.
6.2 Describe the operation of CMOS NAND & NOR gates.
6.3 State special logic gates such as buffer, tri-state and expandable gates.
6.4 Mention the basic principle of ORing and ANDing.

7 Understand digital IC's
7.1 Define Digital IC's
7.2 Describe fixed function Integrated circuit IC's such as AND, OR, NAND etc.
7.3 Mention IC package, code numbers, and important specification of TTL/MOS commercial IC gates.
7.4 Mention the applications of different logic IC's.

8 Understand logic simplification & design of digital circuit.
8.1 State the theorems of Boolean algebra.
8.2 State DeMorgan's theorems and its applications.
8.3 Determine the terms-Sum of Product (SOP) form and Product of Sum (POS) form.
8.4 Determine the SOP & POS form from truth table.
8.5 Define Karnaugh Map.
8.6 State the structure of Karnaugh map.
8.7 State the simplification process of Boolean expression from a K-map and design logic circuit (up to 4 variables).

9 Understand various combinational logic circuits.
9.1 Define combinational logic circuit with example.
9.2 Describe the operation of half adder and half Sub tractor.
9.3 Explain the operation of full adder and full Sub tractor.
9.4 Describe the operation of 4 bit parallel adder.
9.5 Explain the operation of 4 bit subtraction circuit.
9.6 Describe the operation of parity generator and detector circuit.
9.7 Describe the operation of 4 bit BCD adder.
9.8 Explain the operation of multipliers & divisors.
9.9 Mention the application of combinational logic circuit.

10 Understand the concepts of encoder, decoder and display devices.
10.1 Describe the operation of encoder and decoder circuit.
10.2 State the principle of operation of LCD, LED, seven-segment and dot matrix display.
10.3 Explain the operation of commonly used 4-bit BCD decoder/driver for seven segment display of common Anode/Cathode type.
10.4 Describe the operation of parity generator & detector circuits

11 Understand the features of multiplexers and demultiplexer.
11.1 Define multiplexers and demultiplexer.
11.2 Describe the operation of 2:1, 4:1 and 8:1 multiplexer with logic diagram.
11.3 Describe the operation of 1:2, 1:4 and 1:8 demultiplexers with logic diagram.

11.4 State the use of multiplexer &demultiplexer.
11.5 Explain the operation of Binary comparator.
11.6 Describe the Pin diagram of commonly used 4-bit comparator ICs.
11.7 Distinguish between Decoder and Demultiplexer.

12 Understand the features of sequential logic circuits.

12.1 Define sequential logic circuit
12.2 State the terms clock, timing diagram & latch of digital system.
12.3 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.
12.4 State the concept of positive & negative edge triggering and level triggering,
12.5 Describe the pin diagram of commonly used flip-flop IC's.

Practical :

1 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 IC to the Breadboard.
1.4 Connect the circuits as per diagram on trainer board.
1.5 Switch on the DC power supply,
1.6 Verify the truth tables.

2 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 IC to the Breadboard.
2.4 Connect the circuits as per diagram on trainer board.
2.5 Switch on the DC power supply,
2.6 Verify the truth tables.

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

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

4 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 IC to the Breadboard.
4.4 Connect the circuits as per diagram on trainer board.
4.5 Switch on the DC power supply,
4.6 Verify the truth tables

5 Verify the functions of half adder & half sub tractor.

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

6 Verify the functions of full adder & full sub tractor.

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

7 Verify the output operation of binary 4 bit parallel adder.

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

8 Show the operation of encoder & decoder.

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

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

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

10 Show the operation of multiplexer & demultiplexer.

10.1 Select appropriate ICs.
10.2 Draw the pin diagram and internal connection.
10.3 Draw appropriate circuits.
10.4 Select required tools, equipments and materials.
10.5 Connect the circuits as per diagram on trainer board.
10.6 Switch on the DC power supply,
10.7 Verify the truth tables.

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

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

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

12.1 Select appropriate ICs.
12.2 Draw the pin diagram and internal connection.
12.3 Draw appropriate circuits.
12.4 Select required tools, equipments and materials.
12.5 Connect the circuits as per diagram on trainer board.
12.6 Switch on the DC power supply,
12.7 Verify the truth tables.

13 Show the operation of Toggle flip-flops.

13.1 Select appropriate ICs.
13.2 Draw the pin diagram and internal connection.
13.3 Draw appropriate circuits.
13.4 Select required tools, equipments and materials.
13.5 Connect the circuits as per diagram on trainer board.
13.6 Switch on the DC power supply,
13.7 Verify the Toggle operation.

14 Verify the operation of Binary comparator.

14.1 Select appropriate ICs.
14.2 Draw the pin diagram and internal connection.
14.3 Draw appropriate circuits.
14.4 Select required tools, equipments and materials.
14.5 Connect the circuits as per diagram on trainer board.
14.6 Switch on the DC power supply.
14.7 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

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

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.

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

3 Basic idea of Banking system and negotiable instrument.

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

Ref. Book:

১.উচ্চ মাধ্যমিক ব্যবসায়নীতি ও প্রয়োগ -মোহাম্মদ খালেকুজ্জামান
২.উচ্চ মাধ্যমিক ব্যাংকিং ও বীমা -প্রফেসর কাজী নুরুল ইসলাম ফারুকী
৩.আধুনিক কারবার পদ্ধতি -লতিফুর রহমান
৪.কারবার যোগাযোগ ও সচিবের কার্যপদ্ধতি -প্রফেসর লতিফুর রহমান
ও
প্রফেসর কাজী নুরুল ইসলাম ফারুকী

৫.ব্যবসায়িক যোগাযোগ এবং অফিসের কর্মপ্রণালী –ড. এম, এ, মান্নান
৬.ব্যবসায় যোগাযোগ – মোহাম্মদ খালেকুজ্জামান ও মোঃ মুশাররফ হোসেন চৌধুরী
৭.Business organization & management- M.C. Shukla
৮. Business organization & management- R.N. Gupta

BANGLADESH TECHNICAL EDUCATION BOARD

Agargaon, Dhaka-1207

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

SYLLABUS (PROBIDHAN-2016)

COMPUTER TECHNOLOGY

TECHNOLOGY CODE: **666**

5th SEMESTER

DIPLOMA IN ENGINEERING

PROBIDHAN-2016

COMPUTER TECHNOLOGY (666)

5th 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	66651	Programming in Java	2	3	3	40	60	25	25	150
2	66652	Surveillance Security System	1	6	3	20	30	50	50	150
3	66653	Sequential Logic System	3	3	4	60	90	25	25	200
4	66654	Web Development Project	0	6	2	-	-	50	50	100
5	66655	PCB Design & Circuit Making	0	6	2	-	-	50	50	100
6	68546	Operating System application	2	3	3	40	60	25	25	150
7	65851	Accounting Theory & Practice	2	3	3	40	60	50	-	150
Total			**10**	**30**	**20**	**200**	**300**	**275**	**225**	**1000**

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

66652 Surveillance Security System T P C
1 6 3

AIMS
After completing this course, participants will be able to:

- Interact with the customer in order to identify and understand their requirements.
- Ensure customer satisfaction
- Install and Repair dysfunctional system.
- Identify dysfunctional components through visual inspection and by use of multi meter
- To understand surveillance system installation requirement in terms of equipment, system, tools, applications appropriate for a particular site
- Install and Configure access control device and software
- Select Suitable cameras & DVR/NVR to provide the better solution to the customers.
- Read and Comprehend signs, labels and warning
- Communicate effectively
- Follow behavior etiquettes while interacting with others
- Establishing good working relationships with colleagues within and outside the department by coordinating Surveillance system Installation Technician

SHORT DESCRIPTION
Basic concepts of Designing the surveillance security System, Aims of a surveillance camera system, System design elements, Conditions for equipment selections, Camera Installation, Functions of video surveillance, Types of Camera, Lens, sensors & their functions, DVR, NVR interface, Principles of remote access, networking Basic.

DETAIL DESCRIPTION
Theory:

1. **Understand the surveillance security System.**
   - 1.1 Understand the surveillance system
   - 1.2 Describe the knowledge of pro's & con's of surveillance
   - 1.3 Explain the facts of video surveillance
   - 1.4 Explain and construct various nodes of CCTV surveillance system
2. **Understand the Functions of video surveillance.**
   - 2.1 Construct a video surveillance system.
   - 2.2 Explain function of blocks and equipment required to implement a video surveillance system.
   - 2.3 Understanding the facts about CCTV and its interfacing devices
3. **Understand the Types of Camera, Lens, sensors & their functions.**
   - 3.1 Understand the various types of camera and their functionality.
   - 3.2 Reassembling the camera & exam the parts of camera to understand their mechanism.
   - 3.3 Selecting suitable camera after understanding
   - 3.4 Describe different types of lens and their utility.
   - 3.5 Differentiate & select the best camera from the same group depending on the image quality being measured by TVL chart.
   - 3.6 Selecting a camera for higher security application.

4. **Understand the DVR, NVR interface.**
   4.1 Define DVR and NVR.
   4.2 Explain the function of various blocks of DVR, NVR.
   4.3 Understand the recording format of a DVR**,** NVR
   4.4 DVR**/**NVR as interface to view and record the image transmitted by a camera.
   4.5 Describe different type of attendance devices and their functionalities.
5. **Understand the Principles of remote access.**
   5.1 Define remote access system
   5.2 Describe importance/need of remote access system
   5.3 Explain the nodes for remote access of a Surveillance system
   5.4 Explain minimum requirement for remote access system
6. **Video Signal and Control Signal Transmission.**
   6.1 Define data transmission media
   6.2 Describe various wired media- Coaxial Cables, Twisted-pair cable transmission and fiber optic cable.
   6.3 Explain Control signal circuits of transmission media.
   6.4 Describe Electrical Power Construction Requirements of video signal
   6.5 Develop a Drawings to Prepare a block diagrams for Video Signal and Control Signal Transmission
   6.6 Describe various types of CCTV drawing Symbols
7. **Understand the networking Basic**
   7.1 Define Computer Network.
   7.2 Define network topology
   7.3 Define network protocol.
   7.4 State the function of TCP/IP protocol.
   7.5 Define Network Addressing
   7.6 Define IP, IPv4 and IPv6.
   7.7 Define Subnet Masks, Gateway address, Virtual ports, Linksys Port Forwarding, D-Link Forwarding.
   7.8 State Dynamic DNS, Creating a DDNS Account

PRACTICAL:

1. **Analyze Client Requirements, prepare system diagram, Quotation and get approval from client.**
   1.1 Contact authorized person & collect requirements
   1.2 Select products against requirements
   1.3 Prepare Budge against requirements
   1.4 Prepare design diagram
   1.5 Prepare a quotation and approve your client

2. **Perform Power and Network Cable Wiring**
   2.1 Follow OSH practices
   2.2 Identify the power source, perform wiring and Install power equipments
   2.3 Collect Network diagram, perform network wiring and Install network equipments

3. **Install and configure the CCTV camera.**
   3.1 Ensure all the tools, equipments, utilities are available in good to enable installing in single visit
   3.2 Follow specification and the procedures for setting up the system
   3.3 Collect power requirement of different CCTV related equipment
   3.4 Use BNC connectors for joining cables and crimp them

3.5 Connect all the cables from multiple cameras to the CCTV system area.
3.6 Ensure that there are no cable joins, sharp bends during cabling.
3.7 Ensure weather proof (UV proof) cable is used in outdoors.

4. **Install and configure IP (and PTZ) camera**
   4.1 Assign IP address for IP Cameras.
   4.2 Follow installation procedures given in the manuals
   4.3 Use power cable of specified thickness to connect CCTV system with power supply
   4.4 Mount the CCTV camera so as to cover maximum area.
   4.5 Set up the type of camera such as pan, tilt, zoom unit as per customer requirement
5. **Install and configure DVR/NVR Machine.**
   5.1 Unpack DVR/NVR as per manufacture instruction
   5.2 Check Physical status, mount DVR with appropriate place
   5.3 Install HDD
   5.4 Ensure that all cameras are connected to the DVR
   5.5 Monitor is connected (TV / PC) with video output of DVR
   5.6 Speaker is connected with audio output of DVR
   5.7 DVR link option to connect with other DVR in the network
   5.8 Connect the DVR to router, if required, to enable remote monitoring
   5.9 Connect the power supply of DVR, monitor, speakers to set up the system
   5.10 Install the appropriate software for IP network or remote monitoring
   5.11 Enter the appropriate IP address to receive the video signals through IP network / internet
   5.12 Connect all equipments and switch on to start the video capture
6. **Setup camera controls**
   6.1 Identify camera specifications such as focus, lens type, zoom
   6.2 Perform Controls of different options in camera such as rotation, speed of movement in pan / tilt camera
   6.3 Use stable mounting structure and ensure that is not disturbed by wind or rain which would affect the video quality
   6.4 Decide on the height of camera installation according to the end purpose (for example: if the visitor entering the premise is to be monitored, camera should not be placed too high and their face would not be captured)
   6.5 Ensure that cameras are protected from light while installing in outdoor.
   6.6 Ensure the intended area is covered during movement in case of tilt or pan type of camera.
   6.7 Reduce repetition of errors
7. **Survey, planning & maintenance**
   7.1 Making a good site survey and identifying the location of the camera to be fixed.
   7.2 Selecting the suitable camera depending on the coverage area required by the customer.
   7.3 Help & co- operate with the team members while taking measurement of the site.
   7.4 Interfacing & connecting the camera and synchronizing it with control room.
   7.5 Understand the recording & retrieving process of previously recorded footage to the controller of the system.
   7.6 Convince the customer about the best available camera for better surveillance.
8. **Install and Configure access control device and software**
   8.1 Follow workplace and lab/shop safety practices.

8.2 Install and configure Attendance device.

8.3 Install Attendance Device Software & Driver.

8.4 Connect device and enroll employee.

8.5 Configure attendance time table for employee.

8.6 Upload employee list in devices from software.

8.7 Generate Report and get output by software.

8.8 Data download & reports from devices.

REFERENCE

1 Digital video surveillance and security - Anthony c. caputo

2 CCTV, Third Edition. - Vlado Damjanovske.

3 CCTV Surveillance - Herman kruegle.

4 Digital CCTV - Emily Harwood

5 Electronic Access Control - Thomas L. Norman

66654	Web Development Project	T	P	C
		0	6	2

OBJECTIVES

At the end of this module, students will be able to -

- Prepare documentation on project works.
- Assess the requirements of a client.
- Design any web-based solution/system.
- Develop web-based practical solutions.
- Test and implement any web-based solution/system.

SHORT DESCRIPTION

Students have to develop (individually) a web-based (Online) solution from the following list (NOT Limited to) –

- Online Library Management System
- Online Student Management System
- Online Ticket Booking System
- Online Hotel Management System
- Online Shop Management System
- Online Inventory Management System
- Online Payroll Management System
- Online Members' Directory
- Online Accounts Management System
- Online Billing System for service providers
- Any other online system that will provide solutions for practical situation.

DETAIL DESCRIPTION

The Project work must demonstrate the following functional issues –

- Use of PHP, HTML, CSS, JavaScript, MySQL, Images/Graphics, Web-template etc.
- Must have a database oriented "Login" module
- At least 3 to 5 standard Forms should be designed and developed to submit data into a relational database
- Area(s) to search data to – edit, update, delete, etc.
- At least 3 Reports should be generated.
- The system (Project) must be hosted in a hosting environment (localhost using Apache) in order to demonstrate all the functional areas.
- Finally all the students must develop and submit a Project Document according to the following guidelines.

Copyright © (statement of own work)
Acknowledgement
Abstract
Table of Contents

Chapter 1: Introduction

1.1 The Project brief / Executive summery

Chapter 2: Initial Study

2.1 Introduction (importance of understanding the system/process)
2.2 Project Background (why this project is to be developed)
2.3 Description of Current System (or the manual operation/process)
2.4 Problems with the Current System (or the manual operation/process)
2.5 Boundary of the Project (functional areas to be covered in this project)
2.6 Aims/outcome of the Project
2.7 Summary

Chapter 3: Feasibility Study

3.1 Introduction (Objectives of project Feasibility)
3.2 Alternate Solution (can be more expensive)
3.3 The Proposed System (in details)
3.4 Feasibility Consideration
    3.4.1 Technical feasibility
    3.4.2 Economical feasibility
    3.4.3 Operational feasibility
3.5 Project Plan (Gantt chart) with project duration
3.6 Summary

Chapter 4: Requirement analysis & specification

4.1 Introduction (Objectives of requirement analysis & specification)
4.2 Interview Record (data collection methods with evidence)
4.3 DFD of existing system/process
4.4 Requirements catalogue/descriptor
4.5 DFD of proposed system (web based)
4.6 Elementary process description
4.7 Entity Relationship Diagram (ERD of the Project)
4.8 Entity description
4.9 Summary

Chapter 5: System Design

5.1 Introduction (importance of system design)
5.2 Logical design & description
    5.2.1 Sitemap
    5.2.2 Layout of the home page (drawing)
    5.2.3 [form 1] (field design)
    5.2.4 [form 2] (field design)
    5.2.5 [form 3] (field design)
5.3 Summary

Chapter 6: Coding

6.1 (Students will develop the entire system and demonstrate, but for the documentation - Only the code of the home page will be in the document)

Chapter 7: Testing

7.1 Introduction (Objectives of testing)
7.2 Unit Test
7.3 Link Test
7.4 Integration test
7.5 Implementation Test
7.6 Usability Test
7.7 Summary

Chapter 8: Implementation

8.1 Introduction (How the project will be implemented)
8.2 Domain (introduction to Apache Server)
8.3 Hosting (local host)
8.4 Maintenance plan
8.5 Summary

Chapter 9: Limitation and Future plan

9.1 Limitations (of the project) or self criticism
9.2 Future plan (further development plans)

Chapter 10: Conclusion

REFERENCES

Appendix 1

Detail of interview (Data collection evidence)

User manual

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

66655 PCB Design & Circuit Making T P C
0 6 2

AIMS

To provide the students with an opportunity to acquire knowledge and skills to

- Operate and practice PCB design software tools
- Perform schematic design including simulation
- Perform PCB layout design including auto routing
- Generate the output of the PCB layout design
- Build the circuit by soldering

SHORT DESCRIPTION

Basic concept of schematic design and PCB layout design; schematic design and PCB layout design; pad shape, pad size, trace width adjustment; auto routing and adding missing trace; generating output of layout; build circuit.

Practical

1. **Install a PCB design software and identify the commonly used features**
   - 1.1. Select a PCB design software, for example, Proteus, PCB Maker, Eagle, Board Maker, Electronic Workbench, Easy PC, KiCAD, Upvarter etc.
   - 1.2. Install the selected PCB design software
   - 1.3. Identify the commonly used actions of the PCB design software tool
2. **Create schematic symbol of an unavailable part**
   - 2.1. Identify an unavailable part
   - 2.2. Design the schematic of that part using the PCB design software
   - 2.3. Include the part in the software library according to the policy of the selected PCB design software tools
3. **Create and add PCB foot print of an unavailable part**
   - 3.1. Identify an unavailable part
   - 3.2. Design the schematic of that part using the PCB design software
   - 3.3. Access the datasheet / data handbook of those parts in order to find the required parameters.
   - 3.4. Measure the component size, pin size and gap between pin using measuring tools like scale, slide calipers etc.
   - 3.5. Design the PCB footprint of that part
   - 3.6. Include the part in the software library according to the policy of the selected PCB design software tools
4. **Draw a schematic of a given circuit design in paper**
   - 4.1. Collect a simple schematic of circuit diagram
   - 4.2. Interpret the schematic
   - 4.3. List the components and all parameters of the components
   - 4.4. Identify all the unavailable parts
   - 4.5. Creates schematic of all unavailable parts and include those in the PCB design software
   - 4.6. Draw the schematic using the selected PCB design software as like as the design given in the paper
   - 4.7. Verify the correctness of the design by checking the design given in the paper
   - 4.8. Add the Circuit serial number and other necessary information to schematic design

5. **Simulate a circuit**
    5.1. Collect a simple schematic of circuit diagram
    5.2. Draw the schematic using the selected PCB design software as like as the design given in the paper
    5.3. Simulate the circuit
6. **Design PCB layout of a given PCB**
    6.1. Collect a single layer PCB (Printed Circuit Board) and the schematic of that PCB
    6.2. Draw the schematic
    6.3. Draw the PCB layout design by using the selected PCB design software as like as the given PCB
    6.4. Make sure that pad shape, pad size, trace width and gaps between traces are like as given PCB
7. **Generate the 3D view of the PCB design**
    7.1. Design PCB layout of a given schematic
    7.2. Generate the 3D view the design
8. **Use auto routing feature to generate PCB layout automatically**
    8.1. Design schematic of a given design
    8.2. Set the trace line/ track width, pad size for auto-routing system
    8.3. Maintain the space gap between trace to trace, pad to pad, trace to pad and border for auto-routing system
    8.4. Use auto routing feature to generate the PCB layout automatically
    8.5. Rearrange component placement if the software can't generate the complete PCB layout
    8.6. Complete missing trace manually if any trace isn't automatically drawn by the software.
    8.7. Use jumper in order to complete the layout design if necessary
    8.8. Adjust the trace width if necessary
9. **Design a PCB layout of a given circuit**
    9.1. Draw the schematic diagram in the PCB design software
    9.2. Determine the PCB size
    9.3. Place the components on the available space/work area
    9.4. Design the PCB layout
    9.5. Add jumper if necessary.
    9.6. Trace line / trace width are set
    9.7. Adjust the pad size if necessary
    9.8. Determine and set the space gap between trace to trace, pad to pad, trace to pad and border.
    9.9. Add the PCB part number and other necessary information to PCB layout
    9.10. Check the PCB design draft for compliance with the design requirement and design rules
10. **Make output of the PCB layout design**
    10.1. Design a PCB layout
    10.2. Generate output in industry standard file format which is accepted by the automatic PCB manufacturing machine, for example, gerber file etc.
    10.3. Generate PDF or any other industry standard file format in order to make film output of the PCB layout design
11. **Make the PCB from a PCB manufacturer**
    11.1. Print out the PCB layout design in tracing paper or film output
    11.2. Provide the film of tracing paper to PCB manufacturer
    11.3. Or, give the industry accepted file that can be input to automatic PCB manufacturing machine if available
    11.4. Receive the printed circuit board

12. Design PCB layout and make of power supply

12.1. Collect a circuit design of a +5v regulated power supply
12.2. Draw the schematic design
12.3. Design the PCB design
12.4. Collect the necessary parts
12.5. Solder the parts and build the +5v regulated power supply
12.6. Operate and check the power supply

13. Design PCB layout and make a microcontroller based circuit

13.1. Collect a circuit design of a microcontroller based circuit
13.2. Draw the schematic design
13.3. Design the PCB design
13.4. Collect the necessary parts
13.5. Solder the parts and build the system
13.6. Operate and check operation

14. Design PCB layout and make a microprocessor based circuit

14.1. Collect a circuit design of a microprocessor based circuit
14.2. Draw the schematic design
14.3. Design the PCB design
14.4. Collect the necessary parts
14.5. Solder the parts and build the system
14.6. Operate and check operation

REFERENCES

1. Explore the user manual of the selected PCB layout design software

68546 **Operating System application** **T P C**

2 3 3

AIMS

- To be able to understand Computer System Structure and able to develop the skill and attitude to direct, control and manage of computer using operating system.
- To be able to understand process management in operating systems, including such topics as process definition, threads, scheduling, synchronization and deadlocks.
- To be able to understand memory management in operating systems, including such topics as main and virtual memories, memory allocation and paging and segmentation.
- To be able to understand storage management in operating systems, including such topics as file-system interface, mass storage structure and I/O systems.
- To be able to install the Windows and Linux based Operating system and develop skills to configure and customize both Windows and LINUX Operating System.
- To be able to understand distributed systems, including such topics as network-based operating systems, distributed file systems and distributed coordination.

SHORT DESCRIPTION

Basic concepts of operating system, Computer systems structure, Process Management (threads/ scheduling / synchronization / deadlocks), Memory management, Storage management (file system interface, I/O systems), Distributed Systems, File system and Linux fundamentals; windows and Linux commands and utilities

Theory

1. **Understand the general features of operating system.**
   - 1.1 Define Operating System.
   - 1.2 Describe the functions of operating system.
   - 1.3 Define Kernel and Kernel Data Structure.(Lists, Stacks, Queues, Trees, Hash and Maps)
   - 1.4 Define Computing Environments.(Traditional Computing, Mobile Computing , Distributed Systems, Client-Server Computing, Peer to Peer Computing, Virtualization, Cloud Computing, Real Time Embedded System)
   - 1.5 Describe the evolution (history) of operating system.
   - 1.6 Explain the role of operating system as an extended machine and as a resource manager.
   - 1.7 Define Open Source Operating System, Multiuser, Multitasking and GUI.
2. **Understand Operating System Structure.**
   - 2.1 Define Operating System Services.
   - 2.2 Describe User and Operating System Interface.
   - 2.3 Define System Calls and System Programs.
   - 2.4 Describe Types of System Calls.
   - 2.5 Describe Operating System Design and Implementation.
   - 2.6 Basic Concept of Operating System Structures. (Simple Structure, Layered Approach, Microkernels, Modules, Hybrid Systems, Mac OS X, iOS, Android)

3. **Understand the terms related to operating system.**
   - 3.1 Define batch processing system
   - 3.2 Describe the method of batch processing system.
   - 3.3 State the disadvantages of batch processing.
   - 3.4 Describe the uses of job control language for operating system.
   - 3.5 Describe the process of spooling.
4. **Understand the basics of process management and Threads.**
   - 4.1 Define Process, Threads and Process Scheduling.
   - 4.2 Describe the process state with diagram.
   - 4.3 Mention the difference between process and program.
   - 4.4 Describe the importance of process control.
   - 4.5 Explain the process Scheduling and scheduling queues.
   - 4.6 Describe Communication in Client Server Systems.
   - 4.7 Describe Process Synchronization (Re-condition, Reader-Writer problem, dining philosopher, Peterson solution, Semaphores)
   - 4.8 Describe Multicore Programming and Multithreading Models.
5. **Understand the concept of CPU Scheduling.**
   - 5.1 Define CPU Scheduling.
   - 5.2 Describe the Scheduling criteria.
   - 5.3 Describe Scheduling Algorithm. (FCFS – First come first serve, SJF – Shortest job first, RR- Round Robin, Priority)
   - 5.4 Define Multiple-Processor Scheduling.
   - 5.5 State the terms CPU and I/O burst cycle, CPU Scheduler, Dispatcher.
6. **Understand the concepts of deadlock.**
   - 6.1 Define Deadlock, Preempt able and Non-Preempt table resources.
   - 6.2 Mention the Necessary conditions of Deadlocks.
   - 6.3 Define Methods for Handling Deadlocks.
   - 6.4 Describe the Deadlock Prevention.
   - 6.5 Explain the Deadlock avoidance and their algorithm.
   - 6.6 Describe the Deadlock detection algorithm
   - 6.7 Explain the way of recovery from Deadlock.
7. **Understand the technique of memory management.**
   - 7.1 Mention the function of memory management.
   - 7.2 Describe the Single / Multiple partition scheme.
   - 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 Storage System (I/O Systems).**
   - 8.1 Overview of Mass Storage System.
   - 8.2 Describe Disk Structure, Attachment, Scheduling.
   - 8.3 Define RAID Structure.
   - 8.4 State the Characteristics and principle of I/O hardware.
   - 8.5 Describe the role of Operating system in I/O operation.

8.6 Describe the I/O aspects of Operating System.

8.7 Describe the goals of I/O software.

8.8 Describe the function of each layer of I/O system.

9. Understand the concept of file system.

9.1 Mention the concept and attributes of file.

9.2 Describe the basic file operation.

9.3 State the terms: the file pointer, file open count, disk location of file.

9.4 Mention the file types with common features.

9.5 Define file system.

9.6 Describe the organization of file system.

9.7 Describe the features of general file system.

9.8 Describe the free space management of disk space.

9.9 Describe the allocation methods of disk space.

10. Understand the features of DOS, Windows, Unix and Linux Operating system

10.1 Describe the features of DOS, Windows, UNIX and Linux.

10.2 State the advantages and disadvantages of Windows and Linux Operating System.

10.3 State disadvantages of Windows and Linux Operating System.

10.4 Comparison between Windows and Linux Operating System.

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.**
   4.1 Use fdisk command to list all partition, to see each partition is being used and to change the partition.
   4.2 Delete the partition.
   4.3 Create partitions.
   4.4 Change the partition type.
   4.5 Display the partition table and exit.
   4.6 Write a reports.
5. **Perform the task to Use GRUB boot loader.**
   5.1 Boot the computer with GRUB.
   5.2 Change or Add boot options (Temporarily or permanently).
   5.3 Add a new GRUD boot image.
   5.4 Write a report
6. **Perform the task to work with Linux Desktop.**
   6.1 Log on into the Linux.
   6.2 Familiar with the Desktop.
   6.3 Check the home folder.
   6.4 Change the preferences.
   6.5 Configure the panel/desktop.
   6.6 Use the GNOME desktop.
   6.7 Use the Metacity window manager
   6.8 Use the GNOME Panel
   6.9 Use menu
   6.10 Add apllet, application launcher and drawer.
   6.11 Change panel properties.
   6.12 Choose and use KDE desktop.
   6.13 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

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 demnishing 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 TECHNOLOGY

TECHNOLOGY CODE: **666**

6th SEMESTER

DIPLOMA IN ENGINEERING

PROBIDHAN-2016

COMPUTER TECHNOLOGY

6th 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	66661	Principals of Software Engineering	2	6	4	40	60	50	50	200
2	66662	Microprocessor & Interfacing	2	3	3	40	60	25	25	150
3	66663	Microcontroller Application	0	6	2	-	-	50	50	100
4	66664	Database Management System	2	3	3	40	60	25	25	150
*5	6666X	Optional Subject -1	2	3	3	40	60	25	25	150
6	69054	Environmental Studies	2	0	2	40	60	-	-	100
7	65852	Industrial Management	2	0	2	40	60	-	-	100
Total			**12**	**21**	**19**	**240**	**360**	**175**	**175**	**950**

***** 6666X **Optional Subjects-**I

Group	Subject code	Subject Name
Network Maintenance Group	66665	Network & Data Center Operation
Automation System Group	66666	PLC Automation System
Software Developer Group	66667	Web Mastering
Multimedia Developer Group	66668	Multimedia & Animation

66661 Principles of Software Engineering T P C
2 6 4

OBJECTIVES

• To study the approaches of application of engineering to software.
• To develop knowledge and skill to apply systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software.

SHORT DESCRIPTION

Concept of software engineering, Basics of Software development life cycle (SDLC), Project management, Requirements analysis, Design basics, Analysis & Design tools, Design strategies, User Interface design, understanding of Design complexity, Software implementation, Testing and quality assurance, Maintenance, CASE tools overview;

DETAIL DESCRIPTION

Theory:

1. Understand the concept of software engineering

1.1 Define software engineering.
1.2 Describe the evolution of software engineering.
1.3 List software evolution laws.
1.4 Describe E-Type software evolution laws.
1.5 Describe software paradigms.
1.6 Necessity of software engineering.
1.7 List the characteristics of good software.

2. Understand the basics of software development life cycle (SDLC)

2.1 Describe the software development life cycle activities.
2.2 Describe software development paradigm (Waterfall model, Iterative model, spiral model, agile development)
2.3 Describe agile development.
2.4 State the agile manifesto.
2.5 List agile manifesto items.
2.6 List key principles of agile.
2.7 Describe agile methodologies

3. Understand the software project management

3.1 State the need of software project management.
3.2 Describe role of software project manager.
3.3 List software management activities.
3.4 Describe configuration management.
3.5 Describe project management tools.

4. Understand software requirement engineering

4.1 Describe software requirement engineering process.
4.2 List requirement elicitation process.
4.3 Describe requirement elicitation techniques.
4.4 List software requirements characteristics.
4.5 Describe types of software requirements.
4.6 Describe the role of software system analyst.
4.7 List software metrics and measures.

5. Understand the software design basics, analysis and design tools

5.1 Describe software design levels.
5.2 State modularization and concurrency.
5.3 State coupling and cohesion
5.4 Describe design verification.
5.5 State data flow diagram, structure charts.
5.6 Describe Hierarchical Input Process Output (HIPO) diagram.
5.7 State pseudo code.
5.8 Describe decision table.
5.9 Describe entity relationship model.
5.10 State data dictionary.

6. Understand software design strategies

6.1 Define structured design.
6.2 Describe function-oriented design.
6.3 Describe object oriented design.
6.4 Describe software design patterns.
6.5 Describe software design approaches.

7. Understand user interface design

7.1 Describe command line interface (CLI).
7.2 Describe graphical user interface (GUI).
7.3 State user interface design activities.
7.4 List GUI implementation tools.
7.5 State user interface golden rules.

8. Understand software design complexity

8.1 Describe Halstead's complexity measures.
8.2 Describe Cyclomatic complexity measures.
8.3 State function point

9. Understand software implementation

9.1 Describe structured programming.
9.2 State functional programming.
9.3 State programming style and coding guideline.
9.4 Describe software documentation
9.5 State software implementation challenges.

10. Understand software testing process

10.1 Describe software validation and verification
10.2 State manual vs automated testing
10.3 Describe testing approaches
10.4 State testing levels
10.5 Describe testing documentation
10.6 State testing vs quality control & assurance and audit

11. Understand software maintenance overview

11.1 Describe types of maintenance
11.2 List cost of maintenance
11.3 State maintenance activities
11.4 State software re-engineering
11.5 Describe component reusability

12. Understand Scrum agile method

12.1 Describe scrum framework and sprints
12.2 Sate scrum roles
12.3 State scrum master roles
12.4 Describe scrum events (sprint, planning, daily scrum meeting, sprint review, retrospective)
12.5 State artifacts
12.6 State user stories
12.7 Describe burn down charts
12.8 State estimation process
12.9 State scrum tools and benefits

Practical:

1 Measure the complexity of a given source code based on
    a. Halstead's Complexity Measures
    b. Measure cyclomatic complexity of a give code or software.
    c. Identify code blocks
    d. Draw Flow chart
    e. Draw flow graph
2 Measure function point of a given software.
3 Draw a data flow diagram from a given case study.
4 Draw structure chart form a given case study
5 Draw a HIPO diagram for a software requirement.
6 Do requirement analysis for a given case study and prepare requirement document
    a. Gather user requirement
    b. Write sample SRS
    c. Apply Requirement Elicitation Techniques to validate requirements
7 Identify Modules from a case study
    a. Identify Modules
    b. Identify sequential and concurrent units
8 Identify coupling and cohesion From a object oriented design
9 Write a function requirement on structured English model
10 Write pseudo – code of a given problem
11 Prepare a decision table from a given problem
12 Draw entity relationship model from a given case study.
13 Write a object oriented design from a given case study
    a. Write the objects, class
    b. Write Modules
    c. Draw object relationship diagram
14 Design a prototype implementation of a software using GUI
    a. Identify the GUI requirements
    b. List down application specific GUI requirements
    c. Draw a prototype implementation
    d. Draw a prototype design using GUI tools
15 Write a functional code for a given problem
    a. Functional programming approach
    b. Object oriented approach
16 Write a sample software following provided coding guideline
17 Write sample software documentation
    a. Requirement documentation
    b. Design documentation
    c. Technical documentation (code commenting and explanation)
    d. User documentation user guide

18 Write re-usable code or module
    a. Write sample library module
    b. Version control using tools (git, svn)
    c. Write machine independent code
19 Write Test documentation
    a. Write test case for a given problem
    b. Write Unit test cases
    c. Write Functional test cases
    d. Write user interface test cases
    e. Write a automated test program
20 Practice sample scrum using any open source tools
    a. Practice scrum events
    b. Prepare sample artifacts for a project
    c. Write user stories
    d. Prepare burn down chart
    e. Practice estimation planning poker

REFERENCE BOOKS AND URL.

1. Software engineering – A practitioner's approach - Mc GRAW – HILL by Roger S. Pressman
2. Introduction to system analysis and design – Prentice Hall by IgroHawryszkiewycz

Related URL links:

3. http://www.vumultan.com/Books/CS605-Software%20Engineering%20Practitioner%E2%80%99s%20Approach%20%20by%20Roger%20S.%20Pressman%20.pdf
4. https://www.tutorialspoint.com/software_engineering/index.htm
5. https://www.tutorialspoint.com/scrum/index.htm

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

66663 Microcontroller Application T P C
0 6 2

AIMS

To develop knowledge and skill on programming and interfacing to embedded systems using Microcontroller.

SHORT DESCRIPTION

The microcontroller features, architecture, programming and the real world interfacing.

DETAIL DESCRIPTION

PRACTICAL:

1. Interpret the basics of microcontroller

1.1. Express embedded system and microcontroller
1.2. Observe the difference between microcontroller and microprocessor
1.3. Find the application fields of microcontroller
1.4. Find the different manufacturer of microcontroller
1.5. Find the different features of microcontroller

2. Identify the requirement of microcontroller application

2.1. Find the main features of PIC microcontroller
2.2. Demonstrate the architecture of mid-range MCU (microcontroller)
2.3. Find different types of software development tools
2.4. Find different types of hardware development tools
2.5. Find some mid-range PIC MCU that are suitable for easy-to-start like PIC 16F84A, PIC16F628A, PIC16F676, PIC 16F72 etc.

3. Design schematic diagram for making LED flashing system

3.1. Select a simple PIC series mid-range MCU for LED flashing project, for example, PIC 16F84A, PIC16F628A, PIC16F676, PIC 16F72 or any other suitable PIC MCU.
3.2. Identify required input-output devices for building LED flashing system
3.3. Interpret operation procedure of selected I/O devices
3.4. Interpret the interface system of selected I/O devices with selected MCU
3.5. Interpret the interface of different signals and pin of the selected MCU
3.6. Sketch the connection diagram of the power pins of MCU with power supply in schematic design
3.7. Sketch the connection diagram of the crystal with clock signal related pin in schematic design. Internal clock source can be used as well.
3.8. Sketch the connection diagram of other system pin of MCU, for example, like reset etc. with necessary components or power supply if necessary.
3.9. Sketch the connection diagram of the I/O device and other parts if necessary with MCU to complete the schematic design.

4. Develop program for MCU based LED flashing system using C

4.1. Interpret the internal architecture
4.2. Interpret the structure of internal registers for special function of the PIC series mid-range MCU
4.3. Interpret the use of configuration work of PIC MCU

4.4. Interpret the program structure of C Language
4.5. Interpret the use the library function in the program
4.6. Use the C language to develop program for LED flashing system

5. Build and simulate the LED flashing program

5.1. Interpret the use of MPLAB/MPLAB X/MPLAB xpress
5.2. Build the hex file using IDE for PIC MCU for LED flashing system
5.3. Interpret the simulation process in MPLAB/MPLAB X
5.4. Perform the simulate on the developed program for LED flashing system

6. Flash/burn the MCU and construct the circuit of LED flashing system

6.1. Interpret the use MCU flashing/programming tool, for example, PIC Kit 2/3/4, MPLAB ICD 3 etc.
6.2. Flash/program the produced hex file into MCU
6.3. Construct the circuit according to the schematic design using project board and required parts or training kit etc.
6.4. Apply the power and observe the operation

7. Debug the circuit using debugger hardware

7.1. Interpret the operation of debugger
7.2. Install the debugger software
7.3. Connect the debugger hardware with the computer and the MCU
7.4. Start the debugging operation and perform step by step instruction/statement execution

8. Make a project of a MCU based LED running system

8.1. Design the schematic diagram for MCU based LED running system
8.2. Develop the program in C language or PIC Assembly language for LED running system
8.3. Build the hex file of the program
8.4. Simulate the program
8.5. Flash the hex file into MCU
8.6. Construct the circuit and observe the operation
8.7. Debug the program
8.8. Collect the case/box for packing the project
8.9. Packaging the circuit in the case/box
8.10. Make report on the project and perform the presentation of the project output

9. Perform the construction of a MCU based timing pulse generation system

9.1. Design the schematic diagram for MCU based timing pulse generation system
9.2. Develop the program in PIC Assembly language
9.3. Build the hex file of the program
9.4. Simulate the program
9.5. Flash the hex file into MCU
9.6. Construct the circuit and observe the operation
9.7. Debug the program

10. Perform the construction of a MCU based system to display hexadecimal digit using LED 7-segment display unit

10.1. Design the schematic diagram
10.2. Develop the program
10.3. Build the hex file

10.4. Simulate the program
10.5. Flash the hex file into MCU
10.6. Construct the circuit and observe the operation

11. Perform the construction of a MCU based system to display character using LED dot matrix display unit

11.1. Design the schematic diagram
11.2. Develop the program
11.3. Build the hex file
11.4. Simulate the program
11.5. Flash the hex file into MCU
11.6. Construct the circuit and observe the operation

12. Perform the construction of a MCU based system to control the direction and steps of a stepper motor

12.1. Design the schematic diagram
12.2. Develop the program
12.3. Build the hex file
12.4. Simulate the program
12.5. Flash the hex file into MCU
12.6. Construct the circuit and observe the operation

13. Perform the construction of a MCU based system to control the speed of a DC motor

13.1. Design the schematic diagram
13.2. Develop the program
13.3. Build the hex file
13.4. Simulate the program
13.5. Flash the hex file into MCU
13.6. Construct the circuit and observe the operation

14. Perform the construction of a MCU based ADC (Analog to digital converter) interface system

14.1. Design the schematic diagram
14.2. Develop the program
14.3. Build the hex file
14.4. Simulate the program
14.5. Flash the hex file into MCU
14.6. Construct the circuit and observe the operation

15. Perform the construction of a MCU based DAC (Digital to analog converter) interface system

15.1. Design the schematic diagram
15.2. Develop the program
15.3. Build the hex file
15.4. Simulate the program
15.5. Flash the hex file into MCU
15.6. Construct the circuit and observe the operation

16. Make a project of a MCU based traffic light interface system for controlling the direction and movement of vehicles at a junction of 4 roads

16.1. Design the schematic diagram
16.2. Develop the program
16.3. Build the hex file
16.4. Simulate the program
16.5. Flash the hex file into MCU
16.6. Construct the circuit and observe the operation
16.7. Collect the case/box for packing the project
16.8. Packaging the circuit in the case/box
16.9. Make report on the project and perform the presentation of the project output

17. Perform the construction of a MCU based LCD (Liquid Crystal Display) interface system to display information

17.1. Design the schematic diagram
17.2. Develop the program
17.3. Build the hex file
17.4. Simulate the program
17.5. Flash the hex file into MCU
17.6. Construct the circuit and observe the operation

18. Perform the construction of a MCU based system to count pulses

18.1. Design the schematic diagram
18.2. Develop the program
18.3. Build the hex file
18.4. Simulate the program
18.5. Flash the hex file into MCU
18.6. Construct the circuit and observe the operation

19. Perform the construction of a MCU based active low push switch interface system

19.1. Design the schematic diagram
19.2. Develop the program
19.3. Build the hex file
19.4. Simulate the program
19.5. Flash the hex file into MCU
19.6. Construct the circuit and observe the operation

20. Perform the construction of a MCU based 2-state switch interface system

20.1. Design the schematic diagram
20.2. Develop the program
20.3. Build the hex file
20.4. Simulate the program
20.5. Flash the hex file into MCU
20.6. Construct the circuit and observe the operation

21. Perform the construction of a MCU based LDR (Light dependent resistor) interface system

21.1. Design the schematic diagram
21.2. Develop the program
21.3. Build the hex file

21.4. Simulate the program
21.5. Flash the hex file into MCU
21.6. Construct the circuit and observe the operation

22. Make a project of a MCU based temperature sensor interface system

22.1. Design the schematic diagram
22.2. Develop the program
22.3. Build the hex file
22.4. Simulate the program
22.5. Flash the hex file into MCU
22.6. Construct the circuit and observe the operation
22.7. Collect the case/box for packing the project
22.8. Packaging the circuit in the case/box
22.9. Make report on the project and perform the presentation of the project output

REFERENCE WEB ADDRESS AND BOOKS

1. PIC16F84A Data sheet, IDE manual, PIC series MCU datasheet - http://www.microchip.com
2. User Manual for PIC Training Kit - http://www.microprocessorinstitute.org

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 databases2
- 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, Data Type, 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

Optional Subjects-I

(Network Maintenance Group)

66665	Network & Data Center Operation	T	P	C
		2	3	3

AIMS

- To be able to develop knowledge, skill and attitude in Client-Server Environment, Network protocol and security, user privilege.
- To be able to acquire knowledge, skill and attitude of network architectures, protocols, standards, connectivity, services, security and management.
- To be able to acquire knowledge skill of Data Center Policies & Procedures, Floor Inventory & Management, Commissioning & Decommissioning of Data Center.
- To be able to acquire knowledge skill of Data Center Micro Cleaning, Pest Control, Cooling System, Maintenance Regime, Fire Protection Systems Management.
- To be able to learn knowledge and skill of Raised floor & suspended ceiling, Power Infrastructure, Cooling Infrastructure, Fire Protection, Physical Security and Safety.
- To be able to Design Data Center, Understanding tier, sizing and defining layout, associated costs,

SHORT DESCRIPTION

Computer Network, Media Access Techniques, CSMA/CA, CSMA/CD, Client-Server Network, Server-Domain, Protocol and OSI Reference Model, TCP/IP Protocol Suite. Network Architectures and Standards, IPv4 & IPv6, Network & Base Address, IP Address & MAC Address, Subnet & Subnet-Mask, Network connectivity and services, Network security and management. Cloud Network, Cloud Computing, Big Data, Data Center, Data Center Servers, Design of Data Center, Data Center Safety, Security & Management. Data Center Maintenance & Repair.

DETAIL DESCRIPTION

Theory:

1. Understand the Server based and peer computer networks.

1.1 Define client, Server and peer computer in a network.
1.2 Describe the Server-based Network and Domains.
1.3 Describe the roles of common types of servers.
1.4 Mention the deference between DNS and DHCP Server
1.5 State the function of Forward and reverse lookup zones.
1.6 Describe basic features of LAN, VLAN and Inter-VLAN routing.

2. Understand the Media access control design issues for LAN System.

2.1 Mention different techniques of media access control.
2.2 Describe the round robin/ polling, reservation and contention based access control techniques.
2.3 Define collision on a contention based network.
2.4 Describe the operation of CSMA/CD access control.
2.5 State the operation of token ring and token bus access control.
2.6 Describe the comparison of media access control techniques (i, e, CSMA/CA Vs CSMA/CD, CSMA/CD Vs Token passing, CSMA/CD Vs Demand priority access control).

3. Understand the OSI model and TCP/IP protocol architecture.

3.1 List the name of standard organizations responsible for network standards.
3.2 Draw the layers of the OSI reference model.
3.3 Describe the protocols and functions of each layers of OSI model.
3.4 Define Routing Protocol- RIPv2, OSPF, IGRP, EIGRP, EGP and BGP.
3.5 Describe the term Routed Protocol- IP and IPX.
3.6 Mention the layers of TCP/IP protocol architecture.
3.7 Explain the functions of each layer of TCP/IP protocol architecture.
3.8 Explain the role of TCP/IP protocol interface.
3.9 Describe Network Address Translation (NAT) and Port Address Translation (PAT).
3.10 Compare the layering structure of TCP/IP suite and OSI model.

4. Understand the IEEE 802.x standards, Ethernet and FDDI.

4.1 State the objective of the 802 project model.
4.2 Describe the important features of the IEEE 802 categories.
4.3 State the relation between standard IEEE 802 and OSI model.
4.4 Mention Ethernet Specification of 100 base 2 and 100 base 5 cabling system.
4.5 Describe the features of demand priority access LAN/100 base VG Any LAN.
4.6 Describe the working procedure of FDDI.
4.7 Describe Optical Devices- Isolator, Circulator, Splitters, Couplers, Filters and Concentrators.
4.8 Describe the role of dual counter rotating ring in the event of device or cable failure in FDDI.
4.9 Describe the operation of Optical Transport Networking (OTN).
4.10 Describe the functions of Network devices- Router, Layer 2 Switch, Layer 3 Switch, Wireless Router, and Wireless Access Point (WAP).

5. Understand the concept of cloud networking

5.1 Define cloud computing and storage.
5.2 State the concept of big data.
5.3 Define Virtual Private Server and storage management.
5.4 State different types of storage topology (single hop, multihop, Dynamic)
5.5 State the concept of NoSQL Database for cloud system.
5.6 Define Apps and social media data mining.

6. Understand the Concept of Data Center

6.1 Define Data Center and various types of servers.
6.2 Describe Data Center Certification and types of Data Center.
6.3 State the Organizational Structure of Data Center
6.4 Describe the Operations Management of Data Center- Business, Topology, SFI, ITI, and Floor & Site.
6.5 Describe responsibility of Data Center NOC Manager and Data Center S&S Manager.

7. Understand the Data Center Management

7.1 Define Cost & Asset Management of Data Center
7.2 Describe the Equipment Lifecycle Management of Cost & Asset.
7.3 State the Techniques of Asset Management - Buy or Lease Evaluations.
7.4 Define Vendor Management and Crises Management
7.5 State the term RAS, RFP, RFI, RFT, RFQ, IFB

8. Understand Data Center Day-to-Day Operation, Safety, Security Management

8.1 Define Data Center Policies & Procedures

8.2 Describe Data Center Floor Management, Inventory and Documentation Management
8.3 Describe the procedure of Data C enter Commissioning & Decommissioning
8.4 State the techniques of Data Center Micro Cleaning and Pest Control
8.5 Describe the Cooling System Maintenance Regime and Fire Protection Systems Management

9. Understand Data Center Monitoring & Management

9.1 Define M&M Goals.
9.2 Describe the types of Monitoring & Management Systems.
9.3 Describe the Environment Monitoring System (EMS).
9.4 Describe the Electrical Power Management System (EPMS).
9.5 State the techniques of Building Management System (BMS).
9.6 Describe the Network Management System (NMS) and Data Center Infrastructure Management (DCIM).
9.7 Describe the Business Service Management (BSM) and Support & Help Desk Management.
9.8 Describe the technique to make M&M Reporting & Analytics

10. Understand Data Center Safety, Security Management and Maintenance & Repair

10.1 Define Safety Priorities & Plans of Data Center.
10.2 Describe the Emergency Types & Plans of data Center
10.3 Describe Security Controls & Management, Visitor Types and Access.
10.4 State the Data Center Maintenance Regimes.
10.5 Describe Data Center Maintenance Grades, Maintenance Scope, Budget, skillsets.
10.6 Describe Maintenance Contracts MTBF and TTR

PRACTICAL:

1. **Review to Identify the Network Devices & Accessories.**

1.1 Twisted Pair Cable, Co-axial cable and Fiber Optic Cable.
1.2 RJ-45, BNC Connectors, MT-RJ, LC, MTP/MPO, MU, SFF, SC and their constructional features.
1.3 Network Interface Cards, Cable Tester and Crimper, Modems, Hubs, Repeater, Switch & Router
1.4 Make a straight through cable, Cross over cable.
1.5 Make a Console cable and Patch cable.
1.6 Install Network Interface Card (NIC) into the PC and Laptops
1.7 Connect straight or cross cable among PCs or Switch and Test the connectivity among PCs using Ping Command.
1.8 Configure the TCP/IP in each PC, Laptops and Routers.

2. **Establish a Client–Server Local Area Network using** Linux Red Hat Server
3. Install Windows server (2012/2016) into a PC.
4. Configure TCP/IP to server and client PCs.
5. Perform the task to configure the Active Directory
6. Perform the task to configure the DNS, DHCP in Windows & Linux Server
7. Perform the task to configure File Server, Mail Server, Web Server and Proxy Server
8. Perform installation of Apps for Cloud Computing in PC's and Laptops.
9. Observe and fixed Raised Floor/Suspended Ceiling for Data Center.
   9.1. Uniform, concentrated and rolling load definitions
   9.2. Applicable standards
   9.3. Raised floor guidelines
   9.4. Signal Reference Grid, grounding of racks
   9.5. Disability act and regulations
   9.6. Suspended ceiling usage and requirement

10. Install and Check Power Infrastructure for Data Center

10.1. Power infrastructure layout from generation to rack level
10.2. ATS and STS systems
10.3. Redundancy levels and techniques
10.4. Three-phase and single-phase usage
10.5. Power distribution options within the computer room
10.6. Power cabling versus bus bar trunking
10.7. Bonding versus grounding
10.8. Common Mode Noise and isolation transformers
10.9. Distribution boards, form factors and IP-protection grades
10.10. Power quality guidelines
10.11. Real power versus apparent power, Generators
10.12. How to size and calculate load in the data center
10.13. Static and dynamic UPS systems, how they operate and energy efficiency option

11. Install and Setup Equipment Racks for Data Center

11.1 Rack standards, properties and selection criteria
11.2 Security considerations
11.3 Power rail/strip options

12. Setup Cooling Infrastructure for Data Center

12.1 Temperature and humidity recommendations
12.2 Cooling measurement units and conversion rates
12.3 Sensible and latent heat definitions
12.4 Differences between comfort and precision cooling
12.5 Overview of different air conditioner technologies
12.6 Raised floor versus non-raised floor cooling
12.7 Placement of air conditioner units and limitations to be observed
12.8 Supplemental cooling options

REFERENCE BOOKS

1. Data & Computer Communications, –by Willian Stallings
2. Computer Networks, - by Andrew S. Tanenbaum.
3. Data Center Essentials, - Certified Data Center Professional.
4. Learning Red hat Linux-By Bill Mc Carty.
5. Linux- By Kamaran Hossain
6. YouTube Link- https://www.youtube.com/watch?v=XZmGGAbHqa0
https://www.youtube.com/watch?v=0uRR72b_qvc
https://www.youtube.com/watch?v=q2pG0B9e4QA

Optional Subjects-I

(Automation System Group)

Optional Subjects-I
(Software Developer Group)

66667 **Web Mastering** ***T P C***
2 3 3

AIMS

- To be able to acquire the knowledge and skills on domain & domain registration.
- To be able to acquire the knowledge and skills on web hosting.
- To be able to published web site.
- To be able to admin Cpanel & dashboard.
- To be able to upload web contents.
- To be able to acquire the knowledge and skills on the integrity & security of a website.
- To be able to acquire the knowledge on cloud hosting & SEO.

SHORT DESCRIPTION

Web mastering, domain & domain registration, web hosting, feature ofhosting server, web publishing, administration cPanel, dashboard, cloud hosting, web maintenance & backup, SEO.

DETAIL DESCRIPTION

Theory:

1. **Understand the basic concept of web mastering.**
   - 1.1 Define web mastering.
   - 1.2 State the web mastering functions.
   - 1.3 State the job responsibilities of web master.
   - **1.4 State the skills become a good webmaster.**
   - 1.5 Monitor the webmaster tools.
2. **Understand the concepts of domain & domain registration.**
   - 2.1 Define domain & sub-domains.
   - 2.2 Describe domain registration process.
   - 2.3 State the functions of domain registration authority.
   - 2.4 Describe the functions of BTCL & BTRC.
3. **Know the web hosting & hosting server.**
   - 3.1 Define web hosting.
   - 3.2 Describe the web hosting process.
   - 3.3 State the hosting server.
   - 3.4 State the web hosting company's activities.
   - 3.5 List the Bangladeshi web hosting company.
4. **Understand web publishing.**
   - 4.1 Define the Web publishing.
   - 4.2 State the functions of web publishing media.
   - 4.3 State web publisher's activities.
   - 4.4 Describe the different way of web publishing.
   - 4.5 Describe the functions of FTP server.

5. Understand the concept of Cpanel.

5.1 Define the Cpanel.

5.2 Describe Cpanel activities.

5.3 State the Cpanel components.

5.4 Explain the functions of Cpanel components.

6. Know the dashboard.

6.1 Define Dashboard.

6.2 Describe Dashboard functions.

6.3 State the Dashboard components.

6.4 Describe the functions of each dashboard components.

7. Understand the web content uploading & updating.

7.1 Classify web content.

7.2 Describe the different types of web contents.

7.3 Describe contentens uploading steps.

8. Understand the user management.

8.1 Define web user.

8.2 State different type of web user.

8.3 Describe the different user rights.

9. Understand the cloud hosting.

9.1 Define cloud hosting.

9.2 Describe the benefits of cloud hosting.

9.3 Monitor popular cloud hosting platforms.

10. Understand the website routine maintenance.

10.1 State the functions of site promotion, sending out email, voicemail, newsletters, etc

10.2 State routine maintenance of a website.

10.3 State the web backup process.

11. Understand the web security.

11.1 Define site traffic.

11.2 State port forwarding.

11.3 State the different cyber attacks.

11.4 Explain the functions of firewall.

12. Understand the Marketing & SEO (SEARCH ENGINE OPTIMIZATION).

12.1 Study on marketing of websites on various platforms including other sites and search engines.

12.2 Define SEO on a website.

12.3 State a SEO friendly website

12.4 Describe the process of SEO on a website.

PRACTICAL:

1. Web site hosting activities.

1.1 Purchase a domain.

1.2 Register a domain.

1.3 Renew a registered domain.

1.4 Install & configure a web server on local computer.

1.5 Publish a web site on local computer for LAN.
1.6 Manage a online hosting server.
1.7 Publish a web site on online hosting server.

2. Works on database & contents management.
2.1 Create & manage a database.
2.2 Publish a new article in existing web site.
2.3 Modify and update a published content.
2.4 Restrict access article for specific users.

3. Manage cPanel.
3.1 Create and manage email accounts.
3.2 Manage security settings.
3.3 Set up domains, subdomains, add-on domains, parked domains and redirects.
3.4 Manage files, folders and monitor your disk space usage.
3.5 Access databases and track your website's performance.

4. Perform Dashboard management activities.
4.1 Manage existing dashboard components.
4.2 Add new a dashboard component.
4.3 Manage dashboard access control.

5. Manage user accounts.
5.1 Authorize a registered user.
5.2 Manage user access control.
5.3 Add/remove user.

6. Perform maintenance of a web site.
6.1 Perform a routine maintenance of published website.
6.2 Perform whole website backup.
6.3 Perform automated website backup.
6.4 Practice on database backup.
6.5 Practice on problem identification & solving procedures.

7. Manage Web security activities.
7.1 Perform on Cyber security.
7.2 Configure Firewall & port forwarding
7.3 Prevent Ddos attacks.

8. Perform SEO optimization for the site.
8.1 Plan for SEO.
8.2 Perform the activities for SEO of site.

REFERENCE BOOK:

1. Web mastering For Dummies- Daniel A. Tauber

REFERENCES WEB SITE:

1. http://www.btrc.gov.bd
2. https://www.eicra.com
3. https://cloud.google.com

Optional Subjects-I
(Multimedia Developer Group)

BANGLADESH TECHNICAL EDUCATION BOARD
Agargaon, Dhaka-1207

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

COMPUTER TECHNOLOGY

TECHNOLOGY CODE: **666**

7th SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

COMPUTER TECHNOLOGY (666)

7th 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	66671	System Analysis & Design	2	3	3	40	60	25	25	150
2	66672	Network Administration & Services	2	6	4	40	60	50	50	200
3	66673	Apps Development Project	0	6	2	-	-	50	50	100
4	66674	E-Commerce & CMS	2	6	4	40	60	50	50	200
5	66675	Cyber Security & Ethics	1	3	2	20	30	25	25	100
6	6667X	Optional Subject-II	2	3	3	40	60	25	25	150
7	65853	Innovation & Entrepreneurship	2	0	2	40	60	-	-	100
Total			**11**	**27**	**20**	**220**	**330**	**225**	**225**	**1000**

Optional Subject-II (6667x)

1.	**Network Maintenance Group**	Option-II	66676	Network Security System
2.	**Automation System Group**	Option-II	66677	Embedded System Design
3.	**Software Developer Group**	Option-II	66678	Advanced Database Management System
4.	**Multimedia Developer Group**	Option-II	66679	Game Development

66671 SYSTEM ANALYSIS & DESIGN T P C
2 3 3

AIMS

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

SHORT DESCRIPTION

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

DETAIL DESCRIPTION

Theory:

1. Understand the elements of information systems and management.

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

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

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

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

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

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

4.1 Mention the steps of systems analysis.
4.2 State the meaning of system planning.
4.3 List the probable fields of a user request form.
4.4 Describe the steps of initial investigation process.
4.5 Mention the sources and categories of information.
4.6 List the information gathering tools.

4.7 Mention the phases of information gathering.
4.8 Describe the information gathering methods.
4.9 State the guideline of a successful interview.
4.10 State the types of questionnaires.

5. Understand the tools of structured analysis.

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

6. Understand the feasibility analysis.

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

7. Understand the system design and development.

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

8. Understand the process of systems testing and security.

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

9. Understand the implementation and software maintenance activities.

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

10. Understand the concept of object-oriented approach.

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

PRACTICAL:

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

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

STEPS:

Step-1: Perform the collection of documents to recognize the need of a new computerized system.
Step-2: Perform the collection of information of the personnel currently solving the problem into the manual system.
Step-3: Perform the observation of existing system process & gather information by interview and questionnaires.
Step-4: Perform the preparation of end-user's requirements & select the feasible solution for the alternative candidate systems.
Step-5: Perform the design of external forms, input & dialogue screens.
Step-6: Perform the design of reports, display screens & databases.
Step-7: Perform the design of test plan & procedure.
Step-8: Perform the selection of tools, databases and development of menus.
Step-9: Perform the development of input screens and dialogues.
Step-10: Perform the development of modules for data entry & processing.
Step-11: Perform the development of modules for output display and printing.
Step-12: Perform the integration & testing of the developed systems.
Step-13: Perform the preparation of manuals & documentations.

REFERENCE BOOKS

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

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)

12.1 State Internet of Things (IoT).
12.2 Explain Big Data.
12.3 State Cloud Computing.
12.4 Explain System Integration.
12.5 State Autonomous Vehicles System & Autonomous Robots
12.6 Explain augmented reality.
12.7 Explain 3D Printing
12.8 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

66674 **E-COMMERCE & CMS** **T P C**
2 6 4

OBJECTIVES

- Understand the E-Commerce and E-Commerce Transition in the World.
- Recognize the benefits and limitations of E-Commerce.
- Analyze different E-Commerce business models
- Analyze different E-commerce Payment System.
- Understand the E-Commerce Security System.
- Understand the concept of CMS.

SHORT DESCRIPTION

UNDERSTAND THE CONCEPT OF E-COMMERCE, E-COMMERCE BUSINESS MODELS, INFRASTRUCTURE, MARKETING CONCEPT, E-COMMERCE ENVIRONMENT, E-COMMERCE – PAYMENT SYSTEMS, SECURITY SYSTEMS, CONCEPT OF CMS WITH WORDPRESS / DRUPAL / JOOMLA.

DETAIL DESCRIPTION

Theory:

1. UNDERSTAND THE CONCEPT OF E-COMMERCE.

1.1 Define E-Commerce.
1.2 State the Features of E-Commerce
1.3 Describe the difference of Traditional Commerce v/s E-Commerce
1.4 State the Advantages of E-Commerce Organizations, E-Commerce Customers and E-Commerce Society.
1.5Mention the Technical and Non-Technical Disadvantages of E-Commerce.
1.6 State Electronic Data Interchange (EDI).
1.6 Describe the scopes of E-Commerce.

2. E-COMMERCE BUSINESSMODELS

2.1 Identify the key components of e-commerce business models.
2.2 Describe B2B and B2C business models.
2.3 Describe the ArchitecturalModelsofB2BandB2Cbusiness models.
2.4 Describe C2C and C2B business models.
2.5 Describe B2G and G2B business models.

3. E-COMMERCE INFRASTRUCTURE

3.1 Describe PRINCIPAL COMPONENTS OF E-COMMERCE INFRASTRUCTURE
(Internet, TCP/IP, Function of Router, Protocol, IP Addresses, Domain Name Systems (DNS), URL: Uniform Resource Locator, Internet Servers and Clients, Ports and HTTP, E-mail Protocols.)
3.2 State World Wide Web (WWW) and Markup Languages.
3.3 State Intranets and Extranets.
3.4 State VIRTUAL PRIVATE NETWORK (VPN) , STORAGE AREA NETWORKS (SANS)
3.5 State the INTERNET CONNECTIVITY OPTIONS (Dial-up, Integrated Services Digital Network (ISDN), Broadband Connections, Wireless Connections)
3.6 Describe the EVOLUTION OF INTERNET AND WORLD WIDE WEB.

4. E-COMMERCE MARKETING CONCEPT

4.1 Mention the features of Traditional Marketing.
4.2 Define Online/Internet/E- Marketing.
4.3 Describe Basic marketing concepts that needed to understand E-Marketing.
4.4 Define E-advertising and E-branding.
4.5 Describe main technologies that support online marketing.
4.6 Describe E-CRM (Customer Relationship Management).

5. E-COMMERCE ENVIRONMENT

5.1 State the major issues raised by e-commerce,
5.2 State Basic concepts related to privacy.

5.3 State HACKER AND CRACKER
5.4 State Practices of e-commerce companies that threaten privacy.
5.5 Describe the Different methods used to protect online privacy.
5.6 State Major public safety and welfare issues raised by e-commerce.

6. E-COMMERCE PAYMENT SYSTEMS

6.1 Mention the features of traditional payment systems.
6.2 Describe different types of e-commerce payment systems (Credit Card, Debit Card, Smart Card, E-Money, and Electronic Fund Transfer).
6.3 Describe Payment Process of different types of e-commerce payment systems.

7. E-COMMERCE SECURITY SYSTEMS

7.1MentiontheScope of e-commerce crime.
7.2 Describe security threats in the e-commerce environment,
7.3 Mention the measures to ensure e-commerce security.
7.4 Describe the process how technology helps protect the security of messages sent over the Internet.
7.5 Describe Security Protocols in Internet.
7.6 Describe the Tools used to establish secure Internet communications channels, and protect networks, servers, and clients,

8. UNDERSTAND THE CONCEPT OF CMS

8.1 Define Content Management System (CMS)
8.2 List the Features of CMS.
8.3 Mention the Advantages and Disadvantages of CMS.
8.4 State the different between CMS website, a static website, and websites using other server-side technologies.
8.5 Explain the comparison between three popular open source CMS platform (WordPress, Drupal and Joomla).
8.6Understand the benefits of working with a server-side database and the power it brings to creating and managing websites CMS.

PRACTICAL:

- Create and deploy a small E-Commerce websites using CMS, including creating and editing content, adding functionality, and creating custom templates and themes based on Open Cart/WordPress / Drupal / Joomla.

References:

1. E-Commerce 2011, Author: Kenneth Laudon, Carol GuercioTraver.
2. E – Commerce : Strategy Technologies & Applications, Tata McGraw Hill.
3. E-Commerce,M.M. Oka, EPH
4. E-Commerce Concept Model And Strategy, C.S.V. Murthy, Himaliya Publishing
5. E-Commerce, Jibitesh Mishra, Macmillan Publishers India
6. E-COMMERCE: A Managerial Perspective, P.T. Joseph, PHI, fifth printing
7. Global E-Commerce, J. Christopher & T.H.K. Clerk, University Press
8. Beginning E-Commerce, Reynolds, SPD
9. Cyber Warfare: Techniques, Tactics and Tools for Security Practitioners, Author: Jason Andress, Steve Winterfeld

66673 Apps Development Project T P C
0 6 2

AIMS

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

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

SHORT DESCRIPTION

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

DETAIL DESCRITION

1. Create Android Environment for App Development.

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

2. Create an Application and understand the Anatomy.

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

3. Work with Activities.

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

4. Work with Fragment.

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

4.6 Communicate with other fragments.
4.7 Deliver a Message to a Fragment.

5. Work with Android Intents and Filters.

5.1 Understand the intent object and fundamental use cases.
5.2 Explore Intent types.
5.3 Data transfer between activities.
5.4 Register an Activity for the Intent which is triggered when someone wants to open a webpage.
5.5 Build a service in your app to download a file from the web.

6. Create Android User Interface.

6.1 Understand the basic building block for user interface.
6.2 Explore the Frame layout, Linear layout, Table layout, Relative layout, Frame layout, List View, Grid View
6.3 Adapt layout attributes.
6.4 Build Layouts with an Adapter.
6.5 Improve layout performance.

7. Design user Interface with views.

7.1 Add Text, Buttons, checkboxes, radio buttons, toggle buttons, spinners, pickers, tooltips to the layout files.
7.2 Create and manage notifications and channels, modify notification badges.
7.3 Create an activity from a notification.
7.4 Add app bar.
7.5 Dim system bars, Hide status bar and navigation bar.

8. Work with Navigation.

8.1 Design effective navigation.
8.2 Create swipe view with tabs.
8.3 Create a navigation drawer.
8.4 Implement proper Back navigation.

9. Display Pictures and Menus with Views.

9.1 Use Image View, Image Switcher to Display Pictures.
9.2 Use Grid View to Display Pictures.
9.3 Explore Menus with Views.

10. Work with App data & files.

10.1 Save files on device storage - Internal Storage, External Storage (SD Card).
10.2 Save data in a local database.
10.3 Send data to other apps.
10.4 Share files.
10.5 Retrieve file information.

11. Use Content Providers.

11.1 Understand content providers and advantages.
11.2 Accessing and retrieving data from a provider.
11.3 Creating Own Content Providers.
11.4 Create an address book using the Content Provider.

12. Work with Messaging.

12.1 Understand SMS Manager API.
12.2 Analyze Method & Description.
12.3 Send an SMS to the given mobile number.

12.4Analyze Email Messaging.
12.5Analyze Extra Data &Description.
12.6Send an Email to the given recipients.

13. Illustrate Location Based Services.

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

14. Establish Connectivity.

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

15. Develop Android Services.

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

16. Configure your build

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

17. Publish your App

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

18. Create a Contact Book.

18.1Understand the project scope and requirement analysis.
18.2Create a Form that will take username, gender, email, phone number.
18.3Upload user image.
18.4Store data to database.
18.5Update and Delete a contact.
18.6Display user information in List View.
18.7Test your App with UI-Testing and with testing tools.

19. Create a BMI Tracker.

19.1Understand the project scope and requirement analysis.
19.2Create a calculator that will take user height, weight and age.
19.3Create BMI Standard to compare.

19.4 Show user BMI and give status.
19.5 Store BMI result.
19.6 Display monthly BMI.
19.7 Test your App with UI-Testing and with testing tools.

20. Create a Location based App.

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

Reference Books

1. Beginning Android programming with Android Studio
   By - J F DIMarjio

2. Hello Android Introducing Google's Mobile Development Platform
   By - ED Burnette

Essential Links

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

66675 Cyber Security & Ethics T P C

1 3 2

OBJECTIVES

- To develop knowledge and skill on Cyber Security and Ethics.
- To develop knowledge and skill to create and apply of cyber security.

SHORT DESCRIPTION

Basics of Cyber Security, Implementation of Hardware based and software based security, Data and evidence recovery, Hacking, Cyber crimes, Cyber Ethics, IT Laws;

DETAIL DESCRIPTION

Theory:

1. Understand Cyber Security

1.1 Define is Cyber Security.
1.2 Classify Cyber Security.
1.3 Describe the necessity and role of cyber security.
1.4 Distinguish between Information security and Cyber security.
1.5 Describe and explain why information and cyber security are important to business and to society.
1.6 Explain Security, Identity, Authentication, Confidentiality, Integrity, Availability, Threat, Vulnerability, Risk and hazard;

2. Understand Data and Evidence Recovery

2.1 Define file recovery. Classify different procedures for file recovery.
2.2 Define data recovery and Forensic Tool Kit (FTK).
2.3 Describe various types of computer forensics tools.
2.4 Discuss various Personal Identifiable Information
2.5 Discuss various types of E-mail threats.

3. Understand Cyber Crimes

3.1 Define Cyber Crimes.
3.2 Discuss various types of Cyber crimes cyber-bullying, cyber extortion, Phishing, Identity Thefts, Scamming, Cyber laundering (Money Laundering 2.0), DDoS Attack etc.
3.3 Define Malware. Describe various types of Malware.
3.4 Describes various types of Cyber Crimes such as Hacking, Cracking, Virus Attacks, Pornography, Software piracy.
3.5 Define Intellectual property.
3.6 Describe Tracking, IP Tracking, E-mail recovery, Encryption and Decryption methods.
3.7 Describe password cracking.

4. Understand Hacking

4.1 Define Hacking with its classification.
4.2 Describe the reasons and justification of hacking.
4.3 Describe various Hacking techniques such as Vulnerability scanning, Brute force Attack, Dictionary attack, Password cracking, Packet sniffer, Spoofing attack (Phishing), Programmed threats, Social Engineering etc.

4.4 Define Hacker.
4.5 Describe types of hacker such as script kiddie, white hat (Ethical hacker), black hat (crackers), gray hat, green hat, Red hat, blue hat etc.

5. Understand the basics of security

5.1 Define firewalls and Attack prevention.
5.2 Describe types of firewalls.
5.3 Make a comparison among the types of firewalls.
5.4 Describe basic online security.
5.5 Describe the motives of hackers.
5.6 Describe firewalls as the process of Attack Prevention.

6. Understand Cyber Ethics

6.1 Define Cyber Ethics.
6.2 Define Ethical hacking.
6.3 Describe various aspects of Ethical hacking.
6.4 Describe various laws of Bangladesh about Cyber Security.
6.5 Describe various laws of Bangladesh about Cyber Crimes.

PRACTICAL:

1. Apply password to a computer system and various files such as Microsoft Word, Microsoft Excel etc.

1.1 Start a Computer and enter into BIOS setup.
1.2 Give a password to the BIOS security.
1.3 Open the computer again and give password from Control Panel.
1.4 Create an MS Word file and save it with a password for open and edit.
1.5 Create an MS Excel file and save it with a password for open and edit.
1.6 Create a MS Access file and save it with a password for open and edit.
1.7 Make a report for each of above jobs.

2. Practice to recover an e-mail forgotten password.

2.1 Start a computer and open a browser and go to an e-mail provider such as Gmail, yahoo.
2.2 Try to recover a forgotten password by entering various information
2.3 Login into the e-mail by new password.
2.4 Make a report for the above job.

3. Apply various security steps in e-mail.

3.1 Open an e-mail.
3.2 Go to its **Setting**.
3.3 Apply two-steps verification by entering Mobile number and other e-mail address.
3.4 Try to change e-mail password by applying those security steps.
3.5 Make a report for the above job.

4. Apply various security steps in social media such as Facebook login.

4.1 Open your Facebook account.
4.2 Go to its **Setting**.
4.3 Apply various security steps such as Mobile number and e-mail address
4.4 Try to change your Facebook password by applying those security steps.
4.5 Make a report for the above job.

5. Install antivirus software and scan computer system with the software.

5.1 Open your computer.

5.2 Using web browser download a free antivirus software such as Avast, Avira etc.
5.3 Install the antivirus software.
5.4 Scan your computer with the antivirus software.
5.5 Make a report for the above job.

6. Install firewall to a computer system and prevent the computer system from intruder.

6.1 Open your computer
6.2 Find your computer for any firewall.
6.3 Go to Control Panel and protect your PC with Windows firewall.
6.4 Turn Windows firewall on and off.
6.5 Make a report for the above job.

7. Use a hashing program to verify the integrity of data with HashCalc program.

7.1 Open your computer
7.2 Create a .txt file.
7.3 Download HashCalc from web and install the software.
7.4 Calculate a hash of the Hash.txt file
7.5 Make a change to the Hash.txt file
7.6 Calculate a new hash of the Hash.txt file
7.7 Make a report for the above job.

8. Practice to sending Confidential Information over Email utilizing WinZip.

8.1 Open your computer.
8.2 Create a MS Word file named Confidential Document.docx and encrypt the file by WinZip with a strong password.
8.3 E-mail the encrypted file to your friend.
8.4 Send the password of the file to your friend by mobile phone and tell him to open the file using the password.
8.5 Make a report for the above job.

REFERENCES:

1. Cyber Security Essentials - CRC Press
2. হ্যাকিংয়ের গোলকধাঁধাঁ - দিলোয়ার আলম, মনিরুজ্জামান
সাইবার নিরাপত্তা ও তথ্য প্রযুক্তি ব্যবহারে সতর্কতা - শ্যামসুন্দর সিকদার

Optional Subject-II

5.	**Network Maintenance Group**	Option-II	66676	Network Security System
6.	**Automation System Group**	Option-II	66677	Embedded System Design
7.	**Software Developer Group**	Option-II	66678	Advanced Database Management System
8.	**Multimedia Developer Group**	Option-II	66679	Game Development

66676 NETWORK SECURITY SYSTEM T P C
2 3 3

AIMS

- **To be able to understand computer network and information security.**
- **To be able to learn why network security is important**
- **To be able to explain network security prevention, detection and response.**
- **To be able to define and explain the concept of network confidentiality, information integrity, network availability, network auditability.**
- **To be able to understand management's role in the development, implementation and maintenance of network security.**
- **To be able to understand security architecture, it's principles, components and employment.**
- **To be able to understand the relationship between risks, threats, vulnerabilities and countermeasures.**
- **To be able to understand the need for constantly evaluating the status of security management.**
- **To be able to understand the difference between policies, procedures, standards, guidelines, encryption, cryptography terms, firewalls.**
- **To be able to understand operation of Virtual Private Networks, importance of authentication and the characteristics of a good password.**

SHORT DESCRIPTION

Network and information security, network security prevention, detection and response, the concept of network confidentiality, information integrity, network availability, network auditability, security architecture, relationship between risks, threats, vulnerabilities and countermeasures, policies, procedures, standards, guidelines, encryption, cryptography terms, firewalls, Operation of Virtual Private Networks, authentication and the characteristics of a good password.

DETAILS DESCRIPTION

Theory:

1. Understand Security Basics

1.1 Define Computer Security.
1.2 Mention OSI Security Architecture.
1.3 Describe various threats and attacks.
1.4 Explain Security Services.
1.5 State Security Mechanisms (X.800).
1.6 Describe a model for network security.

2. Understand network application protocol

2.1 Define network application protocol.
2.2Describe various application protocols.
2.3 Mention DNS, TFTP, FTP, HTTP, SSL and its application.
2.4 Describe SNMP, SMTP, NTP, SSH, RDEP, and its application.
2.5 State the necessity of protocols in connectivity devices.

3. Understand network security protocols

3.1 Define authentication, authorization and accounting.
3.2 Describe authentication, authorization and accounting of AAA Server.
3.3 Define TACACS+ and RADIUS
3.4 Mention the encryption technology overview.
3.5 State DES, 3DES, AES, MD5, SHA, IPsec protocols.
3.6 Describe Diffie- Hellman technique.

4. Understand Security Technologies

4.1 Define NAT and PAT.
4.2 Describe FIREWALL and public key infrastructure.
4.3 Describe the Virtual Private Network (VPN).
4.5 State network based IDS and host based IDS in Firewall technique.
4.6 State various types of VPN.
4.7 Describe the VPN Connectivity with block diagram.

5. Understand Digital Signatures.

5.1 Define Digital Signatures.
5.2 State the classification of Digital Signatures.
5.3 Describe Symmetric-Key Signatures.
5.4 Describe Public-Key Signatures.
5.5 Describe Cryptography and Ciphers.

6. Understand layer 2 securities

6.1 Define VLAN, Trunking.
6.2. Mention the native VLAN
6.3 Describe inter-VLAN routing in layer 3 switch.
6.4 Explain Spanning Tree Protocol in Layer 2 device.
6.5 Describe RSTP, MSTP, and PPP authentication.
6.6 Describe VLAN Hoping, BPDU Guard and Root Guard.

7. Understand Email security, Web security and Social issues.

7.1 Define Email Security.
7.2Describe Pretty Good Privacy (PGP)
7.3 Define Web Security.
7.4 Describe Secure Sockets Layer (SSL).
7.5 Define Mobile Code Security.
7.6 Define Privacy and Freedom of Speech.

8. Understand Layer 3 Security.

8.1 Define ACL, Standard and Extended, Named
8.2 State the DHCP Snooping
8.3 Define Fast Hop security
8.4 Describe user creating in router with privilege level 15.
8.5 Explain VTY and console port security with user name.

9. Understand Network Security Applications.

9.1 Define Kerberos
9.2 Define X.509 Certificates.
9.3 Define HTTPS.
9.4 Describe Wireless Application Protocol.

10. Network Security policies and protections

10.1 Define Security Policy.
10.2 Define Network Protection
10.3 State Standard Bodies and Incident Response teams
10.4 Describe Incident Response teams and Internet News groups.
10.5Describe Vulnerabilities, Attacks and common Exploits
10.6Mention Internet Distribution System (IDS).

Practical:

1. Identify different types of Network Devices (Switch, Router) and observe their constructional features.

2. Establish a Peer to Peer/Workgroup LAN

(a) Install Network Interface Card (NIC) into the PC
(b)Check the MAC address of the Network Interface Card (NIC)
(c) Connect cable connector with PC & Hub/Switch
(d) Configure the TCP/IP Protocol in each PC
(e) Test the connectivity of the PCs

3. Perform the task to Work with a Peer/Workgroup LAN environment for simple data communication.

(a) Share the folders / secondary memory.
(b) Share a printer or any other resources.
(c) Create User on each PC and set user name and password.
(d) Observe advanced protocols such as- IMAP3, SMTP, POP3, HTTP and HTTPS.

4. Establish a Client–Server Local Area Network

(a) Install Windows server 2012 into a server PC
(b) Configure TCP/IP to server and client PCs
(c) Perform the task to configure the Active Directory –Directory Service (AD-DS)
(d) Set Firewall security in Server and PCs.

5. Perform the task to configure The DNS in Windows Server 2012.

6. Perform the task to configure the DHCP in Windows Server 2012

7. Develop a real time client-server environment to use network security protocol and perform the following

a) Configure Router as DHCP server and set Local User Name and Password for router access.
b) Create two VLAN in a Layer 2 switch.
c) Ensures two VLAN communicates each other.
d) Primary& Secondary connection between two switches to ensure redundancy via STP.

8. Configure DNS and Mail server for local users and ensure that user can send & receive mails.

9. Use PPP Connection between ISP and Router so that Local user can access internet.

10. Apply following security and policy on Router and Switch.

a) Telnet and SSH configuration on Router and switch. So that Administrator can able to access the devices remotely.
b) Ensure port security to block the unauthorized access of switch ports.

REFERENCE BOOK

1. Network Security Essentials,
   By -William Stallings
2. Computer Networks
   – Tanenbaum and Wetherall
3. CCNA Routing & Switching Study Guide
   By- Todd Lammle

Developed by:

Name Signature

1. Engr. S. M Hamidul Hoque
   Instructor (Tech- Computer)
   Computer Technology
   Feni Polytechnic Institute
   E-mail: smhamidcse@gmail.com
   Cell No- 01711231503

2. Md. MokhlesurRahman
   Maintenance Engineer (Network)
   Dhaka WASA.
   E-mail: rahman.wasa@gmail.com
   Mobile - +8801716270832

66677 Embedded System Design T P C
2 3 3

AIMS

To develop knowledge and skill on programming and interfacing of embedded systems using Microcontroller.

SHORT DESCRIPTION

The embedded system features, architecture, programming and the real world interfacing.

DETAIL DESCRIPTION

THEORY:

1. Understand the Embedded System

1.1. Describe embedded system
1.2. List major components of an embedded system
1.3. List the main features of embedded system
1.4. Describe the architecture of embedded system
1.5. State the application fields of embedded system
1.6. List some OS and RTOS for embedded system

2. Understand embedded system development kit

2.1. Identify the difference between microcontroller and single board microcontrollers (Arduino / PICduinoetc.)
2.2. Identify the difference between single board microcontrollers and single board computer (Raspberry Pi etc.)
2.3. List different types of software development tools for embedded system
2.4. Describe different items of embedded system development environment
2.5. List different types of hardware development tools for embedded system
2.6. Describe the different features of Embedded system development kit
2.7. List the different manufacturers of microcontroller based development kit (like Arduino) or microprocessor based development kit (like Raspberry Pi)

3. Understand the interfacing among different component of embedded system

3.1. List interfacing method for different component of embedded system.
3.2. Distinguish serial communication and parallel communication
3.3. Identify the advantage of interrupt driven I/O interfacing
3.4. Describe SPI, I2C, UART/USART, CAN
3.5. Describing LCD unit interfacing technique
3.6. Describe key-pad interfacing technique

4. Understand the modules used in Embedded system

4.1. Describe BLE module used in embedded system to communicate with smart phone or smart devices
4.2. Describe Zigbee module used an embedded system for sensor network
4.3. Describe RTC with built-in battery module
4.4. Describe Wifi-Module used in embedded system
4.5. Describe RF module used in an embedded system
4.6. Describe DC-to-DC converter

5. Understand the interfacing of embedded system with external devices

5.1. Describe USB, Ethernet, RS-232/RS-423
5.2. Mention the difference between RS-232 and RS-423

5.3. Describe IR, BT, BLE, WiFi, Zigbee
5.4. Mention the difference between BT and BLE
5.5. Describe mass storage using USB

6. Understand different memory system of embedded system

6.1. Describe serial EEPROM in an embedded system
6.2. Describe serial flash memory in an embedded system
6.3. Mention the difference between serial EEPROM and serial flash memory
6.4. Describe SD cardin an embedded system

7. Understand sensor interfacing in embedded system

7.1. Define sensors and describe the reason of using sensors
7.2. Describe the features of sensors and describe different types of sensors
7.3. Describe touch screen, MIC, speaker, buttons, temperature sensors, light sensors, metal detectors, proximity sensors and most common sensors used in embedded systems
7.4. Describe the use of different sensors for smart phone, smart home, smart watch, smart glass
7.5. Explain different interfacing systems of different sensors

8. Understand actuators interfacing in embedded system

8.1. Define actuators and describe the reason of using actuators
8.2. Describe the features of actuators and describe different types of actuators
8.3. List different actuators used in an embedded system
8.4. Describe the different actuators used for smart home, humanoid robot, industrial robot, ATM machine
8.5. Describe different types of motor used in embedded system
8.6. Explain different interfacing of different actuators

9. Understand the Embedded Development Life Cycle

9.1. Describe EDLC
9.2. Describe different steps of EDLC
9.3. Describe different software tools used for different steps EDLC
9.4. Describe auto update feature of an embedded system
9.5. Describe QA and testing of embedded system

10. Understand the features of advance embedded system

10.1. Describe ARM architecture
10.2. Identify different ARM series for different type of application
10.3. List the reason for using different clock source of a microcontroller
10.4. List the different features of PIC series High-end and enhanced microcontroller
10.5. Describe FPGA
10.6. Describe SoC
10.7. Define IoT and describe IoT eco system
10.8. Design an abstract model of an smart phone

PRACTICAL:

1. Perform the construction of an embedded system project that has key pad

1.1. Design the schematic diagram
1.2. Develop the program in C language or Assembly language that can detect specific key pressed by user
1.3. Build the hex/bin file of the program
1.4. Simulate the program
1.5. Flash the hex/bin file into MCU

1.6. Construct the circuit and observe the operation
1.7. Debug the program
1.8. Collect the case/box for packing the project
1.9. Packaging the circuit in the case/box
1.10. Make report on the project and perform the presentation of the project output

2. Perform the construction of embedded system project that uses I2C for serial EEPROM interfacing

2.1. Design the schematic diagram
2.2. Develop the program
2.3. Build the hex/bin file of the program
2.4. Simulate the program
2.5. Flash the hex/bin file into MCU
2.6. Construct the circuit and observe the operation
2.7. Debug the program

3. Perform the construction of an embedded system project that uses SPI for interfacing temperature sensor, RF transceiver or any other module

3.1. Design the schematic diagram
3.2. Develop the program
3.3. Build the hex file
3.4. Simulate the program
3.5. Flash the hex file into MCU
3.6. Construct the circuit and observe the operation

4. Perform the construction of an embedded system project that uses UART to output debug information

4.1. Design the schematic diagram
4.2. Develop the program
4.3. Build the hex file
4.4. Simulate the program
4.5. Flash the hex file into MCU
4.6. Construct the circuit and observe the operation

5. Perform the construction of an embedded system project that has a wireless communication module, for example, Wi-Fi module, BLE module, RF module, IR module for communication

5.1. Design the schematic diagram
5.2. Develop the program
5.3. Build the hex file
5.4. Simulate the program
5.5. Flash the hex file into MCU
5.6. Construct the circuit and observe the operation

6. Perform the construction of an embedded system that uses USB for communication

6.1. Design the schematic diagram
6.2. Develop the program
6.3. Build the hex file
6.4. Simulate the program
6.5. Flash the hex file into MCU
6.6. Construct the circuit and observe the operation

7. Perform the construction of an embedded system to control the direction and steps of a stepper motor

7.1. Design the schematic diagram
7.2. Develop the program
7.3. Build the hex file
7.4. Simulate the program
7.5. Flash the hex file into MCU
7.6. Construct the circuit and observe the operation

8. Perform the construction of an embedded system to control the speed of a DC motor

8.1. Design the schematic diagram
8.2. Develop the program
8.3. Build the hex file
8.4. Simulate the program
8.5. Flash the hex file into MCU
8.6. Construct the circuit and observe the operation

9. Perform the construction of an embedded system that uses internal ADC for temperature sensor or any other analog sensors interfacing

9.1. Design the schematic diagram
9.2. Develop the program
9.3. Build the hex file
9.4. Simulate the program
9.5. Flash the hex file into MCU
9.6. Construct the circuit and observe the operation

10. Perform the construction of an embedded system to count pulses using internal counter

10.1. Design the schematic diagram
10.2. Develop the program
10.3. Build the hex file
10.4. Simulate the program
10.5. Flash the hex file into MCU
10.6. Construct the circuit and observe the operation

11. Perform the construction of an embedded system that uses Op-Amp to interface with LDR (Light dependent resistor)

11.1. Design the schematic diagram
11.2. Develop the program
11.3. Build the hex file
11.4. Simulate the program
11.5. Flash the hex file into MCU
11.6. Construct the circuit and observe the operation

12. Make a project of an embedded system that has LCD, serial EEPROM, temperature sensor and key pad

12.1. Design the schematic diagram
12.2. Develop the program
12.3. Build the hex file
12.4. Simulate the program

12.5. Flash the hex file into MCU
12.6. Construct the circuit and observe the operation
12.7. Collect the case/box for packing the project
12.8. Packaging the circuit in the case/box
12.9. Make report on the project and perform the presentation of the project output

13. Perform the construction of an embedded system by using Arduino to generate timing pulse using internal timer of microcontroller

13.1. Develop the program
13.2. Download the program
13.3. Run the program

REFERENCE WEB ADDRESS AND BOOKS

1. http://www.microchip.com
2. www.st.com
3. www.ti.com
4. https://www.arm.com/
5. https://www.raspberrypi.org/
6. https://www.arduino.cc/
7. User Manual for MCU Training Kit - http://www.MicroProcessorInstitute.org

66678 Advanced Database Management System **T P C**
2 3 3

AIMS

- To be able to acquire the knowledge and skill in the Relational and XML Database.
- To be able to acquire the knowledge and skill in the Normalization & Query Optimization
- To be able to acquire the knowledge and skill in the Transaction and Concurrency control.
- To be able to acquire the knowledge and skill in the Crash Recovery and Backup, Security and Privacy.
- To be able to acquire the knowledge and skill in the Parallel and Distributed Databases, Mobile & Intelligent Databases, Object Oriented DBMS, Database applications.

SHORT DESCRIPTION

Relational and XML Database, Normalization, Query Optimization, Transaction and Concurrency control, Crash Recovery and Backup, Security and Privacy, Parallel and Distributed Databases, Mobile & Intelligent Databases, Object Oriented DBMS, Database applications.

Detail Description

Theory:

1. Recall the concepts of advanced database system

1.1 Recall the purpose of Database and Need for DBMS
1.2 Identify Database Users
1.3 Compare 3-tier and 2-tier architecture of DBMS
1.4 Prepare 3-tier architecture of DBMS and mention its advantages over 2-tier
1.5 Define Data Independence
1.6 Describe the Advantages and Disadvantages of different Database Management systems
1.7 Distinguish among DBMS, RDBMS, Distributed and Centralized DB
1.8 Describe Information Retrieval, Data Warehousing, Data Mining

2. Understand the Relational and XML Database

2.1 Define constraints and Indexes
2.2 Define XML Data Model, DTD, XML Schema
2.3 Define Web Databases
2.4 Explain Codd's rules
2.5 Describe Database Design – ER to Relational
2.6 Explain Functional dependencies
2.7 Describe Loss less joins and dependency preserving decomposition

3. Understand the Normalization

3.1 Define Functional Dependency
3.2 Explain Anomalies in a Database
3.3 Describe the normalization process: Conversion to first normal form, Conversion to second normal form, Conversion to third normal form
3.4 Describe the Boyce-code normal form (BCNF)
3.5 Explain Normalization (1 NF, 2 NF, 3 NF, BCNF, 4 NF, 5 NF)
3.6 Explain Normal forms based on primary keys
3.7 Describe Denormalization process against a Normalized Database.

4. Understand the Query Execution and Optimization

4.1 Identify Algorithm for Executing Query Operations: External sorting, Select operation, Join operation, PROJECT and set operation
4.2 Explain Aggregate operations, Heuristics in Query Optimization, Semantic Query Optimization
4.3 Converting Query Tree to Query Evaluation Plan
4.4 Explain multi query optimization and application
4.5 Describe efficient and extensible algorithms for multi-query optimization
4.6 Explain execution strategies for SQL sub queries
4.7 Explain Query Processing for SQL Updates
4.8 Illustrate video preprocessing for content representation and indexing
4.9 Explain image and semantic-based query processing

5. Understand the Transaction and Concurrency control

5.1 Describe Concept of transaction and ACID properties
5.2 Define Serializability
5.3 States of transaction
5.4 Define Concurrency control
5.5 Illustrate Locking techniques
5.6 Illustrate Time stamp based protocols
5.7 Explain Granularity of data items
5.8 Define Deadlock

6. Understand Crash Recovery and Backup

6.1 Describe Failure classifications
6.2 Define Storage structure
6.3 Explain Recovery and atomicity
6.4 Define Log base recovery
6.5 Describe Recovery with concurrent transactions
6.6 Illustrate Failure with loss of Non-Volatile storage
6.7 Explain Database backup & recovery from catastrophic failure
6.8 Define Remote Backup System

7. Understand Security and Privacy

7.1 Define Database security issues
7.2 Design principles for active rules
7.3 Describe Discretionary access control based on grant and revoking privilege
7.4 Illustrate Mandatory access control and role based access control for multilevel security
7.5 Define Encryption and public key infrastructures
7.6 Identify the Protection Management of Database Systems from the theft and damage to Hardware and Software
7.7 Identify the Protection Management of Database Systems from the disruption and misdirection of the services they provide

8. Understand Parallel and Distributed Databases

8.1 Define Centralized, Parallel and Distributed Database Systems.
8.2 Explain the Centralized and Client-Server Architectures.
8.3 Define Server System Architectures
8.4 Define Inter and Intra Operation Parallelism
8.5 Describe I/O Parallelism – Inter and Intra Query
8.6 Illustrate Parallel Systems- Distributed Systems – Parallel Databases
8.7 Define Distributed Database Concepts

8.8 Describe Distributed Database Storage and Transactions
8.9 Explain Distributed Query Processing
8.10 Sketch Three Tier Client Server Architecture

9. Understand Object Oriented DBMS Overview of object

9.1 State Object identity
9.2 Define Object Oriented paradigm
9.3 Explain OODBMS architectural approaches
9.4 Define procedures and encapsulation
9.5 Explain Object oriented data model
9.6 Define relationship, identifiers, Basic OODBMS terminology, Inheritance, Basic interface and class structure
9.7 Classify hierarchies and inheritance
9.8 Classify extents and persistent programming languages
9.9 Describe OODBMS storage issues

10. Understand Mobile & Intelligent Databases

10.1 Define Location and Handoff Management
10.2 Describe Effect of Mobility on Data Management
10.3 Define Location Dependent Data Distribution
10.4 Describe Mobile Transaction Models
10.5 Explain Transaction Commit Protocols
10.6 Explain Mobile Database Recovery Schemes
10.7 Mention the Active databases, Deductive Databases, Knowledge bases & Multimedia Databases
10.8 Explain Multidimensional Data Structures
10.9 Define Image Databases, Text/Document Databases

11. Case Study on Database applications

11.1 State real time buffer management.
11.2 Define active database
11.3 Classify SQL Server, starburst, oracle, PostgreSQL, DB2, chimera
11.4 Applications of active database
11.5 Define temporal database
11.6 Explain special, text and multimedia database
11.7 Explain Video and Audio Databases
11.8 Explain storage management for video
11.9 Demonstrate Multimedia Database Design

PRACTICAL:

1. Apply Normalization (1NF, 2NF and 3NF) on result process database.
2. Perform the task to view Stored procedure
3. Perform the task to view Join concept such as Simple, equi, non equi, self, outer join
4. Perform the task to Primary introduction to DBA User create, granting privileges(Grant, Revoke, Commit, Rollback, Save point)
5. Perform the task to view for Executing Query Operations: External sorting PROJECT and set operation
6. Perform the task to view Aggregate operations, Heuristics in Query Optimization, Semantic Query Optimization
7. Perform the task to view Database backup & recovery from catastrophic failure

8. Perform the task to show Encryption & Decryption Process
9. Perform the task to show Distributed Query Processing
10. Demonstrate Multimedia Database Design
11. Create Login for Users with proper permissions for a Database.
12. Query between two database tables and show the output view.
13. Create scheduled backup for database.
14. Restore backup for database.

TEXT/REFERENCE BOOKS:

1. Henry F Korth, Abraham Silberschatz and S. Sudharshan, “Database System Concepts”, Sixth Edition, McGraw Hill, 2011.
2. C. J. Date, A. Kannan and S. Swamynathan,”An Introduction to Database Systems”, Eighth Edition, Pearson Education, 2006.
3. R. Elmasri, S. B. Navathe, “Fundamentals of Database Systems”, Fifth Edition, Pearson Education/Addison Wesley, 2007.
4. Database Management Systems Bipin Desai
5. James Martin, “Principles of Database Management Systems”, 1985, Prentice Hall of India, New Delhi
6. “Database Management Systems”, Arun K. Majumdar, Pritimay Bhattacharya, Tata McGraw Hill
7. Thomas Cannolly and Carolyn Begg, “Database Systems, A Practical Approach to Design, Implementation and Management”, Third Edition, Pearson Education, 2007.
8. Successful projects in ACCESS - P. M Heathcote

66679	Game Development	T	P	C
		2	3	3

OBJECTIVE

After Completing this course students should be able to-

- Able to design and develop basic 2D Game in Unity Platform.
- Able to design and develop game prototype.
- Able to design and develop basic 3D game in Unity Platform.

COURSE PRE-REQUISITE

- Completed Course on Mathematics consisting, Basic Geometry, Coordinate System (2D, 3D), Angle, Circle, Basic Calculus
- Completed Course on C# and Object Programming or, Course on JavaScript
- Completed Course on Physics, consisting collision, motion etc.

SHORT DESCRIPTION

This course is designed to prepare students for booming game industry, this course is a basic game development course focusing basic game development using latest Unity Tool, which needed Basic C# and Object Oriented Programming. This course will cover – concept on Coordinate System, State Machine, Basic Computer Graphics, Developing Game using Unity Platform.

DETAIL DESCRIPTION

Theory

1. Revisit Object Oriented Programming in C#

1.1. Revisit Class Create and Properties Against Class
1.2. Revisit Aggregation Relationship between objects.
1.3. Revisit Inheritance Relationship, Up casting, Down casting
1.4. Revisit Polymorphism using Inheritance Relationship
1.5. Revisit Interface in C#

2. Concept on event programming and Threading in C#

2.1. Define Event
2.2. Describe Event Programming Mechanism
2.3. Define Threading, Multi-threading, Job
2.4. Describe Job Scheduling
2.5. Describe Running Long Process in Background

3. Review Coordinate System (2D and 3D)

3.1. Define Co-Ordinate System
3.2. Describe 2D Co-ordinate
3.3. Define 3D Coordinate System
3.4. Describe Components in 3D Coordinate System

4. Review Geometry concepts on line and Various Shapes

4.1. Define Line and Describe Calculation mechanism and equations to draw a line.
4.2. Define Circle and Describe calculation mechanism and equation to draw a circle.

5. Review Concepts Collision and Motion between objects.

5.1. Define Collision and Describe Collision identification concepts.
5.2. Define Motion and Motion Calculation for object.

6. State Machine

6.1. Define State Machine
6.2. Describe the necessity of writing a state machine for game programming
6.3. Describe the State Machine creation process and considerations.

7. Basic computer graphics (drawing lines, shapes, etc.)

7.1. Define Pixel, Vertices, Edge
7.2. Define Matrix and describe how to draw a matrix in computer graphics.
7.3. Describe Line Drawing in a Matrix.
7.4. Describe Circle Drawing in a Matrix.

8. Game-style physics (collisions, faked gravity, etc).

8.1. Describe collision management in game development
8.2. Describe how gravity is managed in game development
8.3. Describe motion in game development.

9. Basics of Frame Animation.

9.1. Define Frame and describe the necessity of frame in animation
9.2. Define and Describe timeline for frame animation.
9.3. Define and describe the process of making a frame animation.

10. Understanding on Graphics Illusions.

10.1. Define and Describe how graphics illusions is managed in game development
10.2. Define and describe perspective projection for 3D game development.
10.3. Define and describe various graphic illusion created for 2D game development.

11. Game Story Development

11.1. Describe the process of creating story against a idea of game development.
11.2. Describe the process of story sketch.
11.3. Describe the process of creating state machine for game story.

PRACTICAL

1. Getting Started with Unity

1.1. Download and install Unity from unity3d.com
1.2. Familiarize with Asset Workflow of Unit Tool
1.3. Familiarize with Unity Main Windows – The Scene Window, Game Window, Hierarchy Window, Inspector Window
1.4. Familiarize with Toolbar and components of Tool Bar.
1.5. Familiarize with Unity Tools and Features.

2. Develop 2D Game

2.1. Brainstorm and Create a Game Story for flappy bird (https://en.wikipedia.org/wiki/Flappy_Bird) like game.
2.2. Make State Machine For the Story Components.
2.3. Create Sprites using Sprite Creation tool in Unity

2.4. Render Sprites with Sprite Renderer in Unity like Color, Masking, Texture Providing
2.5. Create Script on C#/JavaScript on various keyboard input for various states according to state machine.
2.6. Create Scripts for various events regarding states according to state machine.
2.7. Use Box Collider and various Physics Collider features from Unity for collision management for the sprites.
2.8. Add Audio Effects and Background tracks for the game on various events

3. Develop a 3D Game

3.1. Brain Storm and Create a 3D Game Story
3.2. Create State Machine your game story.
3.3. Create Player Controller
3.4. Create Enemy Controller
3.5. Create Camera Controller
3.6. Setup World Collision for your game story.
3.7. Make prototypes
3.8. Create and Import Models using Model importing workflows.
3.9. Explore various Physics Colliding Features in Unity.
3.10. Write scripts for various events against key input.
3.11. Add Audio Effects against game.

ONLINE REFERENCE

- Unit3d.com

BOOK REFERENCE

- Game Programming Patterns by Robert Nystrom
- Game Coding Complete, Fourth Edition by Mike McShaffryDavid Graham
- Game Engine Architecture By Jason Jason Gregory

65853 INNOVATION & ENTREPRENEURSHIP T P C
2 0 2

AIMS

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

SHORT DESCRIPTION

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

DETAIL DESCRIPTION

Theory :

1. Understand the basic concept of entrepreneurship & entrepreneur.

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

2. Understand the concept of entrepreneurship and economic development.

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

3. Environment for entrepreneurship development:

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

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

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

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

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

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

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

7. Understand the concept of self employment.

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

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

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

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

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

10. Understand the insurance and premium.

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

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

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

12. Understand SDG 4,8 and 17

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

Reference book :

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