



BANGLADESH TECHNICAL EDUCATION BOARD
Agargaon, Dhaka-1207.

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

**ARCHITECTURE TECHNOLOGY
TECHNOLOGY CODE: 661**

FIRST SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

Architecture Technology

1st Semester

Sl. No	Subject Code	Name of the subject	T	P	C	Marks				Total	
						Theory		Practical			
						Cont. assess	Final exam	Cont. assess	Final exam		
1	65811	Social Science	3	0	3	60	90	0	0	150	
2	65812	Physical Education & Life Skill Development	0	3	1	0	0	25	25	50	
3	65911	Mathematics-1	3	3	4	60	90	50	0	200	
4	65913	Chemistry	3	3	4	60	90	25	25	200	
5	66111	Architectural Drawing & Drafting	0	6	2	0	0	50	50	100	
6	66112	Architectural Materials	2	3	3	40	60	25	25	150	
7	66712	Electrical Engineering Fundamentals	3	3	4	60	90	25	25	200	
Total			14	21	21	280	420	200	150	1050	

65811

SOCIAL SCIENCE

T	P	C
3	0	3

OBJECTIVES:

To provide opportunity to acquire knowledge and understanding on:

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

SHORT DESCRIPTION:

Civics and Social Sciences; Individual and Society; Nation and Nationality; Citizenship; State and government; Law; Constitution; Government and its organs; Public Opinion; Political Party; UNO and its organs;

Scope and importance of Economics; Basic concepts of Economics- Utility, Wealth, Consumption, income wages, salary, value in use and savings; Production – meaning, nature, factors and laws; Demand and Supply; market equilibrium, national income, Current economic problems of Bangladesh; Role of Diploma Engineers in the economic development of Bangladesh; Occupations and career planning; Engineering team.

DETAIL DESCRIPTION:**1. Understand the meaning and scope of civics and interrelations of social science.**

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

2. Understand the relationship of the individual with the society, Nationality and nation, Rights and duties of a citizen.

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

3. Appreciate the relationship between the state and government, law and organs of government.

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

4. Understand and the classification of constitution.

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

5. Understand the role of UNO in maintaining world peace.

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

6. Understand the role of Ethics values and good governance.

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

7. Understand the fundamental concepts of economics.

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

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

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

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

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

10. Understand national income.

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

11. Understand the current issues and the availability and use of natural resource in the economic development of Bangladesh.

- 5.1 Define rural and urban economics.
- 5.2 Identify major problems of rural and urban economy.
- 5.3 Explain the migration of rural population to urban areas.
- 5.4 List of the Natural resource of Bangladesh and classify them according to sources of availability.
- 5.5 Explain the importance of the mine, forest and water resources and potential uses for sustainable development.

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

- 6.1 Explain the concept of the term, “Engineering team”
- 6.2 Identify the functions of Engineers, Diploma Engineers and Craftsmen forming the engineering team.
- 6.3 Discuss the role of a Diploma Engineer in the overall economic development of Bangladesh.
- 6.4 Explain socio-economic status of a Diploma Engineer.

Bangladesh: History & Culture

১৩. ইতিহাস

- ১৩.১ ইতিহাসের সংজ্ঞা।
- ১৩.২ বাংলাদেশের আবহাওয়া ও অধিবাসী।
- ১৩.৩ বাংলায় ইংরেজ শাসন ক্ষমতালাভ ও প্রতিষ্ঠা।
- ১৩.৪ বিটিশ বিশেষ সশস্ত্র প্রতিরোধ আন্দোলন; সংক্ষার আন্দোলন ও জাতীয়তাবাদের বিকাশ এবং বাংলার নবজাগরণ; বঙ্গভঙ্গ ও বঙ্গভঙ্গ উত্তরকালে বাংলার রাজনীতি ও দেশ বিভাগ।
- ১৩.৫. পাকিস্তান আমলে বাংলাদেশ, বঙ্গবন্ধুর নেতৃত্বে বাংলাদেশের মুক্তি সংগ্রাম ও স্বাধীনতালাভ।

১৪. সংস্কৃতি

- ১৪.১ সংস্কৃতি।
- ১৪.২ সভ্যতার সংজ্ঞা।
- ১৪.৩ সংস্কৃতির প্রকরণ।
- ১৪.৪ ভাষা আন্দোলন উত্তর বাংলার সংস্কৃতি।
- ১৪.৫ স্বাধীনতা উত্তর বাংলাদেশের সংস্কৃতির বিবরণ।
- ১৪.৬ বাংলাদেশের সংস্কৃতিতে প্রত্ততার্ত্তিক নির্দর্শন ও ক্ষুদ্র ন্ততার্ত্তিক গোষ্ঠীসমূহ।

সহায়ক পুস্তক

১. হক, মোজাম্বেল “পৌরনীতি”- হাসান বুক হাউস।
২. প্রফেসর এমাজউদ্দিন “রাষ্ট্রবিজ্ঞান” আজিজিয়া লাইব্রেরী।
৩. আলী, মাসুম “অর্থনীতি”।
৪. চৰ্কৰটাৰ্টা, মনতোৱ- “প্ৰিসিপলস অৰ ইকোনোমিক্স”।
৫. মাৰ্শাল, আলফ্ৰেড-“ প্ৰিসিপলস অৰ ইকোনোমিক্স”।
৬. রহমান, আনিসুর-“অর্থনীতি”।
৭. রাহিম, চৌধুরী, মাহমুদ ও ইসলাম, “বাংলাদেশের ইতিহাস(পরিবৰ্ধিত ও পরিমার্জিত)”; নওৱোজ কিতাবিস্তান, ১৯৯৯।
৮. কে, আলী“বাংলাদেশের ইতিহাস”; আজিজিয়া বুক ডিপো, ২০০১।
৯. সিৱাজুল ইসলাম, “বাংলাদেশের ইতিহাস-১৭০৪-১৯৭১”; ১ম, ২য় ও ৩য় খন্দ; বাংলাদেশ এশিয়াটিক সোসাইটি, ২০০০।
১০. কো-আত্মনভা, প্রি, কতোতকি, “ভাৱত বৰ্বৰে ইতিহাস”; প্ৰগতি প্ৰকাশন, ১৯৮৮।
১১. গোপাল হালদার; “সংস্কৃতিৰ রূপাল্পত্ৰ”; মুক্তধাৰা, ১৯৮৪।
১২. মোতাহের হোসেন চৌধুৰী, “সংস্কৃতি কথা”; নওৱোজ কিতাবিস্তান, ১৯৯৮।
১৩. গোপাল হালদার, “বাংলা সাহিত্যেৰ রূপৱেৰখা-১ম ও ২য় খন্দ”; মুক্তধাৰা।

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 Dhyanaasan : Shabasan, Padmasan, Gomukhasan, Sharbangasan, Shashangasan, Shirhasan
- 3.2 Shasthyasan : Halasan, Matshasan, Paban Muktasan, Ustrasan.
- 3.3 Prana and Pranayama: Nadiuddhi Pranayama, 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:

$$\text{Expand (i)} (1 - nx)^{-\frac{1}{n}} \quad \text{(ii)} \frac{1}{\sqrt[4]{4.08}}$$

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 $\sin 750^\circ$, $\tan 750^\circ$.

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 $\sin \alpha$, $\cos \alpha$ and $\tan \alpha$ in terms of $\frac{\alpha}{2}$ and $\frac{\alpha}{3}$

13.2 Solve the problems of the type:

find the value of $\cos 3^\circ$, $\cos 6^\circ$, $\cos 9^\circ$, $\cos 18^\circ$, $\cos 36^\circ$ etc.

REFERENCE:

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

65913	CHEMISTRY	T	P	C
		3	3	4

OBJECTIVES:

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

SHORT DESCRIPTION:

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

DETAIL DESCRIPTION:**1. Understand Atomic Structure and Chemical Bond.**

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

2. Understand Ionic Equilibrium.

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

3. Understand chemical reaction, oxidation and reduction.

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

4. Understand Water Treatment.

- 4.1 State the concept of hard and soft water.
- 4.2 Define hardness of water.
- 4.3 Describe the softening method of permuted process and ion exchange resin process.

4.4 Mention the advantages and disadvantages of hard water in different industries.

4.5 Visit a water treatment plant write a report.

5. Understand Corrosion and Alloy.

5.1 Mention the types of corrosion(dry and wet corrosion).

5.2 Describe atmospheric corrosion, types of atmospheric corrosion and their mechanism, oxide films factors affecting atmospheric corrosion.

5.3 Explain electrochemical corrosion, mechanism of electrochemical corrosion, types of electrochemical corrosion. factors affecting electrochemical corrosion.

5.4. Explain protective measures against corrosion: Coating (Galvanic and Zinc, Organic coating agents, Electroplating, metal cladding)

5.5 Explain the concept of alloy.

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

6.1 Mention types of Chemistry.

6.2 Mention the catenation property of carbon.

6.3 State organic compounds, its properties and applications.

6.4 Explain the classification of organic compound by structure and functional group: Define Homologous series, Alkanes, Alkenes and Alkynes; properties and uses of general formula; Names and structure of first five members hydrocarbons.

6.5 Explain polymer, monomer, classification of polymers, polymerization, addition and condensation polymerization.

6.6 Define plastics and explain its types and uses.

7. Understand Glass and Ceramic.

7.1 Define glass and its constituents; classify glasses, give elementary idea of manufacturing process of glass.

7.2 Give introduction to ceramic materials and its constituent.

7.3 Describe industrial application of glass and ceramic.

7.4 Visit industry and write a report.

8. Understand Soap and Detergent.

8.1 Give introduction to Lipid, Fats and oils.

8.2 Explain saponification of fats and oils, manufacturing of soap.

8.3 Describe synthetic detergent, types of detergents and its manufacturing.

8.4 State exclusives: TNT, RDX, Dynamite.

8.5 Define paint and varnish.

8.6 Describe adhesives.

9. Cement, pulp and papers.

9.1 Classify cement and mention its uses and manufacturing process.

9.2 Describe manufacturing process of pulp and papers.

9.3 Conduct industry visit and reporting.

PRACTICAL:

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

2. Conduct observation and measurement.

2.1 Determine the strength of HCl solution using 0.1N Na_2CO_3

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

3. Perform qualitative analysis of known and unknown salts.

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

REFERENCE BOOKS:

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

OBJECTIVES:

- To develop the ability to use various drawing instruments and materials.
- To enable in constructing and using various types of scales in drawing.
- To provide the ability to construct various geometrical figures & conic sections.
- To enable to adopt the development of different object.
- To provide the basic skill of isometric & oblique drawing
- To provide the basic skill of drawing orthographic views.
- To enable to adopt various symbols used in drawing.
- To provide the basic skill in building drawing.

SHORT DESCRIPTION:

Drawing instruments and their uses; Alphabet of lines and dimensioning; Scales; Geometrical drawing; Conic sections; Developments; Symbols; Isometric, Oblique & Orthographic views; Single-room building drawing.

DETAIL DESCRIPTION**1 Practice with drawing instruments and materials for basic drawing technique.**

- 1.1 Identify the different types of drawing instruments.
- 1.2 Use different types of drafting equipment.
- 1.3 Identify the standard sizes of drawing board and sheets.
- 1.4 Draw the border lines & title box in drawing sheets following standard rule.
- 1.5 Draw horizontal, vertical and inclined lines with the help of set squares, parallel bar.
- 1.6 Draw 15 degree, 75 degree, 105 degree and 120 degree angles with the help of set squares.
- 1.7 Use lettering guide, template, scale pantograph and French curve.

2 Practice Lettering and numbering freehand and with instruments.

- 2.1 Draw freehand single stroke vertical letters from A to Z (upper and lower case) and numbers 0 to 9.
- 2.2 Draw block letters (Gothic) using 5 : 4 proportions and height in given graph pad.
- 2.3 Draw title strip with proper placement using suitable size of letters and measurements.
- 2.4 Identify different lines in drawing.
- 2.5 Use center line, hidden line, phantom line, break line, dimension line, extension line, section line and cutting plane line.
- 2.6 Use different thickness of line to emphasize a part of drawing using different grades of pencil.

3 Adopt the elements and theory of dimensioning.

- 3.1 Put dimensions in engineering drawing according to an accepted standard.
- 3.2 Identify the elements of dimensions from a given dimensioned drawing.
- 3.3 Apply aligned and unidirectional system of dimensioning.
- 3.4 Draw size and location of dimension, continuous dimension, staggered dimension and dimensioning in limited space.
- 3.5 Add necessary dimension to a given drawing with suitable arrows.

4 Prepare scale for drawing application.

- 4.1 Calculate representative fraction and interpret a scale reading.
- 4.2 Use different types of Architectural scale to find full size dimension.
- 4.3 Use & measure a dimension by Diagonal scale.
- 4.4 Draw an object with different scale. F.P.S(1/4"=1', 1/8"=1', 1/16"= 1', 3/32"=1')
M.K.S(1:10, 1:20, 1:50, 1:100, 1:200, 1:500, 1:1000)
- 4.5 Calculate the ratio between metric & foot scale. [i.e. (1/4"=1' ≈ 1:50)]

5. Construct geometric figures (lines, triangles, squares, circle & regular polygon).

- 5.1 Divide given straight line into any number of equal parts.
- 5.2 Draw perpendicular when the given point is at or near the end of the line.
- 5.3 Bisect & trisect a given angle.
- 5.4 Draw a straight line parallel to a given straight line at some given distance.
- 5.5 Draw a square on a given straight line as base.
- 5.6 Draw regular polygons i.e. pentagon, hexagon and octagon having given one side.
- 5.7 Inscribe circle in triangle & rectangle.
- 5.8 Determine the length of the circumference of circle.

6. Construct conic sections & development objects

- 6.1 Draw a cone & different conic section
- 6.2 Draw an ellipse by concentric circle & parallelogram method.
- 6.3 Draw the development of a cube & a pyramid.
- 6.4 Draw the development of a cone & a cylinder
- 6.5 Draw the development of a prism Section at 30 degree angle.
- 6.6 Draw the development of a cone Section at 30 degree angle.
- 6.7 Draw the development of a cylinder Section at 30 degree angle
- 6.8 Draw the development of steps
- 6.9 Draw the development of a T-shape pipe joint.

7. Prepare the Isometric & Oblique view

- 7.1 Show & Identify classification of view.
- 7.2 Differentiate between isometric & oblique view
- 7.3 Draw isometric view of a cube & box.
- 7.4 Draw isometric view of a cylinder.
- 7.5 Draw isometric view of steps.
- 7.6 Draw oblique view of a cube.
- 7.7 Draw oblique view of a cylinder.
- 7.8 Draw oblique view of steps.
- 7.9 Draw isometric & oblique view of the complex objects [i.e. centrally placed cylinder/column on a square block, staggered box, additive & subtractive objects etc.)]

8. Prepare the Orthographic Projection of different objects

- 8.1 Translate pictorial views of simple objects into orthographic views.
- 8.2 Identify different planes.
- 8.3 Show difference between 1st & 3rd angle projection.
- 8.4 Draw 1st & 3rd angle views of a simple object.
- 8.5 Draw different views of an object in 1st angle method.
- 8.6 Draw different views of an object in 3rd angle method.
- 8.7 Draw the views of given different objects in 3rd angle method.

9. Adopt standard symbols in drawing.

- 9.1 Identify different symbols used in drawing.
- 9.2 Draw a legend using symbols of different Architectural & Civil engineering drawing
- 9.3 Draw the symbols of different plumbing fittings and fixtures used in drawing.
- 9.4 Draw the symbols of different electrical fittings and fixtures used in drawing.
- 9.5 Interpret information from drawing containing standard symbols.

10. Apply scale to draw a single room building

- 10.1 Draw the plan of a given single room building (i.e. Guard room/Police box etc.)
- 10.2 Draw the front elevation of the given building.
- 10.3 Draw side elevations of the given building.
- 10.4 Draw sectional views of the given building.

REFERENCE BOOKS

- | | |
|---------------------------------|-----------------------------|
| 1 Geometrical Drawing | -I H Morris |
| 2 Prathomic Engineering Drawing | -Hemanta Kumar Bhattacharia |

66112**ARCHITECTURAL MATERIALS**

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AIMS:

- To be able to identify and classify the materials used for construction in engineering field.
- To be able to recognize the sources of various engineering materials.
- To be able to understand the characteristics of various engineering materials.
- To be able to understand the uses of different engineering materials.

SHORT DESCRIPTION:

Aspects of engineering materials; Stone, Bricks; Sand; Cement; Tiles Light metal, Glass and Ceramics, Paints and varnishes, Timber; Insulating materials; Sound absorbing materials; Engineering use of non-ferrous metal; Fire and water proofing materials; Metals and alloys.

DETAIL DESCRIPTION:**1 Understand the various aspects of engineering materials.**

- 1.1 Define engineering materials.
- 1.2 Mention the classification of engineering materials in different technology.
- 1.3 List the characteristics of engineering materials.

2 Understand the application of stone.

- 2.1 Define building stones.
- 2.2 Mention geological, physical and chemical classification of stones.
- 2.3 List the characteristics of good building stones.
- 2.4 Describe the dressing of stones.
- 2.5 Describe the uses of stone in engineering filed.

3 Understand the characteristic of brick as construction materials.

- 3.1 Define brick.
- 3.2 Mention different constituents for manufacturing of good bricks.
- 3.3 Explain pug mill, table molding and machine molding.
- 3.4 Describe the process of brick drying.
- 3.5 Describe the methods of kiln burning of brick.
- 3.6 Draw the sketches of Bull's trench kiln & Hoffman's kiln.

4 Understand the application of sand.

- 4.1 Mention the classification of sand according to their sources.
- 4.2 Mention the specifications of good sand.
- 4.3 Describe the purpose of grading of sand.
- 4.4 Mention the use of various grades of sand.

5 Understand the application of cement.

- 5.1 Define cement.
- 5.2 Mention the functions of various ingredients of cement.
- 5.3 Distinguish between wet process and dry process of manufacturing Portland cement.
- 5.4 Draw a flow diagram based on wet process of manufacturing of cement.
- 5.5 Mention the uses of cement as engineering material.

6 Understand the basic conception of concrete.

- 6.1 Define types of concrete.
- 6.2 Describe composition of concrete.
- 6.3 Describe the mixture of concrete.
- 6.4 Mention the properties of concrete.
- 6.5 Describe the curing of concrete.
- 6.6 Mention the concrete uses as an element in construction field.

7 Understand the application of tiles.

- 7.1 Identify the following tiles: Clay tiles, Concrete tiles, Plastic tiles, Mosaic tiles, Marble tiles, and Glazed tiles.
- 6.7 Describe the uses of different kinds of tiles.

8 Understand the Light metal (aluminum, white metal, stainless steel) as construction materials.

- 8.1 Explain the important properties of light metal (aluminum, white metal, stainless steel) as construction material.
- 8.2 Mention the uses of aluminum, white metals, stainless steel.
- 8.3 Describe the advantages and disadvantages of using aluminum as construction material.

9 Understand the fundamental concepts of glass and ceramics.

- 9.1 Mention the constituents of glass.
- 9.2 List the properties of glass.
- 9.3 Mention the uses of glass.
- 9.4 Describe the constituents of ceramics.
- 9.5 Mention the classification of ceramics.
- 9.6 List the properties of ceramics.
- 9.7 Describe the uses of ceramics in engineering field.

10 Understand the basic concepts of paints and varnishes.

- 10.1 Define paints and varnish.
- 10.2 Explain the characteristics of good paint.
- 10.3 List the essential constituents of paint.
- 10.4 Explain the functions of pigment.
- 10.5 List the main constituents of varnishes.
- 10.6 Explain the characteristics of good varnish.
- 10.7 Mention the functions of vehicle.
- 10.8 Describe synthetic materials used in paint and varnishes.

11 Understand the characteristic of timber as construction materials.

- 11.1 Define timber.
- 11.2 Mention the classification of trees depending on botanical groups.
- 11.3 Explain conservation of timber in various market forms.
- 11.4 Describe the major defects in timber.
- 11.5 Describe the advantages and disadvantages of using timber in engineering filed.
- 11.6 Describe the characteristics of good timber.

12 Understand the application of various heat and sound insulating materials.

- 12.1 Mention the functions of insulating materials.
- 12.2 List five natural heat insulating materials.
- 12.3 Mention the names of synthetic insulating materials.
- 12.4 Describe the sources of obtaining rubber, cork and ebonite.
- 12.5 Describe the uses of asbestos as insulating material.
- 12.6 List three natural sound absorbing materials.
- 12.7 Mention the names of five sound absorbing materials.

12.8 Explain light weight concrete used in acoustic works.

13 Understand the fundamental aspects of fire and waterproofing materials.

- 13.1 Mention the term of fireproofing materials and waterproofing materials.
- 13.2 Explain the uses of asbestos as fire and waterproof materials.
- 13.3 List the characteristics of refractory materials.
- 13.4 Explain the uses of rubber as water proofing material.
- 13.5 Explain the uses of bituminous felt as water proofing material.

14 Understand the engineering uses of metals and alloys.

- 14.1 Name the common types of iron used in industry.
- 14.2 Mention the uses of wrought iron and cast iron.
- 14.3 Mention the classification of steel on the basis of carbon content.
- 14.4 List the names of commercial steels.
- 14.5 Describe alloy steel.
- 14.6 Mention the uses of various alloy steels.
- 14.7 Define non-ferrous metals.
- 14.8 List the important non-ferrous metals used in engineering field.
- 14.9 Mention the uses of non-ferrous metals and alloys like copper, zinc, tin, lead, brass and bronze.

PRACTICAL:

1. **Show skill in field test of bricks**
 - 1.1. Perform field test of bricks
 - 1.2. Select 1st class , 2nd class, 3rd class bricks and jhama bricks
2. **Show skill in conducting laboratory test of bricks**
 - 2.1. Perform:
 - (a) Compression test
 - (b) Absorption test
 - 2.2. Determine average weight of a brick.
3. **Show skill in conducting laboratory test of cement**
 - 3.1. Conduct laboratory tests of cement.
 - (a) Make cement paste of Normal Consistency(CPNC)
 - (b) Determine initial setting time
 - (c) Perform final setting time test.
 - (d) Perform compressive strength test.
 - (e) Perform tensile strength test.
 - (f) Perform fineness test.
 - 3.2. Conduct field tests of cement.
4. **Show skill in conducting tests of coarse aggregate**
 - (a) Specific gravity of coarse aggregate.
 - (b) Grading of coarse aggregate.
5. **Show skill in conducting test of sand**
 - (a) Bulking of sand
 - (b) F M of sand
 - (c) Specific gravity of sand
6. **Show skill in conducting tests of concrete**
 - (a) Slump test of concrete.
 - (b) Cylinder test of concrete.

7. Show skill in identifying various ferrous and non ferrous metal

7.1. Identify mild steel, cast iron, copper, and aluminum, tin by physical observation.

8. Perform various kinds of joint using appropriate machines and tools.

8.1 Make the following joints:

- (a) Cross lap joint.
- (b) Tennon and mortise joint.
- (c) Half lap dovetail joint.
- (d) Dove tail corner joint.

9. Select suitable size of timber and calculate the gross quantity of timber required for door or window frame from the given sketch.**10. Perform the use of polish to wooden furniture.**

10.1 Use putty in the rack and defective places of wood.

10.2 Select sand paper sheet, cotton and cloth for polishing.

10.3 Apply polish focusing the grain of wood.

REFERENCE BOOKS

1	A text book on Engineering Materials	-G. J. Kulkarni
2	Engineering Materials	-Dr. M. A. Aziz
3	Natural and properties of Engineering Materials	-Zbigniew D. Jastrzebski
4	Architectural Materials	-BTEB

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; Earthing; 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 State 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 State 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.
- 10.2 Make the wiring circuit using required materials and equipment on wiring board.
- 10.3 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 |



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

ARCHITECTURE TECHNOLOGY

TECHNOLOGY CODE: 661

2nd SEMESTER

**DIPLOMA IN ENGINEERING
PROBIDHAN-2016**

ARCHITECTURE TECHNOLOGY (661)

2nd SEMESTER

Sl. No	Subject Code	Name of the subject	T	P	C	Marks				Total	
						Theory		Practical			
						Cont. assess	Final exam	Cont. assess	Final exam		
1	66121	Architectural Design -1	1	6	3	20	30	50	50	150	
2	66122	Creativity & Concept Development	2	3	3	40	60	25	25	150	
3	66611	Computer Application	0	6	2	0	0	50	50	100	
4	65711	Bangla	3	3	4	60	90	50		200	
5	65712	English	2	0	2	40	60	0	0	100	
6	65921	Mathematics-2	3	3	4	60	90	50	0	200	
7	65912	Physics-1	3	3	4	60	90	25	25	200	
Total			14	24	22	280	420	250	150	1100	

66121**Architectural Design - 1****T P C**
1 6 3**AIMS:**

To be able to develop knowledge, skill and attitude in the field of the graphical representation of architectural design & drafting with special emphasis on:

- The elements of drawing and principles of design.
- Form, Space, Organization, Circulation, proportion and scale.
- Concepts of Design, Design Process
- Anthropometric data.
- Design of small structure (temporary and permanent)

SHORT DESCRIPTION:

Elements of Drawing and principles of Design, Form & Space, Organization & Circulation, Proportion & scale, Concepts of Design, Design Process, Architectural drawing & drafting, Texture, Anthropometry, and Design of small structure (Temporary and Permanent)

THEORY:**1. Concept of Design & Design process.**

- 1.1. Define Art and architecture.
- 1.2. Define Design.
- 1.3. Describe the historical background of design principle.
- 1.4. Mention the classification of design.
- 1.5. Describe the Design theme (Analogy, Metaphor, Essences, Problem - Solving and Idea).
- 1.6. Describe the advantages and disadvantages of design.
- 1.7. Describe the Design procedure & Design criteria.

2. Primary elements of Design.

- 2.1. Explain Point as a drawing element and its application.
- 2.2. Explain Line as a drawing element and its application.
- 2.3. Explain Plane as a drawing element and its application.
- 2.4. Explain Volume as a drawing element and its application.

3. Form & Space.

- 3.1. Define Form, shape & and space.
- 3.2. Describe the primary shapes i.e. circle, triangle & square and regular and irregular forms.
- 3.3. Describe the transformation of forms.
- 3.4. Describe the subtractive and additive forms.
- 3.5. Explain the centralized, linear, radial, clustered and grid forms.
- 3.6. Explain Form defining space, Horizontal and Vertical Elements defining space.

4. Organization & Circulation.

- 4.1. Define Organization in design.
- 4.2. Describe the organization of Form & Space and their relationship.
- 4.3. Explain space within a space and interlocking space.
- 4.4. Describe different types of Organization.
- 4.5. Define circulation.
- 4.6. Describe the movement through space (Approach, Entrance, configuration of the path, Path space relationships, Form of the Circulation Space).

5. Proportion and scale.

- 5.1. Define Proportion and scale.
- 5.2. Discuss the materials proportions, structural proportions & manufactured proportion.
- 5.3. Describe the theories of proportions (Golden section, Classical orders, Module, Anthropometry & Scale etc.)
- 5.4. Describe Golden section and explain its drawing procedure.

- 5.5. Explain the modules and grids.
- 5.6. Define Human and Visual scale.

6. Sources and principles of Design.

- 6.1 State the source of nature from which design is developed.
- 6.2 Explain the principles of design in natural design that are observed easily (Rhythm, Appearance, Variety, Unity, Balance etc.)
- 6.3 Discuss the Emphasis factors in design.
- 6.4 Explain the Emphasis factors procedure determination.

PRACTICAL

1.0 Primary Elements

- 1.1. Indicate a position in space by point.
- 1.2. Draw a line with different properties.
- 1.3. Extend a line to plane with different properties.
- 1.4. Make different volume (i.e. Cubic, Cylindrical, Prismatic)

2.0 Form & Shape

- 2.1. Draw different two dimensional forms using lines.
- 2.2. Draw different Shapes (i.e. Square, Rectangle, Triangle, Circle.)
- 2.3. Draw different Shapes showing difference between sizes.
- 2.4. Draw different three dimensional forms.

3.0 Different Forms

- 3.1. Draw a centralized form.
- 3.2. Draw linear form.
- 3.3. Draw a Radial form.
- 3.4. Draw a Clustered form.
- 3.5. Draw a Grid form.

4.0 Different Spaces

- 4.1. Draw Space within Space.
- 4.2. Draw different interlocking space.
- 4.3. Draw Spaces linked by a common space linked.
- 4.4. Draw adjacent Spaces.

5.0 Different Planes

- 5.1. Draw a Base plane.
- 5.2. Draw a elevated Base plane.
- 5.3. Draw Depressed Base plane.
- 5.4. Draw a Overhead plane.

6.0 Golden section & Order

- 6.1. Draw a golden section of rectangle showing mathematical solution.
- 6.2. Draw a golden section of a pentagon.
- 6.3. Show the golden section of Parthenon to show its ratio.
- 6.4. Draw different classic order (i.e. Doric, Ionic, Corinthian, Tuscan, Composite)
- 6.5. Draw different configuration of path (Linear, Radial, Spiral, Grid, Network, Composite)

7.0 Circulation movement through Space.

- 7.1. Draw approach to show distance view.
- 7.2. Draw a entrance from outside to inside.
- 7.3. Draw configuration of the path to show the sequence of spaces.
- 7.4. Draw path-space relationships (Edges, Nodes & Terminations of the path)
- 7.5. Draw form of the circulation space (Corridors, Halls, Stairways & rooms)

8.0 Design temporary or permanent single room building/single structure (Police Box, Guard Room with Gate, Traffic/Passenger Shed, Park Shed etc. - any one project).

- 8.1 Sketch a site with necessary information.

- 8.2 Draw a free hand sketch of the selected (Police box, guard room with gate, Passenger Shed, Park Shed etc.) project plan.
- 8.3 Draw elevation and section of the plan.
- 8.4 Draw a 3D view of the project.

Reference Books:

1. Architecture: Drafting & Design(5th edition) - Donald E. Hepler, Paul I Wallach
2. A Visual Dictionary of Architecture - Francis D.K. Ching.
3. Building Construction Illustrated (3rd Edition) - Francis D.K. Ching.
4. Design Riti O Sthapatya Dhara - Abu H. Imam Uddin
5. Architecture Form, Space & Order - Francis D.K. Ching.

66122

CREATIVITY & CONCEPT DEVELOPMENT

T P C
2 3 3

AIMS:

- Able to understand creativity & concept development in architecture.
- Understand the Anthropometric data in different situation.
- Develop composition by different elements of Architecture.

SHORT DESCRIPTION :

Creativity in Architecture, Concept in Architecture, Anthropometric data, Balance & Composition.

THEORY :

1. Creativity in Architecture

- 1.1 Define Creativity.
- 1.2 Describe two stages of creation.
- 1.3 Describe three points of working definition of creativity.
- 1.4 State creative thinking theories.
- 1.5 State creative process theories.
- 1.6 Mention different creative process.
- 1.7 Explain the climate for creativity.
- 1.8 Describe the effective management for creativity.
- 1.9 Mention the guidelines to encourage creativity.

2. Techniques for Creative Thinking & Understanding Creativity.

- 2.1 Define brainstorming & cataloging.
- 2.2 Describe checklists & attribute list.
- 2.3 Describe free association & forced relationship.
- 2.4 State Morphological analysis & Input-output technique.
- 2.5 Explain model for problem solving.
- 2.6 State creativity organization.

3. Architectural Concepts

- 3.1 Define architectural concept.
- 3.2 Mention the stages of design process.
- 3.3 State design philosophy.
- 3.4 Explain design problems.
- 3.5 State the process to establish concept by understanding the problem.
- 3.6 State the stages of design.
- 3.7 Explain design solution.

4. Anthropometry.

- 4.1 State the meaning of anthropometric data.
- 4.2 Mention anthropometric data for the children.
- 4.3 Mention anthropometric data for the Adults.
- 4.4 Mention the comparative dimension of different portion of a human body (male and female).
- 4.4 State the comparative dimension of different working position of a human body (male and female).

5. Composition in Architecture.

- 5.1 Describe composition.
- 5.2 State necessity of composition.
- 5.3 Explain necessity of composition in Architectural design.
- 5.4 State 2- dimensional and 3- dimensional compositions.
- 5.5 Explain the role of color in composition.
- 5.6 State role of texture in composition.

6. Balance in Architecture.

- 6.1 Describe balance.
- 6.2 State classification of balance.
- 6.3 Describe about symmetrical, asymmetrical and circular balance.
- 6.4 Explain the role of balance in Architectural design.

PRACTICAL:**1. Form Transformation.**

- 1.1 Make form transformation of block.
- 1.2 Make form transformation of cylinder.
- 1.3 Make transformation of prism.
- 1.4 Make form transformation of pyramid.

2. Origami.

- 2.1 Make an origami by paper.
- 2.2 Make origami by board/Transparent sheet.
- 2.3 Make origami by stick.
- 2.4 Make an origami by composite materials.

3. Metamorphosis.

- 3.1 Study metamorphosis of Bird.
- 3.2 Study metamorphosis of Ant.
- 3.3 Study metamorphosis of Bee.
- 3.4 Study metamorphosis of Butterfly.
- 3.5 Make metamorphosis by Block/Cylinder/Prism etc.

4. Prepare a set of the Anthropometric data.

- 4.1 Draw different standing dimension of an adult male.
- 4.2 Draw different standing dimension of an adult female.
- 4.3 Draw the various positions with dimension for the child.

5. Prepare a set of the Anthropometrics data. (Different working position.)

- 5.1 Draw different dimension of working positions of the Adult male.
- 5.2 Draw different dimension of working positions of the Adult female.
- 5.3 Calculate the comparative dimension of different portion of a human body (male and female) in the context of Bangladesh.
- 5.5 Calculate the comparative dimension of different working position of a human body (male and female) in the context of Bangladesh.

6. Draw Techniques of composition.

- 6.1 Make composition of different objects with color.
- 6.2 Make composition with dots and circle.
- 6.3 Make composition with 2-dimensional surface and geometric forms.
- 6.4 Make composition with 2-dimensional geometric elements.
- 6.5 Make composition with 3-dimensional geometric elements.

Reference Books:

1. Design in Architecture - Geoffrey Broadbent.
2. Conceptual Blockbusting - J. L. Adams.
3. Top International Architects design concepts in Architecture.
4. Generating concepts and design ideas.
5. The Architecture concept.

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 cps) are achieved.
- 2.2.4 Specialized Bangla Typing tutor / software are installed.
- 2.2.5 Bangla Home key typing are practiced systematically
- 2.2.6 Text documents are typed repeatedly for increasing typing speed.

2.3 Type documents

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

3. Operate Word Processing Application

3.1 Create documents:

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

3.2 Customize basic settings to meet page layout conventions:

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

3.3 Format documents

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

3.4 Create tables:

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

3.5 Add images:

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

3.6 Print information and Shutdown computer:

- 3.6.1 **Printer** is connected with computer and power outlet properly.
- 3.6.2 Power is switched on at both the power outlet and printer.
- 3.6.3 Printer is installed and added.
- 3.6.4 Correct printer settings are selected and document is printed.
- 3.6.5 Print from the printer spool is viewed or cancelled and
- 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 per 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

65711

BANGLA

T P C
3 3 4

উদ্দেশ্য :

- মাতৃভাষা হিসেবে বাংলা ভাষার প্রকৃতি ও বৈশিষ্ট্য সম্পর্কে ধারণা লাভ। ভাষার ব্যবহারে প্রায়োগিক যোগ্যতা অর্জন।
- বাংলা সাহিত্য পঠন-পাঠনের মাধ্যমে জাতীয় চেতনা, দেশপ্রেম, মুক্তিযুদ্ধের চেতনা, শুন্ধাচার, নীতি ও মূল্যবোধের উন্নয়ন ঘটানো।

সংক্ষিপ্ত বিবরণী :

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

১. বাংলা ভাষার প্রয়োগ:

ক) বাংলা ভাষা :

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

খ) বাংলা বানান রীতি ও শব্দ প্রয়োগ:

১. বাংলা একত্তেমির প্রমিত বানান রীতি, শ-ত্ব ও ষ-ত্ব বিধি

২. শব্দ ও শব্দের শ্রেণি বিভাগ (সংজ্ঞা, শব্দের গঠন, উৎস বা উৎপত্তি ও অর্থগত)

৩. বাক্য প্রকরণ ও গঠন রীতি (সংজ্ঞা, বাক্য গঠন এবং প্রকার)

গ) পত্র রচনা :

আবেদন পত্র (চাকুরি, ছুটি), চাকুরিতে যোগদান পত্র, মানপত্র, স্মারকলিপি, সংবাদপত্রে প্রকাশের জন্য পত্র

২. বাংলা সাহিত্য:

ক. কবিতা :

১. বঙ্গভাষা - মাইকেল মধুসূদন দত্ত

২. সোনার তরী - রবীন্দ্র নাথ ঠাকুর

৩. উমর ফারুক - কাজী নজরুল ইসলাম

৪. বাংলার মুখ আর্যি - জীবনানন্দ দাশ

৫. আসাদের শার্ট - শামসুর রাহমান

৬. স্বাধীনতা শব্দটি কি করে আমাদের হলো? - নির্মলেন্দু গুণ

খ. প্রবন্ধ :

১. অর্ধাসী - রোকেয়া সাখাওয়াত হোসেন

২. বইকেন্দা - সৈয়দ মুজতবো আলী

গ. একাঙ্কিকা (নাটিকা): মানুষ - মুনীর চৌধুরী

ঘ. উপন্যাস: লালসালু - সৈয়দ ওয়ালী উল্লাহ

ঙ. ছেট গল্প:

১. হৈমতী - রবীন্দ্র নাথ ঠাকুর

২. একুশের গল্প - জহির রায়হান

৩. পাতালেহাসপাতালে - হাসান আজিজুল ইক

ব্যবহারিক

১. নির্ধারিত বক্তৃতা :

বাংলাদেশ ও বাঙালি সংস্কৃতি, বিভিন্ন জাতীয় দিবস (একুশে ফেব্রুয়ারি ও আন্তর্জাতিক মাতৃভাষা দিবস, স্বাধীনতা দিবস, বিজয় দিবস, জাতীয় শোক দিবস, মুজিব নগর দিবস, মহান মে দিবস)।

প্রাতিষ্ঠানিক বক্তৃতা- নবাগত শিক্ষক/ছাত্রছাত্রীদের বরণ, গুরুত্বপূর্ণ ব্যক্তিবর্গের আগমন উপলক্ষে বক্তৃতা।

২. উপস্থিতি বক্তৃতা :

বিষয়বস্তু উন্নত

৩. আবৃত্তি :

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

৪. বিতর্ক (নমুনা)

সংস্কৃতিই আধুনিক মানবের ধর্ম

তথ্য প্রযুক্তির অবাধ ব্যবহারই যুব সমাজের অবক্ষয়ের মূল কারণ
গতানুগতিক শিক্ষা নয় কর্মসূচি শিক্ষাই অর্থনৈতিক মুক্তির চাবিকাটি

চালকের অসাবধনতাই সড়ক দুর্ঘটনার প্রধান কারণ
মুক্তিযুদ্ধের চেতনাই অসাম্প্রদায়িক বাংলাদেশ প্রতিষ্ঠার মূলমন্ত্র

প্রযুক্তির বিকাশই প্রকৃতি বিনাশের একমাত্র কারণ

৫. প্রতিবেদন প্রণয়ন ও উপস্থাপন:

স্থানীয় বিভিন্ন সমস্যা ও অনুসন্ধানী যে কোন বিষয়।

65712**ENGLISH**

T	P	C
2	0	2

Objectives:

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

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

Seen Comprehension: (Marks-20)

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

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

Grammar (Marks-20)**1. (A) Uses of Articles.**

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

2. Sentence:

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

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

3. Enrich Vocabulary: Synonyms, Antonyms; Suffix And Prefix.**4. Voice, Narration**

5. Sentence Analysis:

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

Free Writing (Marks -20)

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

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, adjoint 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 adjoint 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 $e^x = 1 + \frac{x}{L^1} + \frac{x^2}{L^2} + \frac{x^3}{L^3} + \frac{x^4}{L^4} \dots \dots \text{to } \infty$
- 3.4 Solve problems of the following types :
 - i) $1 + \frac{1}{L^2} + \frac{1}{L^4} + \frac{1}{L^6} + \dots \dots \text{to } \infty$
 - ii) $\frac{1}{L^2} + \frac{1+2}{L^3} + \frac{1+2+3}{L^4} + \frac{1+2+3+4}{L^5} + \dots \dots \text{to } \infty$

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

$$\begin{aligned} \text{i) } \tan^{-1} x + \tan^{-1} y &= \tan^{-1} \frac{x+y}{1-xy} . \\ \text{ii) } \tan^{-1} x + \tan^{-1} y + \tan^{-1} z &= \tan^{-1} \frac{x+y+z-xyz}{1-xy-yz-zx} \\ \text{iii) } \sin^{-1} x + \sin^{-1} y &= \sin^{-1} \left(x\sqrt{1-y^2} + y\sqrt{1-x^2} \right) \\ \text{iv) } 2 \tan^{-1} x &= \sin^{-1} \frac{2x}{1+x^2} = \cos^{-1} \frac{1-x^2}{1+x^2} = \tan^{-1} \frac{2x}{1-x^2} \\ \text{4.5 Solve problems of the following types.} \\ \text{a) } 2 \tan^{-1} \frac{1}{3} + \tan^{-1} \frac{1}{4} &= \frac{\pi}{4} \\ \text{b) } \cos \tan^{-1} \cot \sin^{-1} x &= x. \\ \text{c) Prove that the area of the segment cut from a circle of radius } r \text{ by a chord at a} \\ \text{distance } d \text{ from the centre is given by} \\ K &= r^2 \cos^{-1} \frac{d}{r} - d\sqrt{r^2 - d^2} \end{aligned}$$

5 Apply the principle of properties of triangles.

- 5.1 Prove the followings identities :

$$\begin{aligned} \text{i) } \frac{a}{\sin A} &= \frac{b}{\sin B} = \frac{c}{\sin C} = 2R . \\ \text{ii) } a^2 &= b^2 + c^2 - 2bc \cos A \\ \text{iii) } a &= b \cos C - c \cos B . \\ \text{v) } \Delta &= \frac{1}{2} bc \sin A. \end{aligned}$$

- 5.2 Establish the followings.

$$\begin{aligned} \text{a) } \tan \frac{A}{2} &= \sqrt{\frac{(s-b)(s-c)}{s(s-a)}} \\ \text{b) } \tan \frac{B-C}{2} &= \frac{b-c}{b+c} \cot \frac{A}{2} \\ \text{c) } \Delta &= \frac{abc}{4R} \end{aligned}$$

- 5.3 Solve the problems of the following types:

$$\begin{aligned} \text{i) } \text{Prove } \cos(B-C) + \cos A &= \frac{bc}{2R} \\ \text{ii) An object experiences two forces } F_1 \text{ and } F_2 \text{ of magnitude 9 and 13 Newtons with} \\ \text{an angle } 100^\circ \text{ between their directions. Find the magnitude of the resultant } R. \end{aligned}$$

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 $\lim_{x \rightarrow a} f(x)$ and $f(a)$.
- 7.3 Establish (i) $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1$

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

Understand differential co-efficient and differentiation.

7.4 Define differential co-efficient in the form of

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

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

8 Apply the concept of differentiation.

8.1 State the formulae for differentiation:

- (i) sum or difference
- (ii) product
- (iii) quotient
- (iv) function of function
- (v) logarithmic function

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

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

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

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

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

9.3 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 ?

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

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

10.2 Express Leibnitz's theorem

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

11 Understand partial differentiation.

11.1 Define partial derivatives.

11.2 State formula for total differential.

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

11.4 State Euler's theorem on homogeneous function.

11.5 Solve the problems of partial derivatives.

INTEGRAL CALCULUS

12 Apply fundamental indefinite integrals in solving problems.

12.1 Explain the concept of integration and constant of integration.

12.2 State fundamental and standard integrals.

12.3 Write down formulae for:

- (i) Integration of algebraic sum.
- (ii) Integration of the product of a constant and a function.

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

12.5 Solve problems of indefinite integration.

13 Apply the concept of definite integrals.

13.1 Explain definite integration.

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

13.3 Solve problems of the following types:

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

SL No	Athour	Reference		Publication
		Title		
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

65912**PHYSICS-1**

T	P	C
3	3	4

OBJECTIVES

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

SHORT DESCRIPTION

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

DETAIL DESCRIPTION**THEORY :****1. PHYSICAL WORLD AND MEASUREMENT**

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

2. SCALAR AND VECTOR QUANTITIES

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

3. MOTION AND EQUATIONS OF MOTION

- 3.1 Define rest and motion
- 3.2 Classify and explain of motion.
- 3.3 Define and explain displacement, speed, velocity, acceleration and retardation.
- 3.4 Deduce the relationship between displacement, velocity, acceleration and retardation from these definitions.
- 3.5 Motion of a Projectile.
- 3.6 Equation of motion of a freely moving body thrown obliquely vertically upward or motion of a projectile.
- 3.7 Define angular velocity and linear velocity with their units.
- 3.8 Deduce the relation between angular velocity and linear velocity.
- 3.9 Define centripetal and centrifugal force with examples.

- 3.10 Prove that centrifugal force = $\frac{mv^2}{r}$
- 3.11 State and explain the laws of falling bodies and mention the equation of motion of a body when it is projected vertically upwards or downwards.

4. NEWTON'S LAWS OF MOTION FORCE AND FRICTION

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

5. GRAVITY AND GRAVITATION

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

6. SIMPLE HARMONIC MOTION (SHM)

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

7. WORK, POWER AND ENERGY

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

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

8. ELASTICITY

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

9. HYDROSTATICS

- 9.1 Define pressure as force per unit area and state that it is measured in N/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 Surface tension and surface energy, Angle of contact.
- 9.5 Capillarity and theory of capillarity.
- 9.6 Viscosity and co-efficient of viscosity.
- 9.8 Necessity of viscosity.

10. WAVE AND SOUND

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

11. SOUND AND VELOCITY OF SOUND

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

PRACTICAL

1. Determine accurate diameter/side of an object using vernier calipers.
2. Measure the area of cross section of a wire by micrometer screw gage.
3. Measure the thickness of a glass plate by speedometer.
4. Verify the law of parallelogram of forces by a force board.
5. Draw L-T² graph and determine the value of “g” by using a simple pendulum.
6. Determine the coefficient of static friction.
7. Determine Young’s modulus of a steel wire by Searle’s apparatus.
8. Determine gravity of a solid heavier than and insoluble in water by hydrostatic balance.
9. Determine specific gravity of a liquid by specific gravity bottle.
10. Determine velocity of sound by resonance air column method.

REFERENCE BOOKS:

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



BANGLADESH TECHNICAL EDUCATION BOARD
Agargoan, Dhaka-1207.

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

ARCHITECTURE TECHNOLOGY

TECHNOLOGY CODE: 661

3rd SEMESTER

**DIPLOMA IN ENGINEERING
PROBIDHAN-2016**

ARCHITECTURE TECHNOLOGY (661)

3rd SEMESTER

Sl. No	Subject Code	Name of the subject	T	P	C	Marks				Total	
						Theory		Practical			
						Cont. assess	Final exam	Cont. assess	Final exam		
1	66131	Architectural Design -2	1	6	3	20	30	50	50	150	
2	66132	Computer Aided Drawing	0	6	2	0	0	50	50	100	
3	66133	Architectural Graphics	1	3	2	20	30	25	25	100	
4	66435	Fundamental Surveying	3	3	4	60	90	25	25	200	
5	65722	Communicative English	1	3	2	20	30	50	0	100	
6	65931	Mathematics-3	3	3	4	60	90	50	0	200	
7	65922	Physics-2	3	3	4	60	90	25	25	200	
Total			12	27	21	240	360	275	175	1050	

66131

Architectural Design - 2

T P C
1 6 3

AIMS

- Able to understand the factors in planning and designing of residential building.
- To develop skills in orientation of different rooms of residential building.
- To provide knowledge and skills of working drawing of residential building

SHORT DESCRIPTION

Fundamentals of design, Basic area of residential building, Residential building planning, Area planning of house, Room arrangement , Floor plan ,

DETAIL DESCRIPTION

Theory :

1. Understand the fundamentals of Architectural design.

- 1.1 State the terms of formal & informal design.
- 1.2 List the principles of architectural design.
- 1.3 List the elements of architectural design.
- 1.4 Describe the principles of architectural design.
- 1.5 Describe the elements of architectural design.
- 1.6 State the style of house.

2. Understand the aspect of residential building planning .

- 2.1 List the general requirement of a house.
- 2.2 State the different components used in residential building.
- 2.3 Describe the function of different components used in residential building.
- 2.4 Describe the location of different components used in residential building.
- 2.5 Mention the size of different components used in residential building.

3. Understand basic areas of residential building.

- 3.1 List the basic areas of a house
- 3.2 Describe basic areas of a house.
- 3.3 State the living area of the house(Living and Dining).
- 3.4 State the sleeping area of a house (Beds).
- 3.5 State the service area of a house (Kitchen , Utility and Stair).
- 3.6 Describe the toilet of of a residence.
- 3.7 Explain the bubble diagram of a house.
- 3.8 Explain traffic pattern of a house.

4. Understand the room arrangement of a house .

- 4.1 State the location of different room of a house.
- 4.2 Describe the function of different room of a house.
- 4.3 Describe the functional relation of different room of a house.
- 4.4 State the criteria depends on select the size of rooms of a house.
- 4.5 State the meaning of the terms Foyer, Corridor, Passage, Verandah, Balcony, Terrace, Open Terrace, Porch, Portico, Head room, Louver, corbel, Offset, Projection wall, Pent house,, Drip course & Groove.

5. Understand the different types of house.

- 5.1 List the different types of house.
- 5.2 Describe different types of house.
- 5.3 Describe Duplex & Split level house
- 5.4 Describe difference between single and multistoried building.
- 5.5 Describe advantage & disadvantage of single and multistoried building.
- 5.6 State the design process of residential building.

6. Understand Architectural Drawing.

- 6.1 Define plan, elevation, section of a residential building.
- 6.2 State working drawing.
- 6.3 Describe Detail drawing.
- 6.4 Describe site plan.

7. Understand the planning of stair & Elevator.

- 7.1 Define staircase.
- 7.2 Mention the classification of staircase.
- 7.3 Mention the space requirement for staircase.
- 7.4 State the relation between tread & riser.
- 7.5 Mention the planning consideration of staircase.
- 7.6 Define Elevator & its function.

PRACTICAL :

1. Perform the area planning.

- 1.1 Draw a bubble diagram showing different areas of a house.
- 1.2 Show the relationship of three basic area.
- 1.3 Draw a traffic pattern
- 1.4 Show the basic types of entrance.
- 1.5 Sketch a line plan showing different rooms.

2. Prepare the drawing of various environmental consideration.

- 2.1 Draw the winter and summer sun angle diagram.
- 2.2 Draw the shading device to control summer and winter sun heat.
- 2.3 Draw the plan showing position of the building.
- 2.4 Draw the room plan showing air movement of the room.

3. Prepare the drawing of staircase.

- 3.1 Draw the plan of a doglegged staircase in 1:50 scale.
- 3.2 Draw a section of a doglegged staircase in 1:50 scale.
- 3.3 Draw the plan of a three-quarter turn stair in 1:50 scale.
- 3.4 Draw the section of a three-quarter turn stair in 1:50 scale.

4. Prepare the presentation drawing.

- 4.1 Sketch a line plan of a multistoried two bed room residential building in a given area.
- 4.2 Draw the plan of the building in 1:100 scale.
- 4.3 Draw the 4-side elevations with rendering of the building in 1:100 scale..
- 4.4 Draw the section of the building in 1:100 scale.
- 4.5 Draw the roof plan of the building in 1:100 scale.
- 4.6 Draw the lay-out plan of the building in 1:200 scale.

5. Prepare the working drawing of a residential building.

- 5.1 Draw the floor plan of a house (working drawing) in 1:50 scale with detail dimensions.
- 5.2 Draw the elevations in 1:50 scale.
- 5.3 Draw a section in 1:50 scale detail dimensions.
- 5.4 Draw detail drawing of building component in 1:10 scale.

6. Prepare the detail drawing of toilet & kitchen.

- 6.1 Draw the detail toilet plan in 1:20 scale with different fixture layout.
- 6.2 Draw the section of toilet in 1:20 scale.
- 6.3 Draw the detail kitchen plan in 1:20 scale with different fixture layout.
- 6.4 Draw the section of kitchen in 1:20 scale.

REFERENCE BOOKS

1. Architecture Drafting and Design

**Donald E.Hepler
Paul I.Wallach**

2. ডিজাইন রীতি ও স্থাপত্যিক ধারা
আবু এইচ ইমামউদ্দিন
3. আর্কিটেকচারাল ড্রাফটিং - ১

66132

Computer Aided Drawing

T P C
0 6 2

AIMS:

Able to develop knowledge, skill and attitude in the field of Computer Aided Drafting (Auto CAD) with special emphasis on:

- Drawing environments and drawing aids.
- Different setup of drawing in Auto CAD.
- Drawing commands.
- Modification & editing of drawing.
- Develop skills in 3D using Auto CAD.
- Printing the drawing.

SHORT DESCRIPTION:

Drawing environments and drawing aids; Different set-up of drawing in Auto CAD; Drawing commands; Modification & edits of drawing; and Printing the drawing.

PRACTICAL

1. Set up the drawing environments.

- 1.1. Start CAD software and identify the different areas of CAD graphic screen.
- 1.2. Use menu bar, command window and toolbar.
- 1.3. Perform the Cartesian co-ordinate system.
- 1.4. Save the drawing & exit from the file.

2. Construct the geometrical shape or object.

- 2.1. Use the command to draw straight line.
- 2.2. Draw single and multiple points using point commands.
- 2.3. Draw angular line using line commands.
- 2.4. Perform snap command.
- 2.5. Erase the object using erase command.

3. Construct the rectangle, circle, polygon, poly line etc.

- 3.1. Draw rectangle using rectangle commands.
- 3.2. Draw circles using different method of circle commands.
- 3.3. Draw polygon using different method of polygon commands.
- 3.4. Draw poly line using poly line commands.
- 3.5. Draw poly line and arc together using poly line commands.
- 3.6. Draw different thickness of poly line using poly line commands

4. Construct the ellipse, arc, donut, offset, array etc.

- 4.1. Draw ellipse using center and axis method commands.
- 4.2. Draw arc using different commands of arc.
- 4.3. Draw donut using donut commands.
- 4.4. Perform offset command.
- 4.5. Perform rectangular and polar array command.

5. Construct ray, chamfer, fillet, lengthen, hatch, stretch and scale etc.

- 5.1. Draw ray in a certain angular distance using ray command.
- 5.2. Use chamfer & fillet in a given rectangle.
- 5.3. Use different lengthen command in a given line.
- 5.4. Fill the drawing areas of an object using different pattern of hatch command.
- 5.5. Use stretch command to extend line and rectangle.
- 5.6. Use scale command to enlarge or reduce an object in a ratio.

6. Edit and modify the object.

- 6.1. Select and delete the object in various methods.
- 6.2. Duplicate the object using copy.
- 6.3. Use trim command in a given drawing.
- 6.4. Use the extend command in a given drawing.
- 6.5. Use mirror command to create duplicate reverse copy.
- 6.6. Break the line using break command.
- 6.7. Rotate the object in different angle /direction using rotate command.

- 7. Set-up the units, limits, layer.**
 - 7.1. Set-up the units using units command.
 - 7.2. Set-up the drawing limits using limits command.
 - 7.3. Select the layer control option.
 - 7.4. Create the name of a layer and make it current.
 - 7.5. Use freeze, lock option of the layer.
 - 7.6. Set the color, line type & line weight for different layer.
- 8. Set-up the dimension style and dimensioning.**
 - 8.1. Set-up the dimension style using dimension style manager.
 - 8.2. Set-up the dimension style using modify dimension style.
 - 8.3. Set-up the units, dimension lines and arrows, text, leader & annotations etc.
 - 8.4. Put dimension in the object using linear, angular, radius, diameter, ordinate, align, center mark, continuous, base line dimension commands.
 - 8.5. Edit dimension.
- 9. Set-up the Text style.**
 - 9.1. Set-up the text style using text style commands.
 - 9.2. Set-up the text height & font using text style commands.
 - 9.3. Select the text justification using text style command.
 - 9.4. Write text by using dtext and mtext commands.
 - 9.5. Edit the text in a given drawing..
- 10. Prepare a drawing in different layer using CAD.**
 - 10.1. Draw a given floor plan of a building using various commands.
 - 10.2. Draw an elevation of the building using various commands.
 - 10.3. Draw the section of the building using various commands.
 - 10.4. Put dimension & write the text or annotation on the floor plan & section.
 - 10.5. Create a folder & Save the drawing.
- 11. Prepare the 3D objects using CAD.**
 - 11.1. Create simple 3D object in auto CAD.
 - 11.2. Draw isometric view.
 - 11.3. Create 3D surface by using 3D poly, Edge surf, Rule surf, Tab surf & Mesh.
 - 11.4. Edit / draw 3D object using polar co-ordinate system.
 - 11.5. Edit 3D object using different editing command i. e. align, 3D rotate, 3Darray 3D, mirror 3D, move, chamfer, fillet, trim etc.
- 12. Modify/Edit the 3D objects using CAD.**
 - 12.1. Create 3D surface/object by using extrude.
 - 12.2. Edit 3d object using union command
 - 12.3. Draw 3d object using revolves command.
 - 12.4. Edit / draw 3D object using intersect command.
Edit 3D object using subtracts command.
- 13. Set the Layout and plot the drawing.**
 - 13.1. Create layout for plot/print using paper space and model space.
 - 13.2. Set up the scale & assign pen (if necessary) for plot/print.
 - 13.3. Select the paper & plotter for plotting/printing.
 - 13.4. Plot/Print the drawing.
 - 13.5. Set various drawing in different scale in a paper through layout.
 - 13.6. Save the drawing in PDF format.

REFERENCE BOOKS :

1. Mastering Auto CAD - Engr. Symuel Mallik
2. Auto CAD 2D & 3D - Engr. Md. Shah Alam

66133

ARCHITECTURAL GRAPHICS

T P C
1 3 2

AIMS:

To be able to develop knowledge, skill and attitude in the field of the graphical representation of architectural design & drafting with special emphasis on:

- Free hand sketching
- Composition
- Colour design & rendering
- Perspective view (one point & two point)

SHORT DESCRIPTION:

Free hand sketching, composition, Design element, View, Isometric View, Oblique view, Orthographic view, Colour design, Rendering, Surface development, One point perspective, Two point perspective.

THEORY:

1. Understand Free Hand Sketching:

- 1.1 Define Free Hand Sketching
- 1.2 Describe the necessity of free Hand Sketching
- 1.3 Discuss the free hand sketch materials used in free hand Sketching.
- 1.4 Describe the Principle & Technique of Free Hand Sketch.
- 1.5 Explain the scaling techniques of Free Hand Sketch.
- 1.6 Describe the use of different types of pencil in sketching.

2. Understand Free Hand Sketch (Human Figure):

- 2.1 State the necessity of Free Hand Sketch of Human Figure.
- 2.2. Describe the principle & technique of draw Human Figure.
- 2.3. Explain the Architecture Data in different situation for adults and children.
- 2.4. Explain the space required by human bodies in different working conditions & positions.

3. Understand Free hand sketches(trees, bushes & natures):

- 3.1. List the different types of Trees uses in Architectural Drawing.
- 3.2. Describe the different data of Trees uses in Architectural Drawing.
- 3.3. Describe the draw of Trees by pencil and charcoal.
- 3.4. Describe the draw of Bushes by pencil and charcoal.

4. Understanding Free Hand Sketching of different Objects:

- 4.1. State the necessity of free hand sketch of objects in Architectural Design.
- 4.2. Describe the principal and technique of free hand sketch of objects.
- 4.3. Describe between free and hand and dimensional sketches.

5. Understand the necessity & importance of composition:

- 5.1. Define composition.
- 5.2. State the list of composition.
- 5.3. Distinguish between different forms and composition.
- 5.4. Describe composition in different medium.

6. Understand the necessity of colour in Architectural Design.

- 6.1 State the colour.
- 6.2 Discuss the necessity of colour use in Architectural Design.
- 6.3 List the different types of colour.
- 6.4 Describe value weight and warmth of colour.
- 6.5 State pigment, tone and shapes in colour.
- 6.6 Describe the language of colour.

7. Understand the concept of rendering and presentation:

- 7.1 Define rendering.
- 7.2 Describe the necessity of rendering.
- 7.3 Describe the importance of rendering.
- 7.4 State the technique of rendering.
- 7.5 State the general approach and materials required for rendering.

- 8. Understand the general feature of perspective drawing.**
 - 8.1 Define perspective drawing.
 - 8.2 Discuss the necessity and importance of perspective drawing.
 - 8.3 List the types of perspective drawing.
 - 8.4 Mention the principle of perspective drawing.
 - 8.5 Describe the methods of perspective drawing.

 - 9. Understand the principle of One point and Two point perspective:**
 - 9.1 Mention the meaning of One point or parallel perspective.
 - 9.2 Describe the methods of One point perspective.
 - 9.3 Mention the meaning of Two point perspective or angular perspective.
 - 9.4 Describe the methods of Two point perspective.
 - 9.5 Mention the meaning of the distortion in perspective.
 - 9.6 Describe the distortion from station point.
- PRACTICAL:**
- 1. Prepare Free Hand Sketches:**
 - 1.1 Draw horizontal, vertical line.
 - 1.2 Draw inclined and curve line.
 - 1.3 Draw contour, expressive, regulating and drawing lines.
 - 1.4 Draw free hand circular figure.

 - 2. Prepare Free Hand Sketch(Human Figure):**
 - 2.1 Draw human figure in different working position.
 - 2.2 Draw human figure with anthropometric Data.
 - 2.3 Sketch three dimensional objects like still life and Abstract forms.

 - 3. Prepare Free Hand Sketches (Trees, bushes, natures & objects):**
 - 3.1 Draw different types of Trees with height.
 - 3.2 Draw different types of Bushes.
 - 3.3 Draw different type of natural symbols.
 - 3.4 Draw the view of simple object in different position.
 - 3.5 Draw different types of household object.
 - 3.6 Draw different complex object having circular and hidden.

 - 4. Perform composition and Design element in Architectural Drawing:**
 - 4.1 Make composition using straight and curve lines.
 - 4.2 Make composition with geometrical forms.
 - 4.3 Make composition with dots and circle.
 - 4.4 Draw different element of Design.
 - 4.5 Make composition with design element.

 - 5. Prepare composition applying colour concept:**
 - 5.1 Make composition with primary colours of different grades.
 - 5.2 Make composition with secondary colors of different grades.
 - 5.3 Make composition with tertiary colours of different grades.
 - 5.4 Prepare a colour wheel and colour charts.
 - 5.5 Prepare a colouor scheme of a building.

 - 6. Prepare Render & presentation:**
 - 6.1 Draw two dimensional object and make rendering with pencil.
 - 6.2 Make different composition with colour.
 - 6.3 Prepare render of human figure indifferent positions.

 - 7. Perform the construction of the perspective view:**
 - 7.1 Draw the different step of One point perspective.
 - 7.2 Draw the One point perspective view of an object using different step.
 - 7.3 Draw the different step of Two point perspective.

- 7.4 Draw the Two point perspective view of an object using different step.
- 7.5 Draw the shape of object by changing vanishing point in One point perspective.
- 7.6 Draw the shape of object by changing vanishing point in Two point perspective.

REFERENCE BOOKS:

1. Prathomic Engineering Drawing – Hemonta Kumar Bhattacharia.
2. Rendering with pen and ink- Robert W.Gill.
3. Order in space- keth Critchlow.
4. Architectural Rendering-Albert. O. Halse.
5. Graphics – 2_Sonnaymot Rezaul Karim
6. Professional Architectural Graphics-C. Leslie Martin.
7. Basic Perspective.
8. Creative Perspective.

66435

FUNDAMENTAL SURVEYING

T P C
3 3 4

AIMS

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

- Survey work with chain, compass and total station.
- Conduct cadastral survey.
- Conduct leveling and contouring
- Calculation of the area by using different instrument.

SHORT DESCRIPTION

Concept of Surveying; Chain surveying; Compass surveying; Cadastral surveying; Leveling and Contouring; Surveying with total station; GPS .

DETAIL DESCRIPTION

Theory:

1 Understand the concept of surveying

- 1.1 Define surveying.
- 1.2 State the purpose of surveying.
- 1.3 Discuss the classification of surveying based on shape of the earth, nature of field, objective of surveying and instrument employed.
- 1.4 Explain field work.
- 1.5 Explain office work.
- 1.6 Identify survey instruments with their care and adjustment.
- 1.7 Differentiate between plane survey and geodetic survey.

2 Understand the basic principle of chain surveying.

- 2.1 Define the meaning of chain surveying.
- 2.2 Explain chain line, base line, tie line, check line and station points ill-conditioned and well conditioned triangle.
- 2.3 List the equipment and accessories used in chain surveying.
- 2.4 Mention the use of arrows, ranging rod, offset rod & optical square.
- 2.5 Explain the construction and use of optical square.
- 2.6 Define direct and indirect ranging.
- 2.7 Describe the procedure of indirect ranging (reciprocal ranging) on sloping ground.
- 2.8 Describe the procedure of measuring linear distances with the help of chain and tape.
- 2.9 Define double line field book.
- 2.10 Describe the procedure of booking in a double line field book.

3 Understand the preparation of a chain survey map

- 3.1 List the instruments and materials required for plotting a survey map.
- 3.2 Identify suitable scale for plotting a map.
- 3.3 Describes the procedure of plotting a survey map from field book.
- 3.4 Identify conventional symbols used in plotting maps.

4 Understand the basic terms used in compass surveying

- 4.1 List the instrument and accessories required for compass survey.
- 4.2 Define the terms: meridian, true meridian, magnetic meridian, bearing, true bearing, magnetic bearing, magnetic declination, dip of the needle, deflected angle, exterior angle, interior angle.
- 4.3 Define fore bearing and back bearing.

- 4.4 Find back bearing from fore bearing and fore bearing from back bearing.
- 4.5 Convert whole circle bearing to reduced bearing and reduced bearing to whole circle bearing.
- 4.6 Describe between prismatic compass.
- 4.7 Define local attraction.
- 4.8 Identify local attraction and correct the observed bearings.

5 Understand the basic concept of cadastral survey.

- 5.1 Define cadastral survey.
- 5.2 Identify scale used in cadastral survey.
- 5.3 List the equipment and accessories used in cadastral survey.
- 5.4 Define the terms:- Quadrilaterals, intersections, shikmi, chanda, check line, field, khaka.
- 5.5 Describe the procedure of cadastral survey.
- 5.6 Explain the procedure of preparing a cadastral survey map.

6 Understand the concept of leveling and bench mark .

- 6.1 Describe the purpose of leveling.
- 6.2 Explain the following terms in leveling :
 - a) Level surface; b) Level line; c) Horizontal surface; d) Horizontal line; e) Vertical plane;
 - f) Vertical line; g) Datum surface; h) Datum; i) Reduced level; j) Formation level
- 6.3 State the meaning of bench mark.
- 6.4 Compare GTS, permanent, arbitrary and temporary bench mark.
- 6.5 Identify different types of level.
- 6.6 Explain the following terms related to leveling:
 - a) Line of collimation; b) Axis of telescope; c) Axis of bubble tube; d) Vertical axis;
 - e) Height of instrument; f) Plane of collimation; g) Focusing; h) Parallax
- 6.7 Identify different types of leveling staff.

7 Understand the temporary and permanent adjustment of leveling Instrument.

- 7.1 Mention different kinds of adjustments of level.
- 7.2 Mention different steps of temporary adjustment.
- 7.3 Identify the fundamental lines of leveling instrument.
- 7.4 Mention the procedure of adjustments

8 Understand the various aspects of leveling.

- 8.1 Explain the meaning of following terms as used in leveling:
 - a) Back sight, foresight and intermediate sight reading; b) Change point; c) Station.
- 8.2 Mention the procedure of holding a leveling staff.
- 8.3 Mention the procedure of leveling work.
- 8.4 Mention the necessity of level book or field book.
- 8.5 Identify different kinds of level book or field book.
- 8.6 Describe the term reduction of leveling.
- 8.7 Mention the procedure of booking of staff reading into level book.
- 8.8 Solve problems on reduction of leveling.
- 8.9 Solve problems on calculation of missing data of old level book.

9 Understand the aspects of contouring.

- 9.1 Explain the terms contour, contouring, horizontal equivalent and vertical interval.
- 9.2 Mention the characteristics of contour.
- 9.3 List the uses of contour.
- 9.4 Mention the different methods of contouring (direct method and indirect method).
- 9.5 State the procedure of different methods of contouring.
- 9.6 Mention the procedure of drawing contour map.
- 9.7 Draw contour maps.

10 Understand the digital theodolite.

- 10.1 Define digital theodolite.**
- 10.3 Describe the components of digital theodolite and its function.

- 10.5 Describe the procedure of setting digital theodolite.
- 10.6 Describe the procedure of taking horizontal angle with digital theodolite.
- 10.7 Describe the procedure of taking vertical angle with digital theodolite.

11 Understand the principle of operation and uses of total station.

- 11.1. Explain the function of the total station.
- 11.2. State focusing and target point of total station.
- 11.3. Describe the procedural steps of setting total station.
- 11.5. Mention the procedure centering and leveling.

12. Understand the operation panel.

- 12.1. Describe the basic key operation.
- 12.2. Describe soft key operation.
- 12.6. Explain configuration mode, measurement mode and memory mode.
- 12.7. Describe the process of selecting different options.
- 12.8. Define horizontal angel.
- 12.9. Explain the procedure of horizontal angel between two points with total station.
- 12.10. Describe the procedure of EDM setting in the total station.
- 12.11. Describe the procedure of measuring horizontal distance and slop distance with total station.
- 12.12. Describe the procedure of measuring vertical distance with total station.

13 Understand the principles of operation and uses of GPS receiver.

- 13.1 Explain the meaning of global positioning system (GPS).
- 13.2 Describe the working principles of GPS receiver.
- 13.3 Mention different features of GPS receiver.
- 13.4 Describe operational process of the instruments related to GPS.
- 13.5 Describe the procedure of finding co-ordinates (latitude & longitude) of a station using GPS receiver.
- 13.6 List the works performed by GPS receiver.
- 13.7 Explain software used in GPS receiver.
- 13.8 Mention different types of software used in GPS receiver.
- 13.9 Mention the applications of different soft wares.
- 13.10 Describe the preparation of a map using mapping software and data received with GPS receiver.

Practical:

1. Measure length of line by chain and tape.
2. Set perpendiculars with the help of chain and tape.
3. Set perpendiculars with the help of optical square.
4. Measure magnetic bearing by prismatic and surveyors compass.
5. Locate the boundary line of a property with the help of chain, tape and which is already plotted on the mouza map.
6. Perform temporary adjustments of level.
7. Conduct fly leveling to establish a bench mark.
8. Conduct reciprocal leveling.
9. Conduct contouring by direct method over a low lying/elevated area, prepare contour map and calculate the quantity of earth work in filling/cutting.
10. Determine the height and distance of a tower using digital theodolite.
11. Determine height and distance of tower using total station.
12. Determine the co-ordinates of a station (within the institute) using GPS receiver.

REFERENCE BOOKS

- 1 Surveying and Leveling-** T. P. Kanatker
- 2 Surveying-** Aziz & Shahjahan
- 3 Surveying-** B. C. Punmia

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.Marriumm-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.
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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.britishcouncil.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	15 × 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.)

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,

- $A = \frac{\sqrt{3}}{4} a^2$, a = length of a side of equilateral triangle.
- $A = \frac{c}{4} \sqrt{4a^2 - c^2}$, where a = length of equal sides, c = third side.
- $A = \sqrt{s(s-a)(s-b)(s-c)}$, 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
 - The length of one side and the radius of inscribed circle are given.
 - The length of one side and the radius of circumscribed circle are given.
- 3.3 Find the area of a regular.

- 3.4 a) Hexagon
 b) Octagon when length of side is given.
 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

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PHYSICS-2

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OBJECTIVES

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

SHORT DESCRIPTION

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

DETAIL DESCRIPTION

THEORY

1. THERMOMETRY AND HEAT CAPACITY

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

2. EFFECT OF HEAT ON DIMENSION OF MATERIALS

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

3. HEAT TRANSFER

- 3.1 Identify the phenomena of heat transferring from hot bodies to cold bodies.
- 3.2 Explain the methods of heat transfer by conduction, convection and radiation with examples of each type of transfer.
- 3.3 Define thermal conductivity (K) and Co-efficient of thermal conductivity.
- 3.4 Find the unit and dimension of Co-efficient of thermal conductivity.
- 3.5 List the factors which determine the quantity of heat (Q) flowing through a material.
- 3.6 Show that the quantity of heat flowing through a material can be found from
$$Q = \frac{KA(\theta_H - \theta_C)t}{d}$$
- 3.7 State Stefan-Boltzman Law and wien's law.
- 3.8 State Newton's law of cooling.
- 3.9 Explain Green house effect.

4. HUMIDITY

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

5. NATURE OF HEAT AND THERMODYNAMICS

- 5.1 Describe the caloric theory and kinetic theory of heat.
- 5.2 Explain the mechanical equivalent of heat.
- 5.3 State and Explain the first law of thermodynamics .
- 5.4 Explain Isothermal and adiabatic change.
- 5.5 Explain Specific heat of a gas, Molar specific heat or molar heat capacity.
- 5.6 Relate between pressure and volume of a gas in adiabatic Change i, e; $PV^\gamma = \text{const.}$
- 5.7 State and Explain Reversible process and irreversible process.
- 5.8 State & explain 2nd 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 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 |



BANGLADESH TECHNICAL EDUCATION BOARD

Agargoan, Dhaka-1207.

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

ARCHITECTURE TECHNOLOGY

TECHNOLOGY CODE: 661

4th SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

ARCHITECTURE TECHNOLOGY (661)

4th SEMESTER

Sl. No	Subject Code	Name of the subject	T	P	C	Marks				Total	
						Theory		Practical			
						Cont. assess	Final exam	Cont. assess	Final exam		
1	66142	Architectural Design -3	1	6	3	20	30	50	50	150	
2	66141	History of Architecture -1	2	0	2	40	60	0	0	100	
3	66143	Working Drawing With CAD	0	9	3	0	0	75	75	150	
4	66446	Fundamental Construction Process	2	3	3	40	60	25	25	150	
5	66144	Model Making	0	6	2	0	0	50	50	100	
6	66447	Basic Estimating & Costing	3	3	4	60	90	25	25	200	
7	65841	Business Organization and Communication	2	0	2	40	60	0	0	100	
Total			10	27	19	200	300	225	225	950	

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Architectural Design - 3

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AIMS:

To be able to develop knowledge, skill and attitude in the field of architectural design & drafting with special emphasis on:

- Site planning of Stall & Pavilion.
- Design of Stall & Pavilion.
- Planning & design of Religious building.
- Building by-Laws,
- RAJUK / Responsible Authority approval sheet.
- Landscape drawing.

SHORT DESCRIPTION:

Site Planning & Design of Stall & Pavilion, Planning & design of Religious building, Building by-Laws, RAJUK / Responsible Authority approval sheet & Landscape Drawing.

Theory:

1. Understand Stall and Pavilion.

- 1.1. Define stall and pavilion.
- 1.2. Distinguish between stall and pavilion.
- 1.3. State the necessity features of a stall.
- 1.4. Discuss the advantages and disadvantages of a stall.
- 1.5. State the necessity features of a pavilion.
- 1.6. Discuss the advantages and disadvantages of a pavilion.

2. Understand the Religious Building.

- 2.1. Define religious building.
- 2.2. Define different types of religious buildings (Mosque, Church, Temple, Pagoda etc.).
- 2.3. Discuss the religious aspects of -
 - 2.3.1. Mosque
 - 2.3.2. Church
 - 2.3.3. Temple
 - 2.3.4. Pagoda
- 2.4. Discuss the design features of different religious buildings.

3. Understand the Mosque.

- 3.1. Define mosque.
- 3.2. Discuss the design aspects of a mosque (prayer hall, mimber/pulpit, mihrub, minar, dome, ablution etc.).
- 3.3. Describe Prayer hall with different dimension & allocation.
- 3.4. Explain Mimber & Mihrub with dimension & allocation.
- 3.5. Discuss ablution area & Shan with dimension & allocation.
- 3.6. Explain necessity of Dome & Minar with dimension & allocation.

4. Understand the Building by - Laws and Building Approval.

- 4.1. Define Building - by - Laws and BNBC.
- 4.2. Define Rajuk Sheet/ Building approval Sheet.

- 4.3. Explain different features of a Rajuk Sheet/building approval sheet.
- 4.4. Explain different terms related to Building by-laws/ Rajuk Sheet (FAR, MGC, Set-Back)/building approval sheet.
- 4.5. Discuss Rajuk rule for Parking, Stair and other rules'2010.

5. Understand Structural features.

- 5.1. Define structural features of a building.
- 5.2. Define beam with classification (simply supported, semi continuous, continuous, cantilever, overhanging beam etc.).
- 5.3. State column with classification (long & short column).
- 5.4. Define slab with classification (one way & two way)
- 5.5. Explain footing, lintel, sunshade, and stair and water reservoir.

PRACTICAL

1. Prepare preliminary drawings of stall/pavilion.

- 1.1. Visit any stall or pavilion and make a presentation on it.
- 1.2. Make free hand sketches of a stall.
- 1.3. Draw presentation drawings of the stall/pavilion.
- 1.4. Draw a plan of the stall/ pavilion in 1:20 scale.
- 1.5. Draw four sides elevation of the stall/pavilion in 1:20 scale.
- 1.6. Draw a 3D view (free hand) of the stall.

2. Prepare a set of presentation drawings of stall/pavilion.

- 2.1. Draw a plan of the stall/pavilion in 1:20 scale to internal arrangements (Passage, Products, Displays etc.).
- 2.2. Draw a long section of the stall/pavilion in 1:20 scale.
- 2.3. Draw the transverse section of the stall/pavilion in 1:20 scale.
- 2.4. Draw a roof plan of the stall/pavilion in 1:20 scale.
- 2.5. Draw a site plan of the stall/pavilion in 1:50 scale.
- 2.6. Make a model of the stall/pavilion.

3. Prepare a set of presentation drawing of mosque.

- 3.1. Visit different historical/contemporary mosque & present a report on it.
- 3.2. Draw a free hand line sketch of the mosque.
- 3.3. Convert the line sketch into 1:100 scale.
- 3.4. Make necessary correction in needed.
- 3.5. Draw the final plan of the mosque in 1:100 scale.
- 3.6. Draw the four side elevation of the mosque in 1:100 scale.
- 3.7. Draw the long & cross section of the mosque in 1:100 scale.

4. Prepare a Rajuk sheet/ Building Approval sheet.

- 4.1. Draw all necessary drawings for Rajuk sheet/ Building Approval sheet residence or religious building as per required scale.
- 4.2. Calculate all necessary measurements.
- 4.3. Calculate FAR, MGC, Set back rules.
- 4.4. Write the title box with all necessary information.

5. Prepare a set of working drawing of mosque.

- 5.1. Draw the plan of the mosque with detail dimensions in 1:50 scale.
- 5.2. Draw the front elevation of the mosque in 1:50 scale.
- 5.3. Draw the side elevation of the mosque in 1:50 scale.

- 5.4. Draw the long section of the mosque in 1:50 scale with dimensions.
- 5.5. Draw the cross section of the mosque in 1:50 scale with dimensions.

6. Prepare a set of detail drawing of mosque.

- 6.1. Draw the floor pattern of tiles/mosaic etc.
- 6.2. Draw the detail plan of Mihrab & Mimber in 1:20 scale.
- 6.3. Draw the detail plan of ablution and toilet showing all fixture 1:20 scale.
- 6.4. Draw the reflected ceiling plan of the mosque 1:50.
- 6.5. Draw the plan & section of Minar 1:20.

7. Prepare the miscellaneous drawing of mosque.

- 7.1. Draw the detail plan & section of the Dome in 1:20 scale.
- 7.2. Make calligraphy for the mosque.
- 7.3. Draw the detail plan, elevation & section of entry door and other door.
- 7.4. Draw the detail plan, elevation & section of the window.
- 7.5. Draw the gateway detail of the mosque.

8. Prepare the landscape drawing of mosque.

- 8.1. Draw the site plan of the mosque in 1:50 scale.
- 8.2. Draw the parking area of the mosque.
- 8.3. Draw the walk way, roads, garden, fountain etc. in the site plan.
- 8.4. Draw the landscape plan of the mosque.
- 8.5. Make a model of the mosque with landscape.

REFERENCE BOOKS:

1. Architecture Drafting and Design by Donald E. Hepler.
2. Architecture Drafting - Wallach.

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History of Architecture– I

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AIMS

- To be able to understand Architectural knowledge from different civilization.
- To be able to understand the Architectural development of early Indian Architecture.
- To be able to know the historical development of early Christian & Byzantine & Romanesque Architecture.

SHORT DESCRIPTION

Architecture in the pre-historic ages; Egyptian Architecture; West Asiatic Architecture; Greek Architecture, Roman Architecture; Architecture of Northern-Indian Hindu style; Christian Architecture; Byzantine Architecture; Romanesque Architecture.

DETAILS DESCRIPTION

1. Understand the development of Architecture in the pre-historic ages.

- 1.1 Define stone ages.
- 1.2 Describe the different features of stone ages
- 1.3 Describe the earliest form of human dwelling.
- 1.4 Explain the Architectural aspects of hut, Menhir, Dolmens, Beehive hut, cave and tents.
- 1.5 Explain the Architectural features of 'Stonehenge'.

2. Understand the Architectural characteristics of Egyptian Architecture.

- 2.1 Describe the historical influence of Egyptian Architecture.
- 2.2 Describe the evolution of pyramid.
- 2.3 Describe the Architectural features of the great pyramid of Cheops.
- 2.4 Explain the architectural characteristics of the temples of Amun at Karnak.
- 2.5 Explain the Architectural characteristics of the temple of Queen Hatshepsut.

3. Understand the Architectural characteristics of West Asiatic Architecture.

- 3.1 Describe the Architectural characteristics of West Asiatic civilization.
- 3.2 Identify the material and building technology adopted by the West Asiatic culture.
- 3.3 Explain the Architectural characteristics of the planning of the city of Khorsabad.
- 3.4 Explain the architectural features of the planning of the place of Persepolis.
- 3.5 Explain the architectural characteristics of the city of Babylon.

4. Interpret the Architectural characteristics of Hellenic period of Greek Architecture.

- 4.1 Describe the historical influences on the Greek Architecture.
- 4.2 Explain the Architectural features of the Greek orders.
- 4.3 Compare Doric, Ionic and Corinthian order.
- 4.4 Explain the planning features of the Acropolis at Athens.
- 4.5 Explain the Architectural features of Parthenon.

5. Understand the Architectural characteristics of Roman civilization.

- 5.1 Describe the historical influences of the Roman Architecture.

- 5.2 Explain the Architectural characteristics of the Basilica of Constantine.
- 5.3 Explain the Architectural characteristics of Roman Coliseum.
- 5.4 Explain the architectural characteristics of the Pantheon at Rome.
- 5.5 Describe the architectural characteristic of Roman houses.

6. Understand the Architectural Development of early India Architecture.

- 6.1 Describe the historical influences on the Indus-valley civilization.
- 6.2 Describe the historical influences of Vedic Architecture.
- 6.3 Explain the development of Chaitya Arch.
- 6.4 Describe the historical influences of the Buddhist Architecture.
- 6.5 Explain the Architectural features of Ashokan pillar.
- 6.6 Explain the Architectural features of Chaitya hall of Elora Rockcut temple.

7. Understand the Architecture of Northern-Indian Hindu style.

- 7.1 Describe the Architectural features of the great temple of Bhuvanessor.
- 7.2 Describe the Architectural features of the temple in Orrissa.
- 7.3 Explain the Architectural features of the great temple of Mothura.
- 7.4 Explain the Architectural features of the Pandyan temple.

8. Understand the development of the early Christian architecture.

- 8.1 Describe the historical influence on the early Christian Architecture.
- 8.2 Describe the Architectural characteristic of Christian Architecture.
- 8.3 Identify the Architectural features of the Basilica church.
- 8.4 Explain Architectural feature of the Basilica church of S. Peter Rome.
- 8.5 Explain Architectural feature of the church of nativity, Bethlehem.
- 8.6 Explain Architectural feature of St. Paul at England.

9. Understand the development of the Byzantine Architecture.

- 9.1 Describe the historical influences of Byzantine Architecture.
- 9.2 Describe the Architectural characteristic of Byzantine Architecture.
- 9.3 Explain the Architectural feature of S. Sophia at Constantinople.
- 9.4 Describe the comparative analysis of Byzantine Architecture.

10. Understand the Romanesque Architecture.

- 10.1 Describe the historical influences of Romanesque Architecture in Italy.
- 10.2 Describe the Architectural character of central Italy.
- 10.3 Describe the historical influences of Romanesque Architecture in France.
- 10.4 Describe the Architectural character of France.
- 10.5 Describe the historical influences of central Europe.
- 10.6 Describe the Architectural character of central Europe.

REFERENCE BOOKS

- 1. History of Architecture – Fletcher
- 2. হাপত্তের ইতিহাস-১ - মোঃ রফিকুল ইসলাম মীর - বাংলাদেশ কারিগরি শিক্ষা বোর্ড

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Working Drawing with CAD

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AIMS

To be able to develop knowledge, skill and attitude in the field of Architectural Drawing with special emphasis on:

- working drawing,
- detail drawing of staircase,
- fixture layout of kitchen and toilet,
- septic tank detail,
- water reservoir detail.
- working drawing with Auto CAD
- structural & electrical drawing with Auto CAD

SHORT DESCRIPTION

Working drawing, detail drawing of staircase, fixture layout of kitchen and toilet detail, septic tank detail, water reservoir detail & working drawing, structural drawing, electrical drawings with Auto CAD.

DETAIL DESCRIPTION

Practical:

1. Construct the floor plan of a 2-Bed room House.

- 1.1. Draw the floor plan in 1:50 (1/4"=1'-0") scale of a 2-bedroom house.
- 1.2. Show the inside and outside detail dimension in the drawn plan (1.1).
- 1.3. Draw Front and side elevation (minimum one) in 1:50 (1/4"=1'-0") scale of the 2-bedroom house
- 1.4. Draw section in 1:50 (1/4"=1'-0") scale of the 2-bedroom house showing all dimension and material symbol.
- 1.5. Make a finish schedule of the residence.

2. Prepare the working drawing set with Auto CAD.

- 2.1. Draw different floor plan of the residence with Auto CAD.
- 2.2. Show inside and outside dimension on the floor plans.
- 2.3. Draw the elevation of the residence with Auto CAD.
- 2.4. Draw the section of the residence with Auto CAD.
- 2.5. Show the dimension & hatch on the section

3. Construct the detail drawing of a Staircase.

- 3.1. Draw the detail ground floor plan of a doglegged staircase in 1:50 (1/4"=1'-0") scale.
- 3.2. Draw the detail typical floor plan of a doglegged staircase in 1:50 (1/4"=1'-0") scale.
- 3.3. Draw the section of the doglegged staircase in 1:50 (1/4"=1'-0") scale with dimension.
- 3.4. Draw the detail of steps, nosing, handrail etc. of the staircase.
- 3.5. Draw the detail plan & section of a three quarter stair in 1:50 (1/4"=1'-0") scale with dimension.

4. Prepare the staircase detail with Auto CAD.

- 4.1. Draw the detail ground floor and typical floor plan of Staircase with Auto CAD.
- 4.2. Draw the detail section of Staircase with Auto CAD.

- 4.3. Draw the plan of a circular stair using polar array command.
- 4.4. Draw the section of the circular staircase with Auto CAD
- 4.5. Draw the details (handrail, nosing, steps etc.) of the staircase with Auto CAD.
- 4.6. Layout the different drawing in different scale at one sheet & make a print of the drawing.

5. Prepare the detail drawing of kitchen with Auto CAD.

- 5.1. Draw the detail plan of kitchen with Auto CAD.
- 5.2. Show the fixtures & fittings of kitchen with dimensions.
- 5.3. Draw the detail section of kitchen with Auto CAD.
- 5.4. Show the fixtures-fittings & materials (hatch) of kitchen with dimensions.
- 5.5. Draw the roof plan showing the rain water drainage system.
- 5.6. Layout the different drawing in different scale at one sheet & make a print of the drawing.

6. Prepare the detail drawing of toilet with Auto CAD.

- 6.1. Draw the detail plan of an attached toilet with Auto CAD.
- 6.2. Draw the detail plan of a common toilet with Auto CAD.
- 6.3. Show the fixtures & fittings of toilet with dimensions.
- 6.4. Draw the detail section of toilet with Auto CAD.
- 6.5. Show the fixtures-fittings & materials (hatch) of toilet with dimensions.
- 6.6. Layout the different drawing in different scale at one sheet & make a print of the drawing.

7. Prepare the electrical drawing set with Auto CAD.

- 7.1. Make a layer for electrical layout of ground floor plan.
- 7.2. Draw the electrical fixtures & fittings on the ground floor plan.
- 7.3. Make a layer for electrical layout of typical floor plan.
- 7.4. Draw the electrical fixtures & fittings on the typical floor plan.
- 7.5. Make a legend of electrical fixture & fittings.
- 7.6. Draw circuit diagram of the floor plan.

8. Prepare a Rajuk sheet/ Building Approval sheet with Auto CAD.

- 8.1. Draw different plan necessary drawings for Rajuk sheet/ Building Approval sheet with Auto CAD.
- 8.2. Draw section & elevation for Rajuk sheet/ Building Approval sheet with Auto CAD.
- 8.3. Draw the layout plan & Mouza map for Rajuk sheet/ Building Approval sheet with Auto CAD.
- 8.4. Write the title box with all necessary information using text command.
- 8.5. Layout the different drawing in different scale at one sheet & make a print of the drawing.

9. Prepare a set of drawing of R.C.C. Beam with auto CAD.

- 9.1. Draw the longitudinal (long section) section of a given simply supported rectangular beam with Auto CAD.
- 9.2. Draw a two cross section (one in near supported & other mid of the span) of a simply supported rectangular beam with Auto CAD.
- 9.3. Draw the longitudinal (long section) section of a given continuous rectangular beam with Auto CAD.
- 9.4. Draw a two cross section (one in near supported & other mid of the span) of a continuous rectangular beam with Auto CAD.

10. Prepare a set of drawing of R.C.C. Column & slab.

- 10.1. Draw the plan and section of a given tide R.C.C. column with footing with Auto CAD.
- 10.2. Draw the plan and section of the spiral R.C.C. column with footing with Auto CAD.
- 10.3. Draw plan of a given one way R.C.C. slab showing reinforcement with Auto CAD.

- 10.4. Show the location of beam, lintel and false slab on a floor slab for reinforcement with Auto CAD.
- 10.5. Draw the plan of a given two way R.C.C. slab showing reinforcement with Auto CAD.
- 10.6. Draw the detail reinforcement of staircase.

11. Construct the detail drawing of Septic Tank & Water Reservoir with Auto CAD.

- 11.1. Draw the plan and section of a 50 user's septic tank showing the dimensions with Auto CAD.
- 11.2. Draw the Plan of a 2500 gallon underground water reservoir showing the dimensions and Reinforcement with Auto CAD.
- 11.3. Draw the section of the water reservoir with Auto CAD.
- 11.4. Draw a roof plan of the drawn 2-bedroom house (1.1) showing slope and location of rain water pipe with Auto CAD.

REFERENCE BOOKS

1. Working Drawing -I – BTEB
 2. Time Saver Standard- Building Type
 3. Architectural drafting with Auto CAD - Rudaba Naz
 4. Auto CAD – Samuel A Mallick
- Engr. Md. Shah Alam

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Fundamental Construction Process

T P C

2 3 3

OBJECTIVES:

At the end of course the students will be able to:

- Apply relevant theory and practice of concrete construction and its quality control methods.
- Perform skills for construction work and its supervision.
- Understand the process, techniques and materials used in different types of masonry, Floor, Doors & Windows.

SHORT DESCRIPTION

Concrete, Brick masonry, Foundation, Painting & varnishing, Insulation, Floor, Doors, Windows.

DETAIL DESCRIPTION

Theory:

1. Understand the features of concrete.

- 1.1State the meaning of concrete.
- 1.2Mention the different Types of concrete.
- 1.3List the uses of concrete in the construction industry.
- 1.4List the ingredients of different Types of concrete.
- 1.5Write the characteristics of materials used in concrete.

2. Understand the properties of concrete.

- 2.1Define the terms: strength, durability, workability, laitance and segregation.
- 2.2State the meaning of water-cement ratio.
- 2.3List the factors affecting the strength of concrete.
- 2.4List the factors affecting the durability of concrete.
- 2.5List the factors affecting the workability of concrete.
- 2.6Describe the effect of water-cement ratio on the strength of concrete.

3. Understand the concept of curing of concrete.

- 3.1Define of deferent type of concrete.
- 3.2State the meaning of curing.
- 3.3State how the curing process affects the strength of hardened concrete.
- 3.4Describe the different methods of curing.

4. Understand the features of different special types of concrete.

- 4.1Compare the properties of polymer concrete and super plasticized concrete.
- 4.2Explain the term pre-stressed concrete.
- 4.3Mention the procedure used in the production of pre-stressed concrete.

5. Understand the features of brick masonry.

- 5.1State the meaning of brick masonry.
- 5.2List the tools required for brick masonry.
- 5.3State the specific uses of brick masonry tools.
- 5.4Distinguish among different types of masonry structures.
- 5.5Define the following terms: header, stretcher, lap, course, bed, joint, closer.
- 5.6Identify the defects in brick masonry.
- 5.7List the factors to be considered while supervising brick masonry works.

6. Understand the purpose of bond in brick masonry.

- 6.1 State the meaning of bond in brick masonry.
- 6.2 Mention the functions of good brick bonding.
- 6.3 Describe the steps for brick laying.
- 6.4 Identify different types of bonds in brick masonry.
- 6.5 Draw the neat sketches of different types of bonds in brick masonry.
- 6.6 Differentiate between English and Flemish bond.
- 6.7 Describe the bonding arrangements around openings and corners.

7. Understand the aspects of foundation.

- 7.1 Define the term 'foundation'.
- 7.2 State the functions of foundation.
- 7.3 List the essential requirements of a good foundation.
- 7.4 List the common causes of failure of foundations.

8. Understand the features of shallow foundation.

- 8.1 Define the term 'shallow foundation'.
- 8.2 Mention the advantages of shallow foundations.
- 8.3 Mention the limitations of shallow foundations.
- 8.4 Mention the suitability of various types of shallow foundations.
- 8.5 Draw the sketches of strip footing, wide strip footing, eccentrically loaded footing, raft foundation, combined footing, stepped strip foundation, grillage foundation.

9. Understand the features of deep foundation.

- 9.1 Define the term 'deep foundation'.
- 9.2 Mention the classification of pile foundations according to function or use, materials and composition, method of construction.
- 9.3 Write the advantages and limitations in each case of deep foundations.
- 9.4 Describe the following methods of casting and placing concrete pile foundation:
 - a. Cased cast-in-situ concrete pile.
 - b. Uncased cast-in-situ concrete pile.
 - c. Pre-cast concrete pile.
- 9.5 Identify the types of hammers used for pile driving.
- 9.6 Describe the methods for driving concrete pile groups and placing pile caps.

10. Understand the process of painting & Varnishing.

- 10.1 State the purpose of painting & varnishing.
- 10.1 Name the ingredients of paint & varnishes.
- 10.2 Mention the specific function of each ingredient of paint & varnishes.
- 10.3 Describe the characteristics of good paints & varnishes.
- 10.4 State the various defects in painting & varnishing.
- 10.5 Describe the factors that should be considered during the supervision of quality painting & varnishing work.
- 10.6 Differentiate between the properties and ingredients of the following:
 - a. white wash and color wash
 - b. distemper and snowcem wash
 - c. oil based paint and water based paint
 - d. plastic emulsion paint and synthetic enamel paint
- 10.7 Describe the procedure of application of the following on new and old specific surfaces:
 - a. white wash
 - b. color wash
 - c. distemper

- d. weather coat
- e. snowcem(cement based paint)
- f. plastic emulsion paint
- g. synthetic enamel paint.

11. Understand the different insulation in building.

- 12.1 Define thermal and sound insulation.
- 11.1 State the necessity of thermal and sound insulation in building.
- 11.2 List various types of materials used for thermal and sound insulation.
- 11.3 Describe the general methods of thermal and sound insulation in building.
- 11.4 Describe the process of thermal insulation of the following with neat sketches:
 - a. floor
 - b. roof
 - c. exposed wall
 - d. exposed door and window.

12.Understand the floor.

- 12.1 State the meaning of floor.
- 12.2 Mention the components of a floor.
- 12.3 Mention the essential requirements of a floor.
- 12.4 Name the suitable materials used for the construction of floor.
- 12.5 Describe the construction procedure of the following type of floors:
 - a. Brick floor
 - b. concrete floor
 - c. patent stone floor
 - d. Mosaic floor
 - e. Tiles floor
 - f. Marble floor
 - g. Timber floor
 - h. Composite floor

13.Understand the doors.

- 13.1 List different type of doors.
- 13.2 Identify the technical terms used in doors.
- 13.3 Mention the factors to be considered in determining the size, shape, location and number of doors in a room.
- 13.4 Describe the various type of doors on the basis of their suitability and uses.
- 13.5 Mention the advantages and limitations of the followings:
 - a. Panel door
 - b. Flush door
 - c. Glazed door
 - d. Louvered door
 - e. Revolving door
 - f. Sliding door
 - g. Swing door
 - h. Collapsible door
 - i. Rolling shutter door
 - j. Mild steel sheet door
 - k. Plastic door
 - l. Aluminum door

13.6 Describe the methods of fixing door frames.

14.Understand the windows.

14.1 List different type of windows.

14.2 Mention the factors to be considered to determine the size, shape, location and number of windows in a room.

14.3 Describe the various types of windows on the basis of their suitability and uses.

14.4 Mention the advantages and limitations of the followings:

- a. Fixed window
- b. Sliding window
- c. Steel casement window
- d. Glazed or sash window
- e. Louvered window
- f. Bay window
- g. Aluminum window

14.5 State the functions of skylight, sunlight, fanlight and ventilator.

14.6 Describe the methods of fixing windows.

15.Understand the importance of scaffolding.

15.1 State the meaning of scaffolding...

15.2 Explain the necessity and uses of scaffolding.

15.3 Name the different components of scaffolding.

15.4 Describe different types of scaffolding.

15.5 Compare the advantages and limitations of timber scaffolding over steel scaffolding.

15.6 Differentiate between shoring and scaffolding.

15.7 Describe the safety requirements for scaffolding works.

PRACTICAL:

1. Draw the grading curves for various samples of aggregates and find out the FM value.
2. Perform slump test of different concrete works.
3. Conduct cube test for concrete and interpret the results.
4. Conduct brick masonry work to erect pillars of sizes 25 cm x 25 cm to 50 cm x 50 cm with English bond up to 5 layers.
5. Perform brick masonry work to erect pillars of sizes 25 cm x 25 cm to 50 cm x 50 cm with Flemish bond up to 5 layers.
6. Construct sample corner (L) joints of 25 cm to 50 cm width English bond brick wall up to 5 layers.
7. Construct sample tee (T) joints of 25 cm to 50 cm width English bond brick wall up to 5 layers
8. Construct any one of the following floors with suitable materials.
 - a. Brick floor
 - b. Brick concrete floor
 - c. Terrazzo floor
 - d. Mosaic floor
 - e. Tiled floor
 - f. Timber floor
 - g. RCC solid floor
 - h. RCC ribbed floor
 - 8.1 Select the required tools and raw materials.
 - 8.2 Prepare the floor according to standard specification.
 - 8.3 Clean the work site.
9. Perform white washing on new and old surface.
 - 9.1 Collect the required tools and raw materials.

- 9.2 Prepare the surface as necessary.
- 9.3 Prepare white wash as required.
- 9.4 Apply first coat of white wash and allow to drying.
- 9.5 Apply second coat of white wash and allow to drying.
- 9.6 Apply the final coat of white wash.

10. Perform color washing on new and old surface.

- 10.1 Collect the required tools and raw materials.
- 10.2 Prepare the surface as necessary.
- 10.3 Prepare color wash as required.
- 10.4 Apply first coat of color wash and allow to drying.
- 10.4 Apply second coat of color wash and allow to drying.
- 10.6 Apply the final coat of color wash.

11 Perform snowcem washing and weather coating on new and old surface.

- 11.1 Collect the required tools and raw materials.
- 11.2 Prepare the surface as necessary.
- 11.3 Prepare paint as required.
- 11.4 Apply first coat of paint and allow to drying.
- 11.5 Apply second coat of paint and allow to drying.
- 11.6 Apply the final coat of paint.

12 . Perform plastic emulsion painting on new and old surface.

- 12.1 Collect the required tools and raw materials.
- 12.2 Prepare the surface as necessary.
- 12.3 Prepare paint as required.
- 12.4 Apply first coat of paint and allow to drying.
- 12.5 Apply second coat of paint and allow to drying.
- 12.6 Apply the final coat of paint.

13 . Perform varnishing on new and old wooden surface.

- 13.1 Collect required tools and raw materials.
- 13.2 Prepare the surface as necessary.
- 13.3 Prepare varnish as required.
- 13.4 Apply first coat and allow to drying.
- 13.5 Apply second coat and allow to drying.
- 13.6 Apply the final coat of varnish.

REFERENCE BOOKS

- 1 Building Construction - B C Punmia
- 2 A Text Book of Construction - S P Aurora & S P Bindra
- 3 Building Construction - G J Kulkarni
- 4 Building Construction - S C Rangwala
5. Construction and Foundation Engineering - Dr. J Jha, S K Sinha
6. Building Construction - Shushil Kumar

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Model Making

T P C

0 6 2

AIMS

To enable to prepare templates & block model; staircase, car & trees; relief work and to provide skill in preparing various interior & exterior models.

SHORT DESCRIPTION

Preparing block model for geometrical prism; Preparing block model of the components of building; Preparing model of an umbrella, pen-stand, relief work, staircase and tree.

DETAIL DESCRIPTION

Practical:

1. Practice to make paper strips and templates

- 1.1 Make different paper strips by N.T. cutter and steel edge/set square.
- 1.2 Make thin threads by paper.
- 1.3 Make a square template by thick paper.
- 1.4 Make an elliptical template by thick paper.
- 1.5 Make a circular template by thick paper.
- 1.6 Make an octagonal template by thick paper.

2. Prepare a block model of cube and rectangular prism.

- 2.1 Select the model making board and other materials for making the model of cube and rectangular prism.
- 2.2 Select the equipment & tools for making model of cube and rectangular prism.
- 2.3 Layout and mark as per drawing on the board for making model of cube and rectangular prism.
- 2.4 Cut the board as per marking.
- 2.5 Glue on the required cut edges.
- 2.6 Paste & assemble the cut pieces for preparing the model.

3. Prepare a block model of circular and triangular prism.

- 3.1 Select the model making board and other materials for making the model of circular and triangular prism.
- 3.2 Select the equipment & tools for making model of circular and triangular prism.
- 3.3 Layout and mark as per drawing on the board for making model of circular and triangular prism.
- 3.4 Cut the board as per marking.
- 3.5 Glue on the required cut edges.
- 3.6 Paste & assemble the cut pieces for preparing the model.

4. Prepare a model of an umbrella and pen stand.

- 4.1 Select the model making board and other materials, equipment & tools for making the model of the umbrella.
- 4.2 Layout and mark as per drawing on the board for making the model of an umbrella.
- 4.3 Cut the board as per marking and glue on the required cut edges.
- 4.4 Paste & assemble the cut pieces for preparing the model.

- 4.5 Select the model making board, equipment & tools and other materials for making model of pen stand.
- 4.6 Layout and mark as per drawing on the board for making the model of a pen stand.
- 4.7 Cut the board as per marking & glue on the required cut edges.
- 4.8 Paste & assemble the cut pieces for preparing the model.

5. Prepare a relief model.

- 5.1 Select the model making board and other materials for making of relief works.
- 5.2 Select the equipment & tools for making the model of relief works.
- 5.3 Layout from a concept & mark as per drawing on the board for making of relief model.
- 5.4 Cut the board as per marking & glue on the required cut edges.
- 5.5 Paste & assemble the cut pieces for preparing the model.

6. Prepare the model of steps.

- 6.1 Select the model making board and other materials for making the model of step.
- 6.2 Select the equipment & tools for making the model of steps.
- 6.3 Layout and mark as per drawing on board for making the model of steps & cut the board as per marking.
- 6.4 Glue on the required cut edges.
- 6.5 Paste & assemble the cut pieces for preparing the model.

7. Prepare the model of car.

- 7.1 Select the model making board and other materials for making the model of a car.
- 7.2 Select the equipment & tools for making model of a car.
- 7.3 Layout and mark as per drawing on board for making model of a car.
- 7.4 Cut the board as per marking.
- 7.5 Glue on the required cut edges.
- 7.6 Paste & assemble the cut pieces for preparing the model.

8. Prepare the model of a tree.

- 8.1 Select the model making board and other materials for making the model of tree.
- 8.2 Select the equipment & tools for making the model of tree.
- 8.3 Cut different material for making the model of tree.
- 8.4 Build up the tree by using different materials.

9. Make a model of stair case used in two storied building with gratis board/plastic board.

- 9.1 Select the model making board & other materials for making the model of stair case.
- 9.2 Draw the development of the stair/steps on model making board according to scale.
- 9.3 Cut the board as per drawing.
- 9.4 Paste & assemble the cut pieces for preparing the model.

10. Prepare a model of pavilion used in different exhibition with model paper.

- 10.1 Select the model making board & other materials for making the model of pavilion.
- 10.2 Select the tools & equipment for making the model of pavilion.
- 10.3 Draw the development of the pavilion on model making board according to scale.
- 10.4 Cut the board as per drawing.
- 10.5 Paste & assemble the cut pieces for preparing the model.

11. Prepare detail model of a multi-storied / high rise building.

- 11.1 Select the model making board & other materials for making the model of a multistoried high rise building.

- 11.2 Draw the side development of the building on model making board according to scale & cut the board as per drawing.
- 11.3 Paste and assemble the cut pieces for preparing the model.
- 11.4 Paste & assemble the prepared model on the base with a beautiful Landscape & presentation.

12. Prepare a detail model of a Kitchen.

- 12.1 Select the model making board & other materials for making the model of the Kitchen.
- 12.2 Select the tools & equipment for making the model of pavilion.
- 12.3 Draw the development of the cabinet of the L-shaped or U-shaped kitchen & Cut the model paper as per drawing.
- 12.4 Paste and assemble the cut pieces for preparing the model.
- 12.5 Make the base & wall of the kitchen.
- 12.6 Paste and assemble the cabinet on the base & wall.

13. Understand the 3D Printing.

- 13.1 Definition and specific terms of 3D printing Technology.
- 13.2 State Advantage and limitation of 3D Printing.
- 13.3 Discuss Short history of 3D printing and 3D application fields.
- 13.4 Discuss 3D Printing equipments and Materials.

14. Prepare different object/product using 3D Printing.

- 14.1 Import the STL file in 3D Printer software.
- 14.2 Scale and positioning the object.
- 14.3 Apply 3D Printing process.
- 14.4 Apply post processing operation for 3D Printing objects.

REFERENCE BOOK

1. Model Making- II. By- Rezaul karim Robin. (Bangladesh Technical Education Board).

BASIC ESTIMATING & COSTING

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T P C
3 3 4

AIMS

- To provide the ability of quantity analysis of civil engineering works
- To enable to estimate volume, quantities of materials used in construction works
- To provide understanding cost abstract of civil engineering works
- To be able to improve knowledge and skill of estimating two storied building consisting of spread footing and frame structure (Colum footing) .
- To develop skill in estimating RCC and bituminous road .
- To develop skill in rate analysis process for different items of work in the building trades.

SHORT DESCRIPTION

Introduction to estimating ,Quantity estimation of excavating tank, road embankment steps, boundary wall, bituminous & RCC road, complete estimate of a single storied building with verandah and two storied frame structure building with verandah, and rate analysis.

DETAIL DESCRIPTION

Theory

1 Understand the basic concept of estimating .

- 1.1 Define the term estimating .
- 1.2 State the methods of estimating .
- 1.3 Mention the rules and methods of measurements of works.
- 1.4 Mention the rules of deduction for opening, bearing etc. in masonry .
- 1.5 List unit weight of different materials used in construction works
- 1.6 Mention the unit of different items of works as per standard practice.

2 Estimate the quantity of earth work in excavation of a tank and embankment.

- 2.1 Mention the rules of finding out the volume of earth work by mid area method.
- 2.2 Mention the rules of finding out the volume of earth work by mean area method.
- 2.3 Mention the rules of finding out the volume of earth work by prismoidal method.
- 2.4 Identify the side slopes for different heights of road embankment.
- 2.5 Identify the cross section of road embankment.
- 2.6 State the method of finding out the volume of earth work in embankment by mid area method..
- 2.7 State the method of finding out the volume of earth work in embankment by mean area method..
- 2.8 State the method of finding out the volume of earth work in embankment by prismoidal method.

3 Estimate the different quantities of work in steps , boundary wall and roads.

- 3.1 Identify different parts of a step .
- 3.2 List different items of works in a boundary wall .
- 3.3 List different items of works in a bituminous road .
- 3.4 List different items of works in a RCC road.
- 3.5 Calculate the quantity of different items : .(a) Step (b) RCC road (c) bituminous road

4 Understand the procedure of estimating a simple building.

- 4.1 State the centre line and separate wall method.
- 4.2 Mention the advantage and disadvantage of centre line and separate wall methods.
- 4.3 Explain the methods of deduction for opening.

4.4 Define sub-structure and super- structure.

4.5 Identify main wall, partition wall, outer wall, inner wall, parapet wall etc.

4.6 Identify RCC work in lintel, beam, stair, floor/roof slab, sunshade, shelve, railing, drop wall etc.

5 Understand the procedure of estimating of a simple two storied frame structure building.

5.1 Calculate the quantity of earth work in excavation of column footing.

5.2. Calculate the quantity of RCC work for column footing upto grade beam.

5.3 Calculate the quantity of RCC work for grade beam.

5.4 Calculate the quantity of RCC column up to roof level.

5.5 Calculate the quantity of RCC beam of ground floor.

5.6 Calculate the quantity of RCC work in roof slab.

6. Understand the estimate of plumbing, sanitary and electrical works.

6.1 State the method of estimate plumbing and sanitary works.

6.2 Name the different fittings and fixtures required for water supply and sanitary works

6.3 Describe the method of estimation the drainage works of a buildings.

6.4 List the different electrical appliances and fittings for drawing room of residential building.

7. Understand the process of analysis of rates of various items of work as per PWD standard for sub-structure

7.1 State the meaning and purposes of rate analysis

7.2 State the rate analysis of the following items.

7.2.1. Earth work in excavation for foundation trenches.

7.2.2. Earth and sand filling in foundation and plinth.

7.2.3. one layer brick flat soling in foundation and floor.

7.2.4. Cement concrete work (1:3:6) in foundation and floor.

7.2.5. Brick work in foundation up to plinth with 1:6 cement mortar.

7.2.6 75 mm thick damp proof course (DPC) in proportion 1 :1.5: 3.

8. Understand the process of analysis of rates of various items of work as per PWD standard for super structure.

8.1. Brick work of 250 mm thick wall with 1:6 and 1:4 cement mortar.

8.2. Brick work of 125mm thick wall with 1:4 cement mortar.

8.3. RCC work in proportion 1:2:4 and 1:1.5:3 including shuttering cost.

8.4. Mild steel reinforcement fabrication work in different types of RCC of work (1000 kg/1 ton of work .

8.5 Patent stone flooring in proportion 1:1.5:3 with neat cement finishing.

8.6 20 mm thick cement plaster (1:4) with neat cement finishing.

8.7 Average 12 mm thick cement plaster (1:6) to brick walls.

8.8 Average 6 mm thick cement plaster (1:4) to RCC surface.

8.9 Lime terracing work with proportion of 2:2:7 over roof slab

8.10 Teak wooden door frame and 38 mm thick paneled door shutter.

8.11 Aluminum swing and sliding door and window.

8.12 Steel glazed window shutter with Z- section, T- section, flat bars etc.

8.13 White washing, color washing, distempering, snowmen washing, plastic emulsion paint, synthetic enamel paint wherever necessary.

8.14 Installation of European type commode & Indian type long pan (WC) with low level flushing tank, bath tub, wash hand basin, sink, squatting & standing urinals.

9. Understand the preliminary estimate for building project work according to plinth area rate.

9.1 State the meaning of preliminary estimate.

9.2 Mention the basis of calculating preliminary cost estimate of a building project work.

9.3 Describe the calculation procedure of preliminary cost estimate for building project work according to plinth area rate.

PRACTICAL Works

1. Calculate the volume of earth work in excavating tank of a given cross-section by
 - a) mid area method. b) mean area method. c) prismoidal method.
2. Prepare an estimate for construction of 100m long boundary wall.
 - a) using 25 cm × 25 cm brick pillar.
 - b) using 25 cm × 25 cm RCC column and grade beam.
3. Prepare an estimate for making wooden
 - a) chair b) table c) almirah d) Sofaset.

4. Calculate the quantity of m.s. reinforcement for the following items.

4.1 Rectangular beam.

4.2 Column.

4.3 Sunshade.

5. Calculate the quantity of m.s. reinforcement for roof slab. (a) one way slab (b) two way slab.

Calculate the quantity of the following items of work of a two storied frame structure building (Sub-structure)

- 6.1 Calculate the quantity of earth work in excavation of foundation trenches.
- 6.2 Calculate the quantity of sand filling in plinth.
- 6.3 Calculate the quantity brick flat soling and mass concrete in foundation and floor.
- 6.4 Estimate the reinforced cement concrete work in foundation up to plinth level.
- 6.5 Calculate the quantity of brick work up to plinth level.

7. Calculate the quantity of the following items of work of a two storied frame structure building (Superstructure)

- 7.1 Calculate the quantity of brick work in ground floor and above(250 mm thick).
- 7.2 Calculate the quantity of brick work in ground floor and above(125 mm thick).
- 7.3 Estimate the cement plaster work on brick wall (1:6).
- 7.4 Estimate the reinforced cement concrete work (a) Ground floor (b) 1st floor and above.
- 7.5 Estimate the cement plaster to RCC surfaces (1:4).
- 7.6 Estimate the quantity of wood work in frame and shutters.
- 7.7 Estimate the wood, steel and aluminum work in window frames and shutters.
- 7.8 Estimate the grill works for window and verandah.
- 7.9 Estimate the patent stone flooring, mosaic work, tiles to skirting.
- 7.10 Estimate the lime terracing (2:2:7) over RCC roof slab.
- 7.11 Estimate the quantity of white wash, color wash, snowcem wash, distemper, plastic paint where necessary.
- 7.12 Estimate the painting and varnishing works to doors, windows, grills and skirting.
- 7.13 Calculate the total cost per square metre according to PWD rate of a two storied frame structure building.

8. Calculate the cost per square metre for a residential building (Including sanitary & electrical works).

REFERENCE BOOKS

1. Estimating and costing - B N Datta
2. Estimating and costing - Gurucharan Singh
3. Estimating and costing - S.C Rangwala
4. A Text book of Estimating and costing - G. S. Birdie.

65841

Business Organization & Communication

T P C

2 0 2

AIMS:

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

SHORT DESCRIPTION:

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

DETAIL DESCRIPTION:

Theory:

1. Concept of Business organization.

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

2. Formation of Business organization.

- 2.1 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.

REFERENCE BOOK:

- 1.উচ্চ মাধ্যমিক ব্যবসায়নীতি ও প্রয়োগ -মোহাম্মদ খালেকুজ্জামান
- 2.উচ্চ মাধ্যমিক ব্যাংকিং ও বীমা -প্রফেসর কাজী নুরুল ইসলাম ফারুকী
- 3.আধুনিক কারবার পদ্ধতি -লতিফুর রহমান
- 4.কারবার যোগাযোগ ও সচিবের কার্যপদ্ধতি -প্রফেসর লতিফুর রহমান ও প্রফেসর কাজী নুরুল ইসলাম ফারুকী
- 5.ব্যবসায়িক যোগাযোগ এবং অফিসের কর্মপ্রণালী -ড. এম, এ, মানান
- 6.ব্যবসায় যোগাযোগ - মোহাম্মদ খালেকুজ্জামান ও মোঃ মুশাররফ হোসেন চৌধুরী
- 7. Business organization & management- M.C. Shukla
- 8. Business organization & management- R.N. Gupta



BANGLADESH TECHNICAL EDUCATION BOARD

Agargaon, Dhaka-1207.

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

ARCHITECTURE TECHNOLOGY

TECHNOLOGY CODE: 661

5th SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

ARCHITECTURE TECHNOLOGY (661)

5th SEMESTER

Sl. No	Subject Code	Name of the subject	T	P	C	Marks				Total	
						Theory		Practical			
						Cont. assess	Final exam	Cont. assess	Final exam		
1	66151	Architectural Design -4	1	6	3	20	30	50	50	150	
2	66152	History of Architecture -2	3	0	3	60	90	0	0	150	
3	66153	Interior Design	1	6	3	20	30	50	50	150	
4	66154	Presentation & Visual Technique	0	6	2	0	0	50	50	100	
5	66441	Structural Mechanics	2	3	3	40	60	25	25	150	
6	66457	Water Supply & Sanitary Engineering	3	3	4	60	90	25	25	200	
7	65851	Accounting Theory & Practice	2	3	3	40	60	50	0	150	
Total			12	27	21	240	360	250	200	1050	

66151

Architectural Design - IV

**T P C
1 6 3**

AIMS

To be able to-

- Understand the general effects of the built environment in designing different types of building.
- Understand the planning of an educational building.
- Prepare a design of an educational building.
- Understand the planning of a health care service.
- Prepare a design of a health care service.

SHORT DESCRIPTION

General concepts of hospitals, types of Hospitals, patient room facilities, medical equipment, lighting facilities, admitting department, special problem of construction, form, relation between department, fire safety, means of escape, Educational Background and School Organization; Structure of Education; Feasibility of a site to design a school; recreation facility Layout; Safety & Security; Class room Design; Library; Main Stair and Fire Escape; Drive Way; Slopped Way/Ramp, lift, Parking, Common toilet.

DETAIL DESCRIPTION

Theory:

1. Understand the general conception of Hospitals.

- 1.1State the Hospital and Health care service.
- 1.2Define different types of hospital.
- 1.3List the points for discussion about Hospitals.
- 1.4Analyze the need of exist Health codes and basic building code requirement.
- 1.5Describe the effect of project location and feasibility by limitation of existing building.

2. Understand the patient Rooms.

- 2.1State the general conception of patient room.
- 2.2Determine the size of the patient room.
- 2.3Describe the closets, Furniture & its size for a patient room.
- 2.4Explain the Doors & windows of the patient room.
- 2.5Describe built in Equipment, medical equipment and space allocation for a patient room.
- 2.6Describe the Lighting facilities, electrical requirements & Medical cases for patient room

3. Understand the Admitting Department of Hospital.

- 3.1State the sequence of the functional flow-chart of Admitting Department/IPD/OPD.
- 3.2Describe the Legend for central admitting department with adjacent medical record department for a 100-Bed Hospital.
- 3.3State the Hospital policies.
- 3.4State the relationship between different departments of hospital.
- 3.5Discuss different components of a hospital such as OT, ICU, HDU, CCU, Post operating room, waste management, kitchen/pantry etc.
- 3.6Describe the special problems of Design and Construction of a Hospital.
- 3.7Discuss the External factors such as air-conditioning, fire safety, means of escape and their location, parking, stair, lift, ramp.

- 4. Understand the planning consideration of a school building**
 - 4.1State structure of Education in Asia.
 - 4.2Discuss types of school Organization.
 - 4.3Define the following terms – Central and/or regional school, Community school, Daycare, Elementary school, International school, Junior high school, Kindergarten, Middle school, Neighborhood school, Nursery, Primary, School without walls, Secondary, Senior high, Special & Urban Schools, Junior High School, High School.
 - 4.4Discuss the pupil capacity of school.
 - 4.5Explain the working space relationships.
- 5. Understand Site Design and the safety & security of school.**
 - 5.1State the site selection criteria of school.
 - 5.2State the space allocation & relationships.
 - 5.3Discuss the circulation of vehicular service with fig. of parking system.
 - 5.4Describe the recreational facility layout, materials & drainage facility for school.
 - 5.5Discuss the building lay-out of school for safety and security.
 - 5.6State landscaping and lighting consideration of school.
 - 5.7Describe the accessibility provision such as school exits, stair ways, corridors, doors and school entry, toilet facilities with standard data.
- 6. Understand the Function of Economy, Content and Class Rooms Design for Secondary School.**
 - 6.1State the statement of use by owner.
 - 6.2State the basic concepts of teaching/administration.
 - 6.3Discuss plan and orientation for function of economy.
 - 6.4Discuss the class room planning.
 - 6.5Explain the general requirements for all class rooms such as – electrical and data access, air-conditioning and ventilation, lighting, projection equipment.
 - 6.6Explain the doors, acoustic and visual control of a class room.
 - 6.7Explain the furniture for a class room and mention the factors that are considering for the reader accommodations.
 - 6.8Discuss the auditorium for a school.
- 7. Understand parking lots and garages.**
 - 7.1Describe the factors to determine a drive way and turning radius.
 - 7.2Describe straight and curve driveway and its formulae.
 - 7.3Describe curved device ways and determine its factors.
 - 7.4Describe double drive ways, drive way exit.
 - 7.5Describe the vehicle length & width.
 - 7.6Discuss the slope of ramp, ramp break over angle, angle of departure and angle of approach.

PRACTICAL

- 1. Site visit, case study & prepare a report for presentation.**
 - 1.1Visit any district school/SOS-SHISUPALLI.
 - 1.2Take photographs of ancient and modern school building of that district.
 - 1.3Analysis the orientation of the school building and the toilet facilities.
 - 1.4Investigate the present needs of that school.
 - 1.5Present the report with photograph.

2. Prepare the flow chart of a Healthcare.

- 2.1Draw a flow diagram of 100-Bed district level Hospital.
- 2.2Draw a flow diagram of administration department.
- 2.3Draw a flow diagram of emergency department & diagnostic facilities.
- 2.4Draw a flow diagram of obstetrical and out-patient department.
- 2.5Draw a flow diagram of service facilities and laundry department.

3. Design the patient room.

- 3.1Draw an isolated single patient room (1:50 or $\frac{1}{4}''=1'-0''$).
- 3.2Draw a semi private patient room (1:50 or $\frac{1}{4}''=1'-0''$).
- 3.3Draw the section of the patient rooms (2.1, 2.2) (1:50 or $\frac{1}{4}''=1'-0''$).
- 3.4Draw sub acute care patient wardrobe elevation with dimension.
- 3.5Draw sub acute care patient rooms head wall elevation with dimension.

4. Design the living area of a hospital.

- 4.1Draw a plan of assisted living apartment (1:50 or $\frac{1}{4}''=1'-0''$).
- 4.2Draw a section of assisted living apartment kitchen (1:50 or $\frac{1}{4}''=1'-0''$).
- 4.3Draw a plan of a six bed ward with furniture (1:50 or $\frac{1}{4}''=1'-0''$).
- 4.4Draw the plan of reception area.

5. Prepare the Preliminary Design of a Hospital.

- 5.1Draw the line sketch plan of a 100-Bed district level Hospital.
- 5.2Draw the plan of 100-Bed district level Hospital in 1:100 or $\frac{1}{8}''=1'-0''$.
- 5.3Draw the landscape plan of the hospital.
- 5.4Draw the elevation & section of the Hospital.
- 5.5Draw the detail car parking area.

6. Case study and submit report of any one of the district/divisional hospital.

- 6.1Visit any one of the divisional medical college hospital and take photographs.
- 6.2Draw the layout plan of the visited hospital.
- 6.3Draw a layout for the future expansion.
- 6.4Prepare a written report with suggestion for the visited hospital.

7. Prepare the design & drawing of a school.

- 7.1Draw the flow diagram showing different area used in school.
- 7.2Sketch the line plan & front elevation of a school as per given requirements.
- 7.3Develop the floor plan according to the scale.
- 7.4Draw the front & side elevation according to scale.
- 7.5Draw a section through the stair and part section through entrance & verandah.

8. Prepare the detail plan of class room & teachers' room.

- 8.1Draw seating arrangement of a classroom with clear dimension.
- 8.2Design and draw seating furniture for classroom with dimension.
- 8.3Draw a wall cabinet for the classroom.
- 8.4Draw the head master's room with furniture arrangement.
- 8.5Draw the teachers' room with furniture arrangement.
- 8.6Draw the common & individual toilet detail of the school with section.

9. Prepare extra purpose building design.

- 9.1Draw a plan of an auditorium.
- 9.2Draw the furniture layout in the auditorium with clear dimension.

9.3Draw a plan of a library for the school with furniture arrangement.

9.4Detail drawing of a bookshelf & a reading table of the library.

REFERENCE BOOKS

1. Planning: The Architects Hand Book, by E and O. E, S. Row Land PIERCE, PATRICK CUTBUSH & ANTHONY WILLSAMS
2. TIME SAVER STANDARD; BUILDING TYPE, by JOSEPH DE CHIARRA
3. School Building Design Asia ,UNESCO
4. Ernst Neufert ARCHITECT'S DATA, by: Vincent Jhones, George Atkinson OBEBA (Arch) RIBA.

66152

History of Architecture – II

T P C

3 0 3

AIMS

- To be able to acquire knowledge of the history of architecture
- To be able to develop knowledge of gothic and renaissance architecture in Europe
- To be able to develop the knowledge of beginning of Islamic architecture in India and be able to know the development of Islamic architecture during Mughal period.
- To be able to understand the contribution of architects for the development of architecture.
- To be able to understand the modern architecture in the world.

SHORT DESCRIPTION

Gothic architecture in France; Renaissance architecture in Europe, Indo-Islamic architecture; Development of imperial style; Development of Islamic architecture during Mughal period; Islamic architecture in Bengal; Islamic architecture in Dhaka; Hindu architecture in East Bengal; Modern architecture in Dhaka; Ancient architecture in Bengal; works of important architects; Islamic architecture in ancient period; Masjid architecture; Islamic architecture in Europe.

DETAIL DESCRIPTION

Theory:

- 1. Understand the development of gothic architecture in France.**
 - 1.1. Describe the historical influences of the gothic style in France.
 - 1.2. Identify the architectural characteristics of gothic style in France.
 - 1.3. Distinguish between cathedral & churches.
 - 1.4. Describe the architectural character of Notre-dame cathedral in Paris.
- 2. Understand the architectural development of renaissance in Italy.**
 - 2.1. Describe the historical influence on the renaissance architecture in Italy.
 - 2.2. Identify the architectural features of St. Peter in Rome.
 - 2.3. Identify the architectural features of S. Paul Cathedral in London.
 - 2.4. Describe the architectural character of Milan cathedral in Italy.
 - 2.5. Describe the architectural character of Florence cathedral in Italy.
- 3. Understand the development of imperial style.**
 - 3.1. Identify different phases of the imperial style.
 - 3.2. Describe the early development of Qutub complex.
 - 3.3. Describe the architectural character of Qutub Minar.
 - 3.4. Identify the change of Qutub complex under the Khilji dynasty.
 - 3.5. Describe the architectural features of Alai-Darwaja.
- 4. Understand the development of the Islamic architecture during the Mughul period.**
 - 4.1. Describe the historical influence in the development of Mughul style.
 - 4.2. Describe the development in the planning of Fathepur Sikri.
 - 4.3. Explain the architectural feature of the Buland Darwaja.

- 4.4 Explain the architectural development in the planning of Red fort.
- 4.5 Explain the architectural development in the planning of Agra fort.
- 4.6 Identify the architectural feature of the Delhi-Jame Masjid.

5. Understand the development of the Tomb architecture during the Mughal period.

- 5.1 Describe the historical influence in the development of Tomb architecture.
- 5.2 Describe the architectural feature of Humayan's tomb.
- 5.3 Explain the architectural feature of the Salim Chisti's tomb.
- 5.4 Describe the architectural features of the Tajmahal.

6. Understand the development of the Indo-Islamic architecture.

- 6.1 Describe the historical influence on the Indo-Islamic architectural style.
- 6.2 Identify the architectural feature of the Bagha Masjid at Rajshahi.
- 6.3 Identify the architectural feature of the Kusomba Masjid at Naogaon.
- 6.4 Visit & Describe the architectural feature of the Tara Masjid at Dhaka.
- 6.5 Describe the architectural feature of the Atia Masjid at Tangail.

7. Understand the development of Islamic architecture in Bengal.

- 7.1 Describe the historical influence on the Islamic architectural style of Bengal.
- 7.2 Visit & Explain the architectural features of the Adina mosque.
- 7.3 Visit & Explain the architectural features of the Sat Gambuj Masjid, Khulna.
- 7.4 Visit & Explain the architectural features of the Atia Masjid, Tangail.
- 7.5 Visit & Explain the architectural features of the Chota-sona mosque at Chapai Nawabgonj.
- 7.6 Visit & Explain the architectural features of the Kadam Rasul at Nabigonj Narayangonj.
- 7.7 Explain the architectural features of the Dakhil-Darwaja.

8. Understand the Islamic architecture in Dhaka.

- 8.1 Visit & Describe the historical development of the Lal-bag fort.
- 8.2 Visit & Describe the historical development of the Hosheney-dalan.
- 8.3 Visit & Explain the architectural features of the Ahsan Monjil.
- 8.4 Visit & Explain the architectural features of the Karjan Hall.
- 8.5 Visit & Explain the architectural features of the Tara mosque.

9. Understand the Hindu architecture in East Bengal.

- 9.1 Visit & Describe the historical development of Kantojir mondir at Dinajpur.
- 9.2 Visit & Describe the historical development of Sotoro- Ratno Mondir at Comilla.
- 9.3 Visit & Describe the historical development of Dhakeyshorey Mondir at Dhaka.
- 9.4 Visit & Describe the historical development of the Joykali Mondir at Dhaka.

10. Understand the development of ancient architecture in Bengal.

- 10.1 Visit & Describe the historical influences of Sonargaon at Narayangonj.
- 10.2 Visit & Describe the historical influences of Maynamoti at Comilla.
- 10.3 Visit & Describe the historical influences of Paharpur at Naogaon.
- 10.4 Visit & Describe the architectural character of Uttara Gano Bhoban at Nator
- 10.5 Visit & Describe the historical influences of Mohastan Gor at Bogra.

11. Understand the development of Islamic architecture & Masjid architecture in Middle East.

- 11.1 Describe the introduction of Muslim architecture in pre- stage.
- 11.2 Explain the architectural characteristics of Muslim architecture.
- 11.3 Explain the historical development of Masjid architecture.
- 11.4 Explain the typical part of a Masjid.

11.5 Describe the historical influences & construction technique of Musjidun-Nabobi at Modina.

11.6 Describe the historical development of Cordova Jame-Masjid at Spain.

11.7 Describe the architectural characteristics of Holy KABA Sharif complex.

REFERENCE BOOKS

1. History Of Architecture - by Fletcher.
2. Indian Architecture(Islamic Period) - by Percy brown
3. Contemporary Architecture Bangladesh. - by institute of architects Bangladesh
8. বাংলাদেশের প্রাচীন কীর্তি (২য় খ্রিস্টাব্দ মুসলিম যুগ) - আ. কা. মো. যাকারিয়া
৫. মসজিদের ইতিহাস - ড. সৈয়দ মাহমুদুল হাসান

66153

Interior Design

**T P C
1 6 3**

AIMS

To provide the students with an opportunity to acquire knowledge, skill and attitude in the area of interior design with special emphasis on:

- Architecture & interior design and its elements.
- Principle, basic styles and rules of interior design.
- Interior space in current practice.
- The role of ceiling, floor covering and wall paneling or cladding.
- The basics of design composition, Interior materials & the elements of Interior design.

SHORT DESCRIPTION

Architecture & history of interior design; Principle, Basic Style & Rules of Interior Design; Basic of Design composition; Interior materials & elements of interior design; Interior space; Natural ventilation & air conditioning.

DETAIL DESCRIPTION

Theory

1. Understand the architecture & history of interior design.

- 1.1 State interior decoration as a profession.
- 1.2 State emergence of professional interior designer.
- 1.3 Planning Describe the concept of function & planning.
- 1.4 State basic Interior decorating Style & Rules.
- 1.5 Describe human dimension with different Furniture.
- 1.6 Describe basic Furniture dimension for residence difference Space
- 1.7 Explain the contemporary architecture & modern interior design features.
- 1.8 Explain the environmental behavior in relation to the design.

2. Understand the basics of Design composition, Interior materials & elements of interior design.

- 2.1 Explain the elements (line, form, texture, color, pattern, light) and the principles (balance, emphasis, rhythm, proportion, unity or harmony).
- 2.2 Explain different types of Materials (different types of Wood, Board, plywood, Timber, ACP, PVC, Glass, Wall paper, Grass, Paints, Gypsum & Others artificial interior materials etc).
- 2.3 Explain Paints and related products, ferrous and non ferrous metals, gypsum and related products, Adhesives (or glues).
- 2.4 Describe the role of furniture in interior design.
- 2.5 Describe the principles of furniture arrangement.
- 2.6 List the principal textiles and textile terms used in interior decoration.

3. Understand the interior space area in current practice.

- 3.1 Discuss about different types of Ceiling with ceiling materials in different residential interior space.
- 3.2 Discuss about different types of Wall Paneling & Partition area with materials in different residential interior space.
- 3.3 Discuss about different types of Floor with materials in different residential interior space.
- 3.4 Discuss about different types of Decorative Display area with materials in different residential interior space.

- 3.5 Discuss about different types of Blinds & Screen area with materials in different residential interior space.
- 3.6 Discuss the importance of Decorative Plantation and Landscaping in different residential interior space.

4. Understand the natural ventilation & air conditioning.

- 4.1 State guidelines for natural ventilation.
- 4.2 State mechanical ventilation & ventilation with ducts.
- 4.3 Explain recommended fresh air supply.
- 4.4 Explain the size of the openings for natural ventilation.
- 4.5 Discuss the need for air-conditioning & atmospheric conditions for human comfort.

5. Understand the natural lighting & artificial lighting.

- 5.1 State daylight factors.
- 5.2 Describe recommended daylight factors for interiors.
- 5.3 Explain calculation of the openings for natural lighting.
- 5.4 Discuss guidelines for good natural lighting.
- 5.5 Discuss different types of lighting arrangements.
- 5.6 Describe lighting accessories and protection devices.
- 5.7 Discuss guidelines for lighting design and the lumen method of lighting design.

PRACTICAL:

1. Perform the human dimension with different situation.

- 1.1 Sketch the basic human dimensions on standing & seating condition.
- 1.2 Sketch plan & section of a group seating for living space with dimension.
- 1.3 Compare the basic human dimensions (Time saver standards) with local human dimensions (female 5'-1" & Male 5'-6").

2. Perform the drawing of different types of seating

- 2.1 Sketch a general consideration for a seating.
- 2.2 Sketch a general purpose chair for a seating.
- 2.3 Sketch a general considerations office chair for a seating.
- 2.4 Sketch a general considerations Easy chair for a seating.
- 2.5 Sketch different types of seating (Alvar Aalto, ARNE Jacobsen, Shaker Ladder back, Hans wegner, Thonet arm chair).

3. Perform the drawing of different types of house hold furniture.

- 3.1 Draw the plan of sofa set with dimensions.
- 3.2 Draw showcase with dimensions.
- 3.3 Draw plan & elevation of different types of bed with dimensions.
- 3.4 Draw plan & elevation of different types of book-self with dimensions.
- 3.5 Sketch plan & elevation of different types of dining table with dimensions.

4. Perform the sketch of molding & fasteners.

- 4.1 Sketch different types of molding.
- 4.2 Sketch different types of nails with dimensions.
- 4.3 Sketch different types of screw head with their dimensions.
- 4.4 Sketch different types of hardware & fasteners.

5. Prepare the drawing & detail of false ceiling.

- 5.1 Draw a reflected ceiling plan of a hall room.
- 5.2 Draw the section of a false ceiling.
- 5.3 Draw the detail section of a false ceiling showing fixing arrangements of different types of materials.
- 5.4 Make a presentation sheet with different type of false ceiling materials.
- 5.5 Make a presentation or collage sheet with different types of collected false ceiling picture.

6. Prepare the working drawing & detail of different interior room with different wall paneling, display showpiece rack and interior landscaping or plantation.

- 6.1 Make a presentation sheet with different type of collected interior wall paneling picture or image.
- 6.2 Make a presentation or collage sheet with different types of collected display showpiece rack's picture or image.
- 6.3 Make a presentation or collage sheet with different types of collected landscaping or plantation's picture or image.
- 6.4 Draw a plan, elevation & section with detail of a TV display with showpiece rack.
- 6.5 Draw a plan, elevation & section with detail of a wall paneling or partition wall.
- 6.6 Draw an interior landscape or plantation arrangement plan and section of a living room.

7. Prepare a presentation sheet with different interior room lighting shade and lighting arrangement.

- 7.1 Sketch different types of table lamps.
- 7.2 Make a decorative light shade with different wastages materials.
- 7.3 Draw an electrical conduit & fixture layout of a residential plan.
- 7.4 Make a collage by different lighting photo.

8. Prepare the interior of a Kitchen.

- 8.1 Draw a kitchen layout.
- 8.2 Sketch different types of kitchen equipment with measurements.
- 8.3 Draw the detail plan of the kitchen with cabinet.
- 8.4 Draw the section of the kitchen cabinet.
- 8.5 Draw an isometric view of the kitchen room.

9. Prepare the interior model of a residence as an Interior Project.

- 9.1 Draw furniture layout plan of different rooms of a residence.
- 9.2 Make a detail interior model of the residence.

Ref.:

1. Interior design principles and practice - by -M. Pratop Rao.
2. Interior design: An introduction to architectural Interiors. - by-Arnold Friedmann.
- John F. Pile , Forrest Wilson.
3. Elements of Interior Design and Decoration. - by-Sherrill Whiton
4. Time Saver Standard interior. - by-Jesph D. Chirra.
5. Construction drawings and details for interiors. - by- W. Otie Kilmer.
6. Interior Design illustrated. - by-Francis D.K. Ching.

66154

Presentation & Visual Technique

**T P C
0 6 2**

AIMS

- To be able to understand the basic concept and purpose of presentation and visualization techniques.
- To be able to communicate Ideas using presentation techniques.
- To be able to prepare a presentation of a project (conservational/historical building).
- To be able to convert the output on illustrator & Photoshop.
- To be able to make a project brochure.

SHORT DESCRIPTION

Basic knowledge of presentation technique; Manual techniques of presentation; Scaling technique for freehand sketch presentation; Exterior and interior Perspective view; Presentation through Photographs; 2D & 3D Presentation by CAD; Presentation by Sketch up; Illustration & Photoshop; a complete Project (Historical or conservational building) presentation.

DETAIL DESCRIPTION

Practical

1. Prepare presentation by free hand sketch.

- 1.1 Show different freehand drawing of conservational/historical building.
- 1.2 Brief the project (conservational/historical building) in detail for presentation.
- 1.3 Sketch different furniture.
- 1.4 Draw the sketch of a given view (with building).
- 1.5 Render on the sketches (black & white).
- 1.6 Render by using color.

2. Perform scaling of freehand sketch.

- 2.1 Select a suitable object i.e. pencil, sketch etc. for scaling.
- 2.2 Follow the scaling technique.
- 2.3 Sketch the real object/plants/flower vas follow the scaling technique.
- 2.4 Sketch a room corner from where you seated by following the scaling technique.

3. Prepare exterior view of building by 2-point perspective.

- 3.1 Draw 2-point perspective view of a small building.
- 3.2 Render the building with different media.
- 3.3 Draw the shade shadow of the perspective view.
- 3.4 Draw the roads, cars/vehicles, trees, pools etc. in front of the building.
- 3.5 Draw the freehand perspective view of the historical building.

4. Prepare interior view of building by 1-point perspective.

- 4.1 Draw 1-point perspective view of a room.
- 4.2 Draw 1-point perspective view of a kitchen.
- 4.3 Draw 1-point perspective view of a bath/toilet.
- 4.4 Draw a sectional perspective view of a building.

5. Prepare a presentation by photograph.

- 5.1 Take different angle photograph of the historical building.
- 5.2 Take close photo of different building components.

- 5.3. Take a motion (moving car/vehicle etc.) picture.
- 5.4. Take & compare the photo of a face in different angle lighting.
6. **Prepare a set of presentation drawing of the project by using CAD.**
 - 6.1. Visit and survey the area of the historical building.
 - 6.2. Collect the floor plan and draw it on CAD.
 - 6.3. Draw the elevation with rendering.
 - 6.4. Draw the sectional elevation of the building.
7. **Prepare a set of 3D presentation drawing of the historical building/Project.**
 - 7.1. Make sketch of the building from the taken photograph.
 - 7.2. Render the sketch using different rendering media.
 - 7.3. Draw a 3D view.
8. **Prepare a project presentation by using illustrator and Photoshop.**
 - 8.1. Convert and edit a CAD file into illustrator/Photoshop.
 - 8.2. Convert any file into /Photoshop and edit them for print and presentation.
 - 8.3. Make a poster with illustrator/Photoshop.
 - 8.4. Make a banner with illustrator/Photoshop.
 - 8.5. Make a brochure for the project.

REFERENCES:

1. Sketch up tutorial on you tube.
2. Drawing techniques: 7 fundamentals of pencil drawing | Creative Bloq
3. Freehand: Sketching Tips and Tricks Drawn from Art by Helen Birch
<https://www.goodreads.com/book/show/17557503-freehand>
4. Freehand Drawing Will Allow You to Draw Anywhere, and Anything.

66441

Structural Mechanics

T P C
2 3 3

AIMS:

- To enable to apply the knowledge of scientific principles to problems of mechanical nature.
- To develop an understanding of mechanical properties of materials.
- To assist in applying mathematical and geometrical calculations to the analysis of statically determinate beams.

SHORT DESCRIPTION

Mechanical properties of material; Laws of forces; Moment; Friction; Centroid and centre of gravity; Moment of inertia; Torsion on circular shaft; Shear force and bending moment.

DETAIL DESCRIPTION

Theory:

1.0Understand the important aspects of mechanical properties of materials.

- 1.1 Mention the necessity to know about the mechanical properties of materials.
- 1.2 Define the following terms:
 - a. Stress, tensile stress, compressive stress, shear stress.
 - b. Strain, tensile strain, compressive strain, shear strain,
 - c. Hooke's law, modulus of elasticity and modulus of rigidity.
- 1.3 Explain stress-strain diagram of mild steel and concrete.
- 1.4 Define the following terms:
 - a. Elasticity, proportional limit, yield point, ultimate stress, breaking stress, working stress and factor of safety.
 - b. Strength, stiffness, toughness, ductility, malleability, brittleness, creep, fatigue failure, resilience, modulus of resilience, thermal stress in simple bar and poisons ratio.
- 1.5 Compute stress, strain, modulus of elasticity and modulus of rigidity.
- 1.6 Solve problems involving resilience, thermal stress and poisons ratio.
- 1.7 Compute stress develop in composite bar under tension and compression.

2. Understand the concept of laws of forces.

- 2.1 Explain the laws of forces.
- 2.2 Define the following terms:

Force, co-planar forces, non-coplanar forces, concurrent forces, non-concurrent forces, co-linear forces, parallel forces, laws of equilibrium of forces.
- 2.3 Mention the parallelogram laws of forces.
- 2.4 State the composition of forces and resolution of force.
- 2.5 Define component of force, rectangular component and resultant of forces.
- 2.6 Compute the resultant force-
 - a. Triangle of forces
 - b. Polygon of forces
 - c. Converse laws of triangle and polygon laws of forces graphically.
- 2.7 Calculate the resultant of forces: co-planar forces, concurrent forces, parallel forces and co-linear forces
- 2.8 Explain Lami's theorem.
- 2.9 Solve problems on Lami's theorem.

3. Understand the aspects of moment of forces.

- 3.1 Define the term moment (analytically and graphically).
- 3.2 Differentiate moment with force.
- 3.3 Explain Varignon's principle of moment.
- 3.4 Distinguish like and unlike parallel forces.
- 3.5 State the meaning of couple.
- 3.6 Mention the properties of couple.
- 3.7 Solve problems on moment of couple and moment of forces.
- 3.8 Solve problems on moment of like and unlike parallel forces.

4. Understand the concept of frictional forces.

- 4.1 State friction, static friction and dynamic friction.
- 4.2 Mention the laws of static friction and dynamic friction.
- 4.3 Explain angle of friction and co-efficient of friction.
- 4.4 Compute friction of a body on horizontal planes.
- 4.5 Compute friction of a body on inclined planes.
- 4.6 Compute frictional force acting on a ladder.

5. Understand the aspects of centroid and centre of gravity.

- 5.1 Define the terms: centroid and centre of gravity.
- 5.2 State the axis of symmetry and parallel axis.
- 5.3 Compute the centroid by the method of moment of the following sections:
 - a. rectangular
 - b. triangular
 - c. circular
 - d. semi-circular
 - e. hollow
 - f. I-shaped
 - g. T-shaped
 - h. L-shaped
- 5.4 Solve problem on centre of gravity of a composite parallelepiped body.

6. Understand the concept of moment of inertia.

- 6.1 State 1st and 2nd moment of area.
- 6.2 Explain the meaning of radius of gyration.
- 6.3 Mention the theorems of moment of inertia.
- 6.4 Compute the moment of inertia of plane area about any axis of the following sections:
 - a. rectangular
 - b. triangular
 - c. circular
 - d. semi-circular
 - e. hollow
 - f. I-shaped
 - g. T-shaped
 - h. L-shaped

7. Understand the aspects of torsion on solid and hollow circular shaft.

- 7.1 State the laws of motions.
- 7.2 Explain the term circular motion.
- 7.3 Define the terms: torsion and torsional stress.
- 7.4 Mention the fundamental assumptions of torsional stress.
- 7.5 Find the relation between torsional stress and strain.
- 7.6 Interpret the formulas relating to finding torque
- 7.7 Solve problems involving torsion.

8. Understand shear force (SF) and bending moment (BM).

- 8.1 Define the term 'beam'.
- 8.2 List different types of beams.
- 8.3 Mention various types of load on beams.
- 8.4 Define shear force and bending moment.
- 8.5 Differentiate between shear force and bending moment.

- 8.6 Mention the sign conventions of shear force and bending moment.
- 8.7 List the characteristics of shear force and bending moment diagram.
- 8.8 Calculate and draw SF and BM diagram of cantilever beams with point load, distributed load and both.
- 8.9 Calculate and draw SF and BM diagram of simply supported beams with point load, distributed load and both.
- 8.10 Calculate and draw SF and BM diagram of simply supported overhanging beam with point load, distributed load and both.

PRACTICAL:

1. Perform compression test of a timber specimen.
2. Conduct tensile test of mild steel rod and draw stress-strain curve with test results.
3. Determine the percentage elongation of mild steel.
4. Determine the centroid of a composite area.
5. Determine the resultant of a force system graphically.
6. Show the resultant of forces by using force board.
7. Prove the Lami's theorem by using force board.
8. Practice to determine the co-efficient of friction of timber, concrete and mild steel.
9. Practice to determine reactions of a beam by using spring balance.

REFERENCE BOOKS:

1. Structural Mechanics - W Morgan and D T Williams
2. Structural Mechanics - Singer / Popov
3. Mechanics of Materials - Philip Gustave Laurson and Williams Junkin Cox
4. Structural Mechanics - A. K. Upadhyay Published by SK Kateria & Sons, India.
5. Applied Mechanics - R.S Khurmi

66457

Water Supply & Sanitary Engineering

T P C

3 3 4

AIMS

To be able

- to select suitable methods for collection and distribution of water from source to community.
- to identify impurities of water and suitable methods of purification.
- to develop understanding of the procedure of construction, repair and maintenance of water supply systems.
- to compare various methods and techniques used to treat and dispose of sewage and control of water pollution.
- to identify various sewer pipes, fittings, procedures of construction, repair and maintenance of sewage disposal.
- to compare various types of pit latrine.

SHORT DESCRIPTION

Water requirements; Sources of water; Different types of appurtenances used in water supply systems; Collection and transmission of water; Quality of water; Treatment of water (clarification) filtration, disinfection, softening; Water distribution; Constructions and maintenance of distribution system; Water reservoir; Rural water supply system; Water pollution and its effects on the environment; Sewage general consideration; Sewer pipe; Sewer appurtenance; Flow in sewer; Construction and maintenance of sewer; Characteristics of sewage; Sewage Sludge treatment and disposal; Rural sanitation; Health and hygiene;

DETAIL DESCRIPTION

1. Understand the various aspects of consumption of water.

- 1.1 Describe population prediction and various methods of population forecast.
- 1.2 Describe the various needs for clean water and list the quantities required for those purposes.
- 1.3 Explain the influence of the factors which affect per capita consumption of water:
 - a. Size of city
 - b. Characteristics of population
 - c. Industries and commercial organization
 - d. Climatic condition
 - e. Metering of water

2. Understand the different sources of water.

- 2.1 Identify different sources of water.
- 2.2 Explain the hydrological cycle.
- 2.3 State the advantages and disadvantages of ground water.
- 2.4 Mention the advantages and disadvantages of surface water.
- 2.5 Distinguish between the ground water supply and surface water supply in respect to quality of water.
- 1.6 Explain rainwater harvesting.

3. Understand the pipe appurtenances.

- 3.1 List some pipe appurtenances
- 3.2 Describe air valves
- 3.3 Describe bib and stop cocks.
- 3.4 Describe fire hydrant
- 3.5 Describe reflux, relief, scour and sluice valves
- 3.6 Describe water meters

4. Understand the collection and transmission system of water.

- 4.1 Identify the different types of intake used in collecting surface water.
- 4.2 Describe the different intake systems with sketches.
- 4.3 Classify the different type of pumps used in water supply.
- 4.4 Explain the uses and limitations of different type of pumps.
- 4.5 Distinguish between turbine pump and submersible pump used in deep tube well.

5 Understand the various types of impurities in water.

- 5.1 State the different type of impurities present in water.
- 5.2 Explain the causes of turbidity, color, taste and odor in water.
- 5.3 Mention the effects and maximum allowable limits(WHO & BSTI) of impurities (pH, colour, Turbidity, TDS, SS, Hardness, chloride, Nitrate, Iron, Sodium, Arsenic, Cadmium, lead, total coliform and faecal coliform) in water.
- 5.4 Explain the causes and effects of alkalinity, acidity and hardness in water.
- 5.5 Describe the effects of gaseous impurities(carbon di-oxide, hydrogen sulphide, dissolved oxygen) in water.

6 Understand the treatment of water by clarification, filtration, disinfection and softening.

- 6.1 Explain a typical flow diagram of treatment plant units.
- 6.2 Outline the need of screening and filtration of water.
- 6.3 Explain latest water filter and filtration process for drinking of water.
- 6.4 Mention the principle of plain sedimentation and sedimentation with coagulation.
- 6.5 State different types of coagulants with their purpose and action.
- 6.6 Describe a typical sketch of sedimentation tank and process of flocculation.
- 6.7 Explain the characteristics between the slow sand and rapid sand filter.
- 6.8 Describe disinfection of water by chlorination and advantages and limitations of disinfection of water by chlorination and by;
 - a. Heating and boiling
 - b. pH control
 - c. Using oxidizing agent
 - d. Ultra violet Ray
 - e. Ozone
- 6.9 Explain the need of softening and list different processes of water softening

7 Understand the different types of water distribution methods, construction and maintenance of water distribution system.

- 7.1 State the different features of the distribution systems.
- 7.2 Describe with the help of sketches the different methods of supply of water.
- 7.3 Outline the advantages and disadvantages of different methods of supply of water.
- 7.4 Describe with sketches the different layout methods of distribution pipes.

- 7.5 Explain the relative advantages and disadvantages of different layout methods of distribution pipes.
- 7.6 Describe the procedure of excavation and back filling for laying pipe lines.
- 7.7 Describe the procedure for-
 - a. handling and laying pipes and their maintenance
 - b. placing and maintenance of hydrants and valves
 - c. cleaning of water mains and use of washout system.

8 Understand different types of reservoir.

- 8.1 Define reservoir.
- 8.2 Mention the different types of reservoir according to position and shape.
- 8.3 Explain the needs of roof tank and water reservoir in a building.
- 8.4 Describe the typical section of roof tank and water reservoir in a building.
- 8.5 Describe the procedure for cleaning of water reservoir.

9 Understand the water supply systems in rural area of Bangladesh.

- 9.1 Give introduction to different types of hand pumps: No. 6 hand pump, deep-set (Tara) pump.
- 9.2 Describe the procedure of drilling, aquifer selection, back filling and installation techniques including developing of new tube well.
- 9.3 Describe operation & maintenance of No. 6 hand pumps and deep-set(Tara) hand pumps.
- 9.4 Describe operation & maintenance of deep tube well.

10 Understand the general consideration of sewerage system.

- 10.1 Define sewage
- 10.2 Explain conservancy system and water carriage system of sewage.
- 10.3 Compare various types of sewerage system.
- 10.4 Outline the advantages and limitations of sewerage system and septic tank.

11 Understand the sewer pipes and techniques of their joint.

- 11.1 Identify various types of sewers of a complete sewerage system.
- 11.2 Compare the advantages and limitations of uses of different kinds of sewer pipes according to construction materials.
- 11.3 Identify the pipes of different materials for different uses.
- 11.4 Describe various kinds of joint in connecting the pipes with the help of sketches.
- 11.5 List the requirements of a good sewer joint.
- 11.6 Describe the process of jointing two pipes of different materials.
- 11.7 Identify methods of limiting the corrosion of sewer pipes.

12.Understand appurtenances and their purposes.

- 12.1 Identify various sewer appurtenances.
- 12.2 Describe various sewer appurtenances with the help of sketches and state their functions.
- 12.3 Discuss the factors to be considered for locating the sewer appurtenances so that their function can be achieved.
- 12.4 Explain the junction chamber and regulator with sketches.
- 12.5 Draw a neat sketch of siphon & inverted siphon and describe their functions.
- 12.6 Describe the necessity of pumping sewage.
- 12.7 Discuss the requirements of sewage pumps and list various types of sewage pumps.
- 12.8 List the points that should be considered in locating the site of pumping station and state the capacity of pump and pumping stations.

13.Understand the principle of construction maintenance of sewers.

- 13.1 Explain general aspects for preparation of sewerage scheme and list various types of sewer.
- 13.2 Describe procedures followed in the construction of sewers and explain the procedure of laying a sewer in a trench.
- 13.3 Explain under what circumstances the sheeting (timbering), bracing and dewatering of trenches are required and what is the process of removal of sheeting (timbering) of trenches.
- 13.4 Specify with sketch, the setting-out of the fall of sewer for the continuous gravitational flow of sewage.
- 13.5 Describe the construction of brick sewer and concrete sewer.
- 13.6 Describe the techniques of testing sewer lines and the precautions should be taken during back filling of trenches.
- 13.7 State different ways of protection for sewer.
- 13.8 Identify the need for maintenance of sewer and identify the precautions to be taken before entering in sewers and identify the factors to be considered for frequent inspection and supervision of sewer so that proper flow is maintained.
- 13.9 List the main problems which are faced in maintenance of sewer and describe the procedures used to clean and unlock sewer.

14.Understand the characteristics of sewage.

- 14.1 Describe the constituents of sewage.
- 14.2 Outline the necessity of examination of sewage.
- 14.3 Describe physical characteristics of sewage and their tests.
- 14.4 Explain the importance of determination of solids in sewage.
- 14.5 Describe various chemical tests of sewage.
- 14.6 Describe the importance of common laboratory in the treatment of sewage.
- 14.7 Describe the role of aerobic and other micro-organism in the decomposition of sewage.
- 14.8 Explain the following terms:
 - a) Anaerobic activity in sewage
 - b) Biochemical oxygen demand(BOD)
 - c) Chemical oxygen demand(COD)

15.Understand the methods used for sewage treatment and disposal.

- 15.1 Outline the stages of sewage treatment.
- 15.2 Explain the purpose of preliminary sewage treatment.
- 15.3 Name different kinds of treatment process for removing impurities of each stage of the treatment process.
- 15.4 Describe the schematic layout of a typical sewage treatment plant.
- 15.5 Describe with the help of neat sketch of a sedimentation tank giving the factors, which reduce the efficiency of sedimentation tanks.
- 15.6 List various methods of sewage disposal.
- 15.7 State the characteristics of soil which influence waste water disposal.
- 15.8 Explain the term dilution and its suitability.
- 15.9 Describe septic tank and draw a neat sketch of septic tank and soak well.

16.Understand the rural sanitation practices in Bangladesh.

- 16.1 Pit latrine technology:
 - a) Describe the ventilated improved pit (VIP) latrine and simple pit latrine.
 - b) Draw a neat sketch of VIP latrine and describe the special features of VIP latrine.
 - c) Mention the advantages & disadvantages of VIP and simple pit latrine.

16.2 Pour flush technology:

- a) Describe the single/twin pit pour flush latrine.
- b) Types of single/twin pit pour flush latrine.
- c) Mention the advantages & disadvantages of single/twin pit pour flush latrine.
- d) Compare the advantages and disadvantages of using twin pit latrine over septic tank.

16.3 Construction and maintenance of sanitation facilities:

- a) Describe the construction procedures of VIP, simple pit, single and twin pit pour flush latrine.
- b) Describe the construction procedure of small bore sewer system.

17.Understand health and hygiene.

- 17.1 Describe the common diseases.
- 17.2 Explain the causes of transmission of these diseases.
- 17.3 Describe how to control these diseases.
- 17.4 Explain the importance of hygiene education.
- 17.5 Describe the scope and methodology for hygiene education.
- 17.6 Explain the advantages of social mobilization for hygiene practice.
- 17.7 Explain integrated approach for water, sanitation and health education.

PRACTICAL

1. Make a legend of water supply and sewerage system with related fittings and fixtures.
2. Sketch the pipeline network for rural water supply
3. Draw a neat sketch of a underground water reservoir
4. Sketch different types of plumbing fixtures
5. Identify the common troubles in water supply lines and their solution by visiting concern authorities (WASA, City Corporation, Pourashava and Polytechnic Institute).
6. Conduct physical and chemical tests of water.
 - a. Conduct physical tests of water (pH value & turbidity) using field pH and turbidity meter.
 - b. Conduct chemical tests of water (iron and chloride) using field kits.
 - c. Conduct the arsenic test of water using field kits.
 - d. Conduct hardness test using field kits.
7. Prepare a model of septic tank
8. Prepare a model of soak pit
9. Sketch layout plan of pipe lines for latrine
10. Draw a neat sketch of different components of small bone sewer system
11. Prepare a model of ventilated improved pit (VIP) latrine.
12. Prepare a model double vault compost latrine.
13. Sketch of different types of sewers.

REFERENCE BOOKS

1. Water Supply and Sanitary Engineering [Environmental Engineering] by S. C. Rangwala. Charotar Publishing House, India (2006).
2. Water Supply & Sanitation- Rural and Low Income Urban Communities by M. Feroze Ahmed and Md. Mujibur Rahman. ITN-Bangladesh, BUET, Dhaka, Bangladesh (2000).

65851

Accounting Theory & Practice

T P C

2 3 3

AIMS

- To be able to understand the principles and practices of book keeping and accounting.
- To be able to understand the procedures of general accounting, financial accounting and their applications.
- To be able to understand the concept of income tax , VAT & Public works accounts.

Course Outlines

Concept of book keeping and accounting; Transactions; Entry systems; Accounts; Journal; Ledger; Cash book; Trial balance; Final accounts; Cost account & financial accounting; Income Tax; Public works accounts.

DESCRIPTION;

Theory

1. Concept of book keeping and accounting.

- 1.1 Define book keeping and accountancy.
- 1.2 State the objectives & of book keeping.
- 1.3 State the advantages of book keeping.
- 1.4 Differentiate between book keeping and accounting.
- 1.5 State the necessity and scope of book keeping and accounting.

2. Transactions Analysis.

- 2.1 Define transactions and business transaction.
- 2.2 Describe the characteristics of transaction.
- 2.3 Discuss the classification of transaction.

3. Entry system of Accounting.

- 3.1 State the aspects of transactions.
- 3.2 Define single & double entry system ..
- 3.3 Discuss the principles of double entry system.
- 3.4 Distinguish between single entry and double entry system of book keeping.
- 3.5 Justify whether double entry system is an improvement over the single entry system.

4. Classification of accounts.

- 4.1 Define accounts.
- 4.2 State the objectives of accounts.
- 4.3 Illustrate different type of accounts with example.
- 4.4 Define “Golden rules of Book keeping”.
- 4.5 State the rules for “Debit” and “Credit” in each class of accounts.
- 4.6 Define accounting cycle.

5. Journal .

- 5.1 Define Journal.
- 5.2 State the functions of Journal.
- 5.3 Mention the various names of Journal.
- 5.4 Interpret the form of Journal.

6. ledger.

- 6.1 Define ledger.
- 6.2 Interpret the form of ledger.
- 6.3 State the functions of ledger.
- 6.4 Distinguish between Journal and Ledger.
- 6.5 Explain why ledger is called the king of all books of accounts.
- 6.6 Explain the following terms: Balance, Balancing; Debit balance; credit balance.

7. Cash book & Its Classification.

- 7.1 Define cash book.
- 7.2 Classification of cash book.
- 7.3 Explain cash book as both Journal and Ledger.
- 7.4 Define discount.
- 7.5 Explain the different types of discount.

8. Trial balance.

- 8.1 Define trial balance.
- 8.2 State the object of a trial balance.
- 8.3 Discuss the methods of preparation of a trial balance.
- 8.4 Explain the limitations of a trial balance.
- 8.5 Prepare trial balance from given ledger balance. (practical)

9. Final accounts.

- 9.1 State the components of final account.
- 9.2 Distinguish between trial balance and balance sheet.
- 9.3 Select the items to be posted in the trading account, profit & loss account and the balance sheet.
- 9.4 State the adjustment to be made from the given information below or above the trial balance.
- 9.5 Explain the following terms: revenue expenditure; capital expenditure; depreciation; annuity method diminishing balance method, machine hour method

10. Cost and financial accounting.

- 10.1 Define financial accounting.
- 10.2 State the objectives of financial accounting.
- 10.3 Define cost accounting.
- 10.4 State the elements of direct cost and indirect cost.
- 10.5 Discuss the capital budgeting
- 10.6 Explain the following terms:
 - a. Fixed cost b. Variable cost c. Factory cost d. Overhead cost e. Process cost f. Direct cost g. Operating cost h. Standard cost

11. Income Tax

- 11.1 Define Income Tax.
- 11.2 State the objects of Income Tax.
- 11.3 Classification of assesses.
- 11.4.Taxable income of assesses.
- 11.5 Tax rebate.
- 11.6 Explain the following terms: Income tax year; assessment year,NBR.

12. Public works accounts.

- 12.1 State the important aspects of public works accounts.
- 12.2 Describe the main features of public works accounts.
- 12.3 Define Value Added Tax (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
4. হিসাবরক্ষণ ও হিসাববিজ্ঞান - পরেশ মণ্ডল
5. উচ্চ মাধ্যমিক হিসাববিজ্ঞান - হক ও হোসাইন
6. আয়কর - ড. মনজুর মোরশেদ



BANGLADESH TECHNICAL EDUCATION BOARD

Agargaon, Dhaka-1207.

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

ARCHITECTURE TECHNOLOGY

TECHNOLOGY CODE: **661**

6th SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

ARCHITECTURE TECHNOLOGY (661)

6th SEMESTER

Sl. No	Subject Code	Name of the subject	T	P	C	Marks				Total	
						Theory		Practical			
						Cont. assess	Final exam	Cont. assess	Final exam		
1	66161	Architectural Design -5	1	9	4	20	30	75	75	200	
2	66162	Computer Rendering & Animation -1	0	9	3	0	0	75	75	150	
3	66163	Landscape Design	1	3	2	20	30	25	25	100	
4	66164	Contemporary Architecture	3	0	3	60	90	0	0	150	
5	69054	Environmental Studies	2	0	2	40	60	0	0	100	
6	66454	Theory of structure	2	3	3	40	60	25	25	150	
7	65852	Industrial Management	2	0	2	40	60	0	0	100	
Total			11	24	19	220	330	200	200	950	

66161

Architectural Design And Planning- V

T P C

1 9 4

AIMS

To be able to-

- To be able to understand planning of an office building.
- To be able to understand the designing an office building.
- Understand the general consideration of a shopping complex planning.
- Prepare a design of shopping complex.

SHORT DESCRIPTION

Core Location of an Office; Main Stair and Fire Escape; General Principle; Office Layout; Guide for Space Allowance; Drive Way; Slopped Way/Ramp. Conception of Shopping center, retail shops, types of shopping, Design and Planning criteria, service details, self service shops.

DETAIL DESCRIPTION

Theory:

1 Understand the site selection of an office building.

- 1.1 Define office building.
- 1.2 Describe the necessity of office building.
- 1.3 Define down town.
- 1.4 Describe the site selection process of an office building.
- 1.5 Discuss the general requirements of an office building.
- 1.6 Discuss the design process of an office building.
- 1.7 Explain design rules of RAJUK for office building.
- 1.8 Discuss the necessary rules from BNBC for designing of an office building.

2 Understand the core location of an office building.

- 2.1 Define core area.
- 2.2 Describe the factors determining the size & numbers of elevators.
- 2.3 Describe the services that are provided in a vertical duct.
- 2.4 Describe the factors that determine the size, shape, location and number of lavatories.
- 2.5 Describe main stair and fire escape and its function.
- 2.6 Describe the efficiency of an office building.

3 Understand the general principle of an office building.

- 3.1 Mention the work flow of an office building.
- 3.2 Describe the straight line principle.
- 3.3 Describe the necessity of internal circulation of an office.
- 3.4 Name six basic office functions (management, financial, sales, general, technical, production – office group functions).
- 3.5 Describe the types of space in an office.
- 3.6 Describe space allowances i.e. office space & file space, special equipment, storage space, special room allowances.

4 Understand the Introduction of Retail Shops and Self Service Shop.

- 4.1 Define Shops.
- 4.2 Explain the necessity of shops.
- 4.3 List the types of shops.

- 4.4 Discuss site selection process for different types of shops.
- 4.5 Describe the general consideration and principles of Retail Shop.
- 4.6 Discuss the inducing entrance, store space organizing & interior displays.
- 4.7 Describe the sequence of customer flow with figure.
- 4.8 Describe the position of entrance for self service shop.
- 4.9 Discuss the parceling and delivery system of shop.
- 4.10 Discuss the functional aspects of shop front.

5 Understand the Retail Trading and General Design & Planning criteria of a Shopping Complex.

- 5.1 State the type of shopping facilities.
- 5.2 Describe the self or staff service.
- 5.3 Differentiate the open market and covered market.
- 5.4 Describe Shops (Shops in new development, shop layout, location), Departmental Store (Definition- display, gondolas), Shopping centers (Definition- siting, basic design), Hypermarket (definition- Design).
- 5.5 Describe the general consideration of site selection for shopping complex.
- 5.6 Describe the planning problems of shopping complex.
- 5.7 Explain the sales area storey heights, structural grid and aisles.
- 5.8 Describe the movement between floors.

6 Understand the Service Details of Shopping Complex.

- 6.1 State the back-up stock and goods transport.
- 6.2 State display window, staff entrance & staff WC.
- 6.3 Discuss the building regulations, entrance & exits.
- 6.4 Discuss the windows, cold, fire, temperature & ventilations.
- 6.5 Discuss the column spacing, store depth, clear height and ducts and shafts.

PRACTICAL:

1 Prepare the proposal of an office building.

- 1.1 Collect data for the office project.
- 1.2 Analysis the data as per requirements.
- 1.3 Line sketches the project plan.
- 1.4 Present the proposal.

2 Prepare the presentation drawing of an office building.

- 2.1 Draw a flow diagram of an office.
- 2.2 Sketch line plan of an office building as per general requirements.
- 2.3 Develop the line plan according to scale.
- 2.4 Make a presentation drawing for approval by the client (plan, Elevation, selection (scale - 1:100 or $\frac{1}{8}$ " = 1'- 0").
- 2.5 Draw different elevation with shade & shadow (scale - 1:100 or $\frac{1}{8}$ " = 1'-0").
- 2.6 Show furniture arrangement of different work station.

3 Prepare the working drawing set of an office building.

- 3.1 Draw all floor plan showing all dimensions (scale 1:50 or $\frac{1}{4}$ " = 1'- 0").
- 3.2 Draw front and any other side elevation (scale 1:50 or $\frac{1}{4}$ " = 1'- 0").
- 3.3 Draw a section through stair & lift (scale 1:50 or $\frac{1}{4}$ " = 1'- 0").
- 3.4 Draw roof plan showing rain water drainage (scale 1:50 or $\frac{1}{4}$ " = 1'- 0").
- 3.5 Make a door-window schedule for the building.

4 Prepare landscape design in the site plan.

- 4.1 Draw the lay-out plan of building.
- 4.2 Draw 90° , 60° & 45° car parking in the site plan.

- 4.3 Show the walkway, water-bodies and trees, green in the site plan.
- 4.4 Show the waste disposal system in the site plan.

5 Prepare a set of drawing for private office.

- 5.1 Draw the desk clearance for private office.
- 5.2 Draw the typical modular office plan.
- 5.3 Draw the corridor width based of the human figure.
- 5.4 Draw the furniture lay-out for private office.

6 Prepare the model and presentation for the office project.

- 6.1 Make a model for the office building.
- 6.2 Place the model of a base and show landscape on it.
- 6.3 Design a presentation through power point or any other software for the project.
- 6.4 Present the project in front of audience/ jury.

7 Prepare electrical drawing of a building.

- 7.1 Draw the various electrical systems used in building drawing.
- 7.2 Draw general first and typical floor electrical fixture lay-out.
- 7.3 Show the conduit lay-out in the plan.
- 7.4 Show detail electrical circuit diagram.

8 Prepare the Preliminary design of a shopping center (multi storied - 15 shops per floor).

- 8.1 Draw the flow diagram of a shopping center (multi storied - 15 shops per floor).
- 8.2 Sketch the line plan of shopping center with given requirements.
- 8.3 Develop the line plan according to scale.
- 8.4 Draw the four side elevation of shopping center.
- 8.5 Draw a vertical section through stair and lift.

9 Prepare layout & landscape plan of shopping center.

- 9.1 Draw the layout plan according to the RAJUK rules.
- 9.2 Draw the landscape plan showing different plantations & structures.
- 9.3 Prepare door & window schedule.
- 9.4 Draw detail planning of core area.

10 Prepare a departmental store.

- 10.1 Draw a flow diagram of a departmental store.
- 10.2 Draw a typical plan showing different goods area.
- 10.3 Draw the typical plan selection of different counters.
- 10.4 Draw the plan of escalator used in shopping complex.
- 10.5 Draw the section of escalator.

REFERENCE BOOKS

1. Planning; The Architects Hand Book

by E and O. E
S. Row Land PIERCE
PATRICK CUTBUSH
ANTHONY WILLSAMS

2. TIME SAVER STANDARD; BUILDING TYPE

BY- JOSEPH DE CHIARRA

3. The Hand book of building types. ERNST Neufert ARCHITECTS DATA

By- Vincenet Jones,
George Atkinson OBEBA (Arch) RIBA.

66162

Computer Rendering & Animation -I

T P C

0 9 3

AIMS:

To be able to develop knowledge, skill and attitude in the field of Computer Rendering & Animation (Sketchup) with special emphasis on:

- Drawing environments and drawing aids.
- Different setup of drawing in Sketchup.
- Drawing commands.
- Modification & edits of drawing.
- V-Ray.
- Printing the drawing elements.

SHORT DESCRIPTION:

Drawing environments and drawing aids; Different setup of drawing in Sketchup; Drawing commands; Modification & edits of drawing; camera, material assign, lighting setup, V-ray;- camera, lighting, Rendering etc.

PRACTICAL

1. Set up the drawing environments and drawing aids.

- 1.1. Install & Start Sketchup software.
- 1.2. Identify the different areas of Sketchup screen.
- 1.3. Use menu bar, command prompt area, toolbox, units and drawing aids.
- 1.4. Use the drawing aids, different menus and dialog boxes of Sketchup package.
- 1.5. Import the CAD file into Sketchup.
- 1.6. Apply how to save the drawing & exit from the file.

2. Construct the geometrical shape or object.

- 2.1. Use the command to draw Line.
- 2.2. Erase the object using different erase commands.
- 2.3. Draw rectangle using rectangle commands.
- 2.4. Draw circles using different method of circle commands.
- 2.5. Draw polygon using different method of polygon commands.
- 2.6. Draw arc using different commands of arc.
- 2.7. Use the freehand tools to create polygons.
- 2.8. Use the paint tools.

3. Edit and modify the object.

- 3.1. Select and delete the object.
- 3.2. Move objects using the move tool.
- 3.3. Use the push/pull tool.
- 3.4. Rotate the object in different angle /direction using rotate command.
- 3.5. Draw lines/object in certain distance using offset commands.
- 3.6. Use scale command to enlarge or reduce an object in a ratio
- 3.7. Use the orbit tool to see the rotating view of any object.

- 4. Dimensioning/measurement the object.**
 - 4.1. Use the Tape measure tool to dimensioning the object.
 - 4.2. Put dimension in the object using linear, angular, radius, diameter, ordinate, align, center, mark, continuous, base line commands.
 - 4.3. Use the protractor tool to measure the circular/rotating dimension.
 - 4.4. Use the axis tool to measure the axis.
 - 4.5. Edit dimension.
- 5. Operate the object using the scroll/zoom command.**
 - 5.1. Use the pan tool.
 - 5.2. Use zoom tool to customize the object size on screen.
 - 5.3. Show the objects various ways use zoom extends & zoom window tool.
 - 5.4. Show the objects earlier view using the previous tool.
 - 5.5. See the objects from outdoor and indoor using the walk & look around tool.
- 6. Operate the status bar**
 - 6.1. Use Undo tool to cancel the immediate doing works.
 - 6.2. Use Redo tool to recreate the works.
 - 6.3. Use help tool.
 - 6.4. Use the language tool for writing the text.
 - 6.5. Look out the overview of an object use feedback & status tool.
- 7. Construct the shade-shadow using shadow command.**
 - 7.1. Use wireframe to show the skeleton of the object.
 - 7.2. Use hidden tool to conceal the skeleton of the object.
 - 7.3. Show the shaded view using shaded command.
 - 7.4. Show the shaded view with texture.
- 8. Produce different view using view command.**
 - 8.1. Show isometric view in different angle using isometric view tool.
 - 8.2. Use the front, back, left, right view tool to show the view of the object.
 - 8.3. Use the top & bottom view tool to show the view of the object.
- 9. Operate the different panels.**
 - 9.1. Use the entity info tool for the works.
 - 9.2. Use the instructor & components tool.
 - 9.3. Show the materials on the object.
 - 9.4. Use the layers tool for the drawing.
 - 9.5. Use the Scene & Display command.
- 10. Set up the camera & control.**
 - 10.1. Operate the Target and free Camera.
 - 10.2. Use lens, FOV, Dolly camera etc.
 - 10.3. Apply two cameras for the projects and adjust necessary parameters.
 - 10.4. Set two Viewport for Rendering.
- 11. Assign the materials & Show Materials on object.**
 - 11.1. Use Material Editor Dialogue box and its necessary Tools.
 - 11.2. Prepare a material Slot by adding Color.
 - 11.3. Apply a Material to a object.
 - 11.4. Create a glass Material by using Refraction Map.

- 11.5. Create a MS/SS material and assign it to the railing of the Project.
- 11.6. Create a Multi/sub material for Windows and assign it to the Project.

12. Set up Lighting & texture mapping .

- 12.1. Show standard and Photometric Light.
- 12.2. Create Standard Light (Target Spot, Target Direct, Omni etc.)
- 12.3. Use general parameters, Intensity parameters, spot light parameters, Shadow parameters etc.
- 12.4. Apply 1 or 2 standard light to the project and adjust the necessary parameters for best output.
- 12.5. Use Texture/Bitmap for material.
- 12.6. Practice to tiling the texture, Real-world scale, bitmap rotate reloads etc.
- 12.7. Assign Texture material slot to an object and apply UVW Map Modifier.
- 12.8. Create necessary numbers of texture materials and assign them to the project.

13. Perform Rendering.

- 13.1. Familiar with Render Setup dialogue Box.
- 13.2. Use render output size and apply it for the project.
- 13.3. Select a camera View and render it.
- 13.4. Save the Render Image in different formats such as BMP, JPEG, PNG, TIF, Targa image etc.

14. Install and setup V-Ray .

- 14.1. Use V-Ray and its different version for Sketch up.
- 14.2. Perform V-Ray installation for Sketch up.
- 14.3. Perform V-Ray setup for Sketch up.

15. Set up V-Ray Camera & Rendering for Sketch up

- 15.1. Use V-Ray Target and free Camera.
- 15.2. Use V-Ray lens, FOV, Dolly camera etc.
- 15.3. Apply to V-Ray cameras for the projects and adjust necessary parameters.
- 15.4. Set to Viewport for Rendering.
- 15.5. Create V-ray Sun.
- 15.6. Create V-ray Dome Light.
- 15.7. Create V-ray HDR Light.
- 15.8. Create V-ray Light (plane light, spot light, photometric web light).
- 15.9. Assign V-ray light to the Project and render it for output.

16. V-Ray Rendering for Sketch up

- 16.1. Use v-ray as an assign render under common tab of render setup Dialogue box.
- 16.2. Use V-ray tab and its Sub/Parameters.
- 16.3. Use indirect illumination Tab and its Sub parameters.
- 16.4. Setting and its sub parameters.

17. V-ray Materials for Sketch up

- 17.1. Create a V-ray material slot for color and assign it to an object.
- 17.2. Create a V-ray material slot for bitmap and assign it to an object.
- 17.3. Create material for glass, mirror, MS, SS.
- 17.4. Create Multi/sub material for window and door.
- 17.5. Assign V-ray material to the Project and render it for output.

18. Prepare a portfolio of a project.

- 18.1. Import the cad file of a project.
- 18.2. Draw base of the structure.
- 18.3. Use modify tool as requirements.
- 18.4. Use push/pull tool if needed.
- 18.5. Add detail to the structure.
- 18.6. Paint the structure.
- 18.7. Save the project.
- 18.8. Print the project.

66163

Landscape Design

T P C

1 3 2

AIMS

To be able to-

- Understand the fundamentals of landscape design
- Use of Land and water, Vegetation.
- Importance of Climate, site, spaces, visible landscape, and circulation.
- Layout of water bodies, landscape & visit the site,
- Prepare a landscape model.

SHORT DESCRIPTION

Fundamentals of landscape; Use of land & water; Importance of Site, Spaces, Visible landscape, and Circulation. Layout of water bodies, landscape & visit the site.

DETAIL DESCRIPTION

1.0Understand the fundamentals of landscaping.

- 1.1 Define Landscape and landscape design.
- 1.2 Describe the necessity of landscape design.
- 1.3 Identify the elements of landscape design.
- 1.4 Describe the importance of nature in landscape.
- 1.5 Describe ecological basis and ecological balance.
- 1.6 Explain the landscape character.
- 1.7 Explain the natural forces, forms and feature.
- 1.8 Explain the importance of the built-environment.

2.0Understand the use of land.

- 2.1 State the land.
- 2.2 Describe the land as heritage
- 2.3 Describe the land as resource.
- 2.4 Explain the land grants and land rights.
- 2.5 Describe the importance of land surveying.
- 2.6 Discuss various uses of land.
- 2.7 Define earth forms and slope retention.

3.0Understand the use of water.

- 3.1 State the planning approach of water related site design.
- 3.2 Describe water as resource.
- 3.3 Explain water as landscape feature.
- 3.4 Define streams and rivers.
- 3.5 Discuss pools, fountains, cascades.
- 3.6 Define swimming pool and its standard measurement.

4.0Understand the importance of vegetation.

- 4.1 List the indoor and outdoor plants.
- 4.2 Describe different elements of plants in nature.
- 4.3 State plantation.
- 4.4 Discuss the importance and necessity of plantation and gardening.
- 4.5 Describe the planned and planted landscape.
- 4.6 Differentiate between the micro and macro climate.
- 4.7 Describe the effect of climate on plants.

5.0Understand the importance of climate.

- 5.1 Define weather and climate.
- 5.2 Differentiate between weather and climate.
- 5.3 Describe the physical and social characteristics of climate.
- 5.4 Explain different type of climate region.
- 5.5 Describe the microclimatology.

6.0Understand the Site.

- 6.1 Define site
- 6.2 Describe the site selection process.
- 6.3 Compare the alternative sites and the ideal site.
- 6.4 Define site analysis and list out the procedure of systematic site analysis.
- 6.5 Discuss specification for topographic survey.
- 6.6 Describe the environmental impact assessment.
- 6.7 Explain the conceptual plan with diagram of the planning-design process.
- 6.8 Explain the terms of site systems.
- 6.9 Describe the site development guidelines (A checklist of helpful considerations).

7.0 Understand the Spaces.

- 7.1 Define site volumes.
- 7.2 Describe the spatial impact, spatial qualities, size, form and color.
- 7.3 Explain abstract spatial expression and definitions of volumes.
- 7.4 Distinguish the base plane and the overhead plane with examples.
- 7.5 Define the verticals.
- 7.6 Describe the verticals as enclosure for privacy.

8.0 Understand the visible landscape.

- 8.1 Define view and vista with their components.
- 8.2 Describe the axis and the axial characteristics.
- 8.3 Explain the axis as unifying elements with the example.
- 8.4 Explain symmetrical plan and asymmetrical plan.
- 8.5 Explain the visual resource management.

9.0 Understand the circulation.

- 9.1 Define motion
- 9.2 Discuss motion impelled by form and concept and the kinematics of motion.
- 9.3 Explain the pedestrian traffic and the planning consideration of pedestrian traffic- things seen, base plane, distance and grade and traffic flow.
- 9.4 Explain the automobile traffic and the planning consideration of automobile traffic-the road way, approach drive, entrance court and the parking compound.
- 9.5 Describe the rain, water and air movements.

PRACTICAL

1.0 Prepare a layout plan by visit the site.

- 1.1 Visit a given site and present a report about the site with photographs.
- 1.2 Draw the site plan showing existing structure,
- 1.3 Draw different roads and pavement and drive way.
- 1.4 Draw the parking of the site.
- 1.5 Sketch the surface water drainage and disposal plan of the given plot.

2.0 Prepare the layout of pools, fountain, low and high land and water bodies.

- 2.1 Sketch the different earth forms.
- 2.2 Sketch the various types of slope retention.
- 2.3 Sketch the docks, decks, overlooks, terraces and balconies on the slope of the banks.
- 2.4 Sketches the slope treatment or water edge detail of different water bodies.
- 2.5 Sketches the pools, fountain and cascades.
- 2.6 Draw the plan and section of a swimming pool.

3.0 Prepare a landscape plan of a room corner or garden or park.

- 3.1 Visit a park and find out the point of renovation and present a report on it with photographs.
- 3.2 Sketches the plan and elevation of some small plants, trees (canopy, intermediate, shrubs, vines and ground covers) and bushes.
- 3.3 Draw the form and space modulation of plants.
- 3.4 Sketches the trees as screen, natural shading device, slope and watershed protection, noise abatement and ornamentation.
- 3.5 Design a corner of a room/ a lobby/ a mini garden/ a lawn corner / a terrace corner with plants, seats and small pool or fountain.

4.0 Prepare a site plan.

- 4.1 Draw a topographic survey map.
- 4.2 Draw a site analysis map.
- 4.3 Draw the wind movement and sun path diagram.
- 4.4 Draw the site schematic plan.
- 4.5 Draw a final site plan.

5.0 Design a canopy or a fountain as a landscape element with model.

- 5.1 Draw the plan of the canopy/fountain.
- 5.2 Draw the elevation of the canopy/fountain.
- 5.3 Sketch a 3D view (isometric/perspective) of the canopy/fountain.
- 5.4 Make a model of the canopy/fountain.

Ref:

- Landscape Architecture, John Ormsbee Simonds

66164

Contemporary Architecture

T P C
3 0 3

AIMS

To be able to understand the -

- Master Architects and their works
- Modern Architects in Bangladesh and their works
- International modern Structure/Buildings
- Contemporary Buildings in Bangladesh
- Contemporary Buildings in Asia, Europe and America.

DETAIL DESCRIPTION

1.0 Understand the development of new concepts in Architecture

- 1.1 Define modern Architectural materials.
- 1.2 Define traditional Architectural materials.
- 1.4 Explain the modern methods of construction
- 1.5 Describe the influence of materials on modern architecture.

2.0 Understand engineering achievement for developing architecture.

- 2.1 List the ten longest bridges in the world.
- 2.2 Describe development of bridge.
- 2.3 Describe role of glass in developing contemporary architecture.
- 2.4 Explain the role of R.C.C. and steel in developing contemporary architecture.

3.0 Understand various movements in architecture caused by works of pioneers.

- 3.1 Explain the movement in architecture caused by Le-Corbusier.
- 3.2 Explain the movement in architecture caused by Frank Lloyed Wright.
- 3.3 Explain the movement in architecture caused by Walter Gropius.
- 3.4 Explain the movement in architecture caused by Mies Vender Rohe.
- 3.5 Explain the movement in Architecture by Luis I Kahn.

4.0 Understand the works of pioneer architects.

- 4.1 List & describe the important works of Walter Gropius.
- 4.2 List & describe the important works of Mies Vender Rohe.
- 4.3 List & describe the important works of Frank Lloyed Wright.
- 4.4 List & describe the important works of Le-Corbusier.
- 4.5 List & describe the important works of Pier Luige Nervi
- 4.6 List & describe the important works of Luis I Kahn.

5.0 Understand various movements in Bangladesh architecture caused by the works of different architects.

- 5.1 Explain the movement in architecture caused by Mazharul Islam.
- 5.2 Explain the movement in Architecture caused by Bashirul Haque.
- 5.3 Explain the movement in architecture caused by Shamsul Wares.
- 5.4 Explain the movement in architecture caused by F.R. Khan.
- 5.5 Explain the movement in architecture caused by Rafique Azam.

6.0 Understand the works of important architects in Bangladesh by visit the working places.

- 6.1 List & describe the important works of Mazharul Islam.
- 6.2 List & describe the important works of Bashirul Haque.

- 6.3 List & describe the important works of Shamsul Wares.
- 6.4 List & describe the important works of F.R. Khan.
- 6.5 List & describe the important works of Rafique Azam.
- 6.6 Visit the important works/places and present the reports on that.

7.0 Understand the important architecture in the world.

- 7.1 Describe the architectural feature of the United Nation Headquarter at New York.
- 7.2 Describe the architectural feature of the UNESCO secretarial building at Paris.
- 7.3 Explain the architectural feature of the Royal Festival Hall at London.
- 7.4 Explain the architectural feature of the Sydney Opera House.
- 7.5 Explain the Architectural feature of Sangshed Bhabon.
- 7.6 Describe the architectural feature of the Guggenheim museum.

8.0 Understand the modern architecture in the world.

- 8.1 List the ten tallest structures in the world.
- 8.2 Describe the architectural feature of the Kaba Sharif, Makkah.
- 8.3 Describe the architectural feature of the Patronus Twin Tower, Malaysia.
- 8.4 Describe the architectural feature of the Borze-Al-Arab.
- 8.5 Describe the architectural feature of the Eiffel Tower & Canada National Tower.
- 8.6 Describe the architectural feature of the Statue of Liberty.
- 8.7 Describe the architectural feature of the Borze – Kholifa.

9.0 Visit & Understand the modern Architecture in Dhaka.

- 9.1 Visit & Describe the architectural feature of the National Memorium of at Savar.
- 9.2 Visit & Explain the architectural feature of the Kamalapur railway station at Dhaka.
- 9.3 Visit & Explain the architectural feature of the Baitul Mokaram national mosque at Dhaka..
- 9.4 Visit & Explain the architectural feature of the Shahjalal International air port at Dhaka..
- 9.5 Visit & Explain the architectural feature of the Sangshad Bhabon.
- 9.6 Visit & Explain the architectural feature of the Nagar Bhabon at Dhaka..
- 9.7 Visit & Explain the architectural feature of the Art College at Dhaka..

10.0 Understand the Bridges in the world.

- 10.1 Explain the feature of Jamuna Bridge.
- 10.2 Explain the feature of London Bridge.
- 10.3 Explain the feature of Golden Gate Bridge.
- 10.4 Explain the feature of Hawra Bridge.
- 10.5 Explain the feature of Vidya Sagar Setu.

11.0 Understand the Contemporary Architecture of Bangladesh.

- 11.1 Visit & report the important works of Mustapha Khalid.
- 11.2 Visit & report the important works of Rafiq Azam
- 11.3 Visit & report the important works of Marina Tabassum.
- 11.4 Visit & report the important works of Kashef Mahbub Chowdhury.
- 11.5 Visit & report the important works of Tanzim Hasan Salim/Naheed Farzana.

12.0 Understand the Contemporary Architecture of Asia.

- 12.1 Analyse & report about important works of B.V.Doshi.
- 12.2 Analyse & report about important works of Geoffrey Bawa
- 12.3 Analyse & report about important works of Tadao Ando.

13.0 Understand the Contemporary Architecture of Europe.

- 13.1 Analyse & report about important works of Norman Foster.
- 13.2 Analyse & report about important works of Zaha Hadid.
- 13.3 Analyse & report about important works of Renzo Piano.

14.0 Understand the Contemporary Architecture of Asia.

- 14.1 Analyse & report about important works of Daniel Libeskind.
- 14.2 Analyse & report about important works of Peter Eisenman.
- 14.3 Analyse & report about important works of Frank Gehry.

69054

Environmental Studies

T P C

2 0 2

AIMS

- To be able to understand the basic concepts of environment and environmental pollution.
- To be able to understand the concepts of ecology and ecosystems
- To be able to understand the basic concepts of environmental degradation relating to industrial production.
- To be able to understand the major environmental issues and problems.
- To be able to understand legislative measures to protect environment.

SHORT DESCRIPTION

Basic concepts of environment; natural resources; biogeochemical cycling; ecology and ecosystem; air; water; soil; solid waste management; development and environment; global environmental challenges; legislative protection of environment.

DETAIL DESCRIPTION

Theory:

1. Understand the multidisciplinary nature of environmental studies.

- 1.1. Define environment, nature, pollution, pollutant, contaminant.
- 1.2. Describe the scope of environmental studies.
- 1.3. Describe the importance of environmental studies.
- 1.4. Describe the formation and structure of the Earth.
- 1.5. Describe the earth's natural system.
- 1.6. Describe the changing attitudes to the natural world.
- 1.7. Mention the main components of environment.
- 1.8. Define natural and man-made environment.
- 1.9. Distinguish between natural and man-made environment.

2. Understand the natural resources.

- 2.1. Define natural resources.
- 2.2. Classify natural resources.
- 2.3. Describe forest resources.
- 2.4. Describe water resources.
- 2.5. Describe mineral resources.
- 2.6. Describe food resources.
- 2.7. Describe energy resources.
- 2.8. Describe land resources.
- 2.9. Describe environmental problem relating to resources use.
- 2.10. Describe the role of an individual in conservation of natural resources.

3. Understand the biogeochemical cycling.

- 3.1. Define biogeochemical cycle.
- 3.2. Describe hydrologic cycle.
- 3.3. Describe carbon cycle.

- 3.4. Describe nitrogen cycle.
- 3.5. Describe oxygen cycle.
- 3.6. Describe phosphorus cycle.
- 3.7. Describe sulfur cycle.
- 3.8. Describe nutrient cycle.

4. Understand the ecology and ecosystem.

- 4.1. Define ecology and ecosystem.
- 4.2. Structure and function of an ecosystem.
- 4.3. Describe the components of ecosystem.
- 4.4. Explain the stability of ecosystem.
- 4.5. Describe ecological factors.
- 4.6. Describe interdependency between abiotic and biotic component.
- 4.7. Describe the meaning of following terms: species, population, community, ecological succession, community periodicity, climax community, ecological niche, habitat, plankton, nekton, ecological indicator, evolution, adaptation, producers, consumers, decomposers, food chains, food webs, ecological pyramids, bio-concentration, bio-magnification, biodiversity, threatened species, endanger species, extinct species, exotic species, biodiversity conservation and biogeography.
- 4.8. Describe energy flow in the ecosystem.
- 4.9. Describe the ecosystem of pond, ocean, estuary, grassland, cropland, forest, desert and mangrove.

5. Understand the air as a component of environment.

- 5.1. Define air.
- 5.2. Describe the composition of the clean dry atmospheric air at ground level.
- 5.3. Describe the atmospheric structure.
- 5.4. Define air pollution.
- 5.5. Describe major air pollutants and their impacts.
- 5.6. Describe the sources of air pollutants.
- 5.7. Explain the formation of photochemical smog and its effects.
- 5.8. Describe the effects of air pollution on vegetation, animal, human health and materials and resources.
- 5.9. Define sound and noise.
- 5.10. Describe the classification of sound.
- 5.11. Describe the effects of noise.

6. Understand the water as a component of environment.

- 6.1. Define water.
- 6.2. Describe the characteristics of water.
- 6.3. Describe the sources of water.
- 6.4. Describe the uses of water.
- 6.5. Explain that the water is a universal solvent.
- 6.6. Define water pollution, biological oxygen demand (BOD), effluent treatment plant (ETP).
- 6.7. Describe the sources of water pollution.
- 6.8. Describe the effects of water pollution.

7. Understand the soil as a component of environment.

- 7.1. Define soil.
- 7.2. Describe the constituents of soil.
- 7.3. Define soil pollution.
- 7.4. Describe causes soil degradation.
- 7.5. Describe the sources of soil pollution.
- 7.6. Describe the effects of soil pollution

8. Understand the concept of solid waste management.

- 8.1. Define solid waste, refuse, garbage, rubbish, trashes, demolition and construction waste, e-waste, agricultural waste, pathological waste, radioactive waste, hazardous waste, 3R, 4R.
- 8.2. List the sources of solid waste.
- 8.3. Mention the classification of solid waste.
- 8.4. Mention the methods of collection of solid waste.
- 8.5. Describe the recycling of solid wastes.
- 8.6. Describe resource recovery from solid waste.
- 8.7. Describe the potential method of disposal of solid waste.
- 8.8. Describe control measures of urban and industrial wastes.

9. Understand the development and environment.

- 9.1. Define environmental ethics and environmental stress.
- 9.2. Describe environmental stress.
- 9.3. Define sustainable development.
- 9.4. Define urbanization.
- 9.5. Describe the causes of urbanization.
- 9.6. Describe the effects of urbanization on environment.
- 9.7. Define industrialization.
- 9.8. Describe the causes of industrialization.
- 9.9. Describe the effects of industrialization on environment.

10.Understand the global environmental challenges.

- 10.1. Define greenhouse gas and greenhouse effects.
- 10.2. Make a list of greenhouse gases and their contribution on greenhouse effects.
- 10.3. Describe the causes and consequences of greenhouse effects.
- 10.4. Describe acid rain.
- 10.5. Describe importance of ozone layer.
- 10.6. Define ozone depleting substances (ODS).
- 10.7. Describe ozone layer depletion mechanism.
- 10.8. Describe hazardous waste.
- 10.9. Describe chemicals pesticides.
- 10.10. Describe radioactive pollution.
- 10.11. Describe natural disaster.

11. Understand the legislative protection of environment.

- 11.1. Define environmental impact assessment (EIA) and environmental auditing (EA).
- 11.2. Mention environmental act and legislations prescribed for air, noise, water, soil and wild life protection.
- 11.3. Describe environmental conservation act 1995 in Bangladesh.
- 11.4. Describe the environment conservation rule 1997 in Bangladesh.
- 11.5. Describe the environmental framework in Bangladesh.
- 11.6. Describe The Montreal Protocol and The Kyoto Protocol.
- 11.7. Describe role of an individual in prevention of pollution.

REFERENCES:

1. Fundamentals of Environmental Studies, Mahua Basu and S. Xavier, Cambridge.
2. Ecology and Environment, P.D. Sharma, Rastogi Publications.
3. Basics of Environmental Science, Michael Allaby, Routledge.
4. Environmental Science, Jonathan Turk and Amos Turk, Saunders golden sunburst series.

66454

Theory of Structure

T P C
2 3 3

AIMS

- To be able to consolidate and extend the fundamental understanding of the behavior of statically determinate structures i.e. beams, frames etc.
- To be able to develop of awareness of structural behavior such as deflection and stability of masonry dam.
- To be able to develop understanding for selection of suitable section of beam and member of the truss.

SHORT DESCRIPTION

Shear force and bending moment of beams; Stresses in beams; Deflection of beams; Joints and connections; Forces in frames; Steel structure; Masonry dam; Column; Moving loads; Thin Cylindrical shells.

DETAIL DESCRIPTION

Theory:

1. Understand shear force and bending moment of beams.

- 1.1 Define determinate, indeterminate and homogeneous structure.
- 1.2 Mention different types of support condition.
- 1.3 Explain the relations between shear force and bending moment.
- 1.4 Define dangerous section and point of contra flexure.
- 1.5 Solve problems on SF and BM of cantilever beam with concentrated load, distributed load, inclined load and combined loads.
- 1.6 Solve problems on SF and BM of simply supported beam with concentrated load, distributed load, inclined load and combined loads.
- 1.7 Solve problems on SF and BM of overhanging beam with concentrated load, distributed load, inclined load and combined loads.

2. Understand the bending stresses in beams.

- 2.1 State the meaning of bending stresses in beam.
- 2.2 List the assumptions of bending stresses in beam.
- 2.3 Differentiate between bending moment and bending stress.
- 2.4 Express and derivation of the formula for bending stress.
- 2.5 State the meaning of elastic section modulus.
- 2.6 Solve problems on section modulus of circular, rectangular, I, T, L and hollow sections of beams.
- 2.7 Solve problems on bending stresses of circular, rectangular, I, T, L and hollow sections of beams.

3. Understand the shearing stresses in beams.

- 3.1 State the meaning of shearing stresses in beam
- 3.2 Differentiate between maximum and average shear stress.
- 3.3 Relate maximum shear stress and average shear stress for rectangular, circular and triangular section.
- 3.4 Express the derivation of the formula for shearing stress.

3.5 Solve problems on shearing stresses of circular, rectangular, I , T, L and hollow sections of beams.

3.6 Determine the section of homogeneous beam with respect to shearing stress and bending stress.

4. Understand the deflection of beams.

4.1 Define the meaning of deflection of beam and elastic curve.

4.2 List the assumptions of deflection of beam.

4.3 State the maximum allowable deflection for RCC beam, RCC slab and steel beam.

4.4 Express the derivation of equation for elastic curve

4.5 State the 1st and 2nd area moment proposition.

4.6 Compute the slope of elastic curve for cantilever beam with concentrated and distributed load.

4.7 Compute the maximum deflection for cantilever beam with concentrated and distributed load.

4.8 Compute the slope of elastic curve for simply supported beam with symmetrically concentrated and distributed load.

4.9 Compute the maximum deflection for simply supported beam with symmetrically concentrated and distributed load.

5. Understand the concept of steel structure and joints.

5.1 Define steel structure.

5.2 Describe joint and connections of steel structure.

5.3 State the differences between cold rolled and build up section.

5.4 Name the elements of pre-fabricated building.

5.5 Define pitch, back pitch and repeating section.

5.6 State the necessity of joints.

5.7 Classify joints and state efficiency of joints.

5.8 Explain the modes of failure and remedial measures of riveted joints.

5.9 Solve problems on simple lap joint and butt joint subjected to axial load only.

6. Understand the significance of welded connections.

6.1 Define terms: Fillet, Leg, Throat.

6.2 State the significance of welded connections.

6.3 Classify different types of welded connections.

6.4 Mention the merits and demerits of welded connections.

6.5 Solve problems on fillet weld connection subjected to axial load only.

6.6 Solve problems on butt weld connection subjected to axial load only.

7. Understand the action of forces in steel frames.

7.1 Define the terms: truss, tie, strut, redundant, deficient, web and chord member, perfect, imperfect frame.

7.2 Mention different types of roof trusses, bridge trusses and beams.

7.3 State the fundamental assumptions in trusses.

7.4 Describe the methods of computing forces in trusses.

7.5 Determine the forces on frames for warren truss, cantilever and Howe truss with dead load by Analytical (joint and moment) method.

7.6 Determine the forces on frames for warren truss, cantilever and Howe truss with dead load by graphical method.

8. Understand the stability of masonry dam.

8.1 Define dam and mention the functions of a dam.

- 8.2 Mention the different types of dam.
- 8.3 Explain the stability of a masonry dam.
- 8.4 State the meaning of middle third law.
- 8.5 Express the derivation of the equation for minimum width of the base for just no tension.
- 8.6 Calculate the maximum and minimum pressure on the foundation bed for rectangular dam
- 8.7 Calculate the maximum and minimum pressure on the foundation bed for trapezoidal dam having water face vertical only.
- 8.8 Solve problems on stability of the dam.

9. Understand the elastic buckling of columns.

- 9.1 State the meaning of short and long column.
- 9.2 Mention the type of columns on the basis of end conditions.
- 9.3 Compare the equivalent length of different columns.
- 9.4 Interpret the Euler's formula for flexural buckling of a pin ended strut/column.
- 9.5 Calculate the safe load on column using Euler's formula.
- 9.6 State the Rankin-Gordon formula.
- 9.7 Calculate the safe load on column using Rankin-Gordon formula.

10. Understand the concept of moving loads.

- 10.1 State the meaning of moving load.
- 10.2 Classify different types of moving loads.
- 10.3 State the meaning of influence line.
- 10.4 Draw influence line for single concentrated load and reaction of a simply supported beam.

11. Understand the concept of Thin Cylindrical Shells.

- 11.1 Define cylindrical shell.
- 11.2 Failure of a cylindrical shell due to an internal pressure.
- 11.3 Stresses in a thin cylindrical shell.
- 11.4 Circumferential stress.
- 11.5 Longitudinal stresses.
- 11.6 Design of thin cylindrical shells

PRACTICAL:

1. Determine shear force & bending moment at different sections of simply supported beam with different types of load and draw the diagrams.
2. Determine shear force & bending moment at different sections of overhanging beam with different types of load and draw the diagrams.
3. Determine the position of dangerous section and inflection point or point of contra flexure of overhanging beam and show in diagram.
4. Determine the bending stresses of circular, rectangular & hollow sections of beams and draw the diagrams.
5. Determine the bending stresses of I, T, L sections of beams and draw the diagrams.
6. Determine the shearing stresses of circular and rectangular sections of beams and draw the diagrams.
7. Determine the shearing stresses of I & T sections of beams and draw the diagrams.
8. Determine the section of homogeneous beam with respect to shearing stress and bending stress.
9. Determine the deflection of cantilever and simply supported beam with respect to concentrated/distributed load.
10. Draw the neat sketches of different type of riveted joints showing the mode of failures.

11. Determine the forces developed on the member of a truss graphically.
12. Prepare some models of different types of truss with suitable materials.
13. Draw a sketch of a pre-fabricated building and show the different elements in the figure.

REFERENCE BOOKS

1. Theory of simple structure - T C Shed and J Vawter
2. Strength of materials and structures - J Case and A H Chilver
3. Theory of structures - R S Khurmi
4. Strength of Materials - R S Khurmi
5. Steel Structure - Gay Lord

65852

INDUSTRIAL MANAGEMENT

**T P C
2 0 2**

AIMS

- To be able to develop the working condition in the field of industrial or other organization.
- To be able to understand develop the labor management relation in the industrial sector.
- To be able to develop the management techniques in the process of decision making.
- To be able to manage the problems created by trade union.
- To be able to understand Planning
- To be able to perform the marketing.
- To be able to maintain inventory.

Course Outline

Basic concepts of management; Principles of management; Planning, Organization, Scientific management; Span of supervision; Motivation; Personnel management and human relation; Staffing and manpower planning ; Training of staff; Concept of leadership; Concepts and techniques of decision making; Concept of trade union; Inventory control; Economic lot size ; Break even analysis; Trade Union and industrial dispute, Marketing;

1 Basic concepts & principles of management.

- 1.1 Define management and industrial management.
- 1.2 State the objectives of modern management.
- 1.3 Describe the scope and functions of management.
- 1.4 State the principles of management.
- 1.5 State the activity level of industrial management from top personnel to workmen.
- 1.6 Describe the relation among administration, organization & management.

2. Concept of Planning

- 2.1 Define Planning
- 2.2 Discuss the importance of Planning
- 2.3 Discuss the Types of Planning.
- 2.4 Discuss the steps in Planning

3 . Concepts of organization and organization structure.

- 3.1 Define management organization.
- 3.2 State the elements of management organization.
- 3.3 Describe different forms of organization structure.
- 3.4 Distinguish between line organization and line & staff organization.
- 3.5 Distinguish between line organization and functional organization.
- 3.6 Describe the features, advantages and disadvantages of different organization structure.

4. Concept of scientific management.

- 4.1 Define scientific management.
- 4.2 Discuss the basic principles of scientific management.
- 4.3 Explain the different aspects of scientific management.
- 4.4 Discuss the advantages and disadvantages of scientific management.
- 4.5 Describe the difference between scientific management and traditional management..

5. Concept of span of supervision.

- 5.1 Define span of supervision and optimum span of supervision.
- 5.2 Discuss the considering factors of optimum span of supervision.
- 5.3 Discuss advantages and disadvantages of optimum span of supervision.
- 5.4 Define delegation of authority.
- 5.5 Explain the principles of delegation of authority.
- 5.6 Explain the terms: authority, responsibility and duties.

6 . Concept of motivation.

- 6.1 Define motivation.
- 6.2 Discuss the importance of motivation.
- 6.3 Describe financial and non-financial factors of motivation.
- 6.5 Discuss the motivation theory of Maslow and Harzberg.
- 6.6 Differentiate between theory-X and theory-Y.

7. Concept of leadership.

- 7.1 Define leadership.
- 7.2 Discuss the importance and necessity of leadership.
- 7.3 Discuss the functions of leadership.
- 7.4 Describe the qualities of a leader.

8. Basic concepts and techniques of decision making.

- 8.1 Define decision making.
- 8.2 Discuss the importance and necessity of decision making.
- 8.3 Discuss different types of decision making .
- 8.4 Describe the steps in decision making.

9 .Concept of personnel management and human relation.

- .9.1 Define personnel management.
- .9.2 Discuss the functions of personnel management.
- 9.3 Define staffing.
- 9.4 Define recruitment and selection of employees.
- 9.5 Describe various sources of recruitment of employees.
- 9.6 Describe the methods of selection of employees.
- 9.7 Define training and orientation of employee.
- 9.8 Discuss the importance and necessity of training.
- 9.9 Discuss the various methods of training of workmen, technicians and executive personnel.

10. Concept of inventory control & Economic lot size

- 10.1 Define inventory.& inventory control.
- 10.2 Describe the function of inventory control.
- 10.3 Define Economic lot size and the Method of determination of economic lot size.
- 10.4 Discuss the effects of over supply and under supply.
- 10.5 Explain the following terms :

- Bin card or Bin tag.
- Purchase requisition.
- Store requisition.
- Material transfer note.
- First in first out (FIFO).
- Last in first out(LIFO).
- Safety stock
- Lead time

11. Concept of Break Even Point(BEP)

- 11.1 Define Break Even Point and Break Even Chart.
- 11.2 Describe the method of determination of BEP
- 11.3 Explain the terms :

- Break even analysis.
- Fixed cost.
- Variable cost

12 . Concept of Marketing

- 12.1 Define marketing.
- 12.2 Discuss the function of marketing.
- 12.3 State the objectives of marketing.
- 12.4 Explain the terms :

- Purchase
- Brand
- Producer
- Consumer
- Customer
- Copyright
- Trade mark

- 12.5 Discuss product life -cycle and marketing strategies in different stages of a product life-cycle

13. Concept of trade union and industrial dispute

- 13.1 Define trade union.
- 13.2 Mention the objectives of trade union.
- 13.3 Discuss the function of trade union.
- 13.4 Describe different types of trade union.
- 13.5 Define industrial dispute
- 13.6 Discuss different type of industrial dispute

REFERENCE BOOKS

- 1.Dr. Md. Mainul Islam and Dr. Abdul Awal Khan-Principles of Management, Bangladesh Open University.
2. Mohammad Mohiuddin-Personnel Management and Industrial Relation, NIDS Publication Co. Dhaka.
3. সুফিয়া বেগম, মো: জাহেরুল হক ও সুপ্রিয়া ভট্টাচার্য-
ব্যবস্থাপনা এর মৌলিক ধারণা, ব্যতিক্রম প্রকাশনী ঢাকা।Matz Usry-Cost Accounting:
Planning & Control.



BANGLADESH TECHNICAL EDUCATION BOARD

Agargaon, Dhaka-1207.

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

ARCHITECTURE TECHNOLOGY

TECHNOLOGY CODE: 661

7th SEMESTER

DIPLOMA IN ENGINEERING
PROBIDHAN-2016

ARCHITECTURE TECHNOLOGY (661)

7th SEMESTER

Sl. No	Subject Code	Name of the subject	T	P	C	Marks				Total	
						Theory		Practical			
						Cont. assess	Final exam	Cont. assess	Final exam		
1	66171	Architectural Project	0	9	3	0	0	75	75	150	
2	66172	Professional Practice	3	0	3	60	90	0	0	150	
3	66173	Interior Design-2	2	6	4	40	60	50	50	200	
4	66174	Urban Planning	2	3	3	40	60	25	25	150	
5	66175	Computer Rendering & Animation -2	0	6	2	0	0	50	50	100	
6	66463	Design of structure -1	2	3	3	40	60	25	25	150	
7	65853	Innovation & Entrepreneurship	2	0	2	40	60	0	0	100	
Total			11	27	20	220	330	225	225	1000	

66171

ARCHITECTURAL PROJECT

T P C
0 9 3

AIMS

To be able to understand

- the Individual building
- related drawings
- operate an individual building project
- represent a building project as a coordinator

SHORT DESCRIPTION

Site Analysis; Preliminary Sketch; Final Sketch; Approval Sheet; Working Drawing; Finishing Schedule; Utility Services; Cost Estimate; Perspective Drawing; Model; & Brochure.

DETAIL DESCRIPTION

PRACTICAL

Each student has to submit the following things of any one of the given projects:

- A brochure containing all necessary drawings, photographs of model of the project, detail estimated cost of the project,
- A detail model of the project.

PROJECT:

Duplex House/ Split Level House/ Multi Storied Apartment House

1. Accomplish preliminary site investigation and analysis.

- 1.1 Make the site inventory and resource analysis.
- 1.2 List the considerations of the site.
- 1.3 Make the topographical survey of the site
- 1.4 Make soil investigation of the site.
- 1.5 Select a foundation type needed for the site from the above investigation.

2 Bring out the factors affecting building location and orientation.

- 2.1 Draw the sun path diagram.
- 2.2 Draw the prevailing wind orientation.
- 2.3 Categorize the local climatic condition.
- 2.4 Sketch the noise propagation surrounding the site.
- 2.5 Draw the landscape elements of the site.

3. Prepare preliminary sketch of the project.

- 3.1 Draw the site in 1:100 (1/8"=1'-0") scale.
- 3.2 Draw bubble diagram of the project.
- 3.3 Sketch line diagram of the ground floor maintaining building-by-laws for approval of client.
- 3.4 Sketch line diagram of the 1st/typical floor maintaining building-bylaws.
- 3.5 Sketch the elevation/ free hand perspective view of the project.

4. Prepare presentation drawing of the project.

- 4.1 Draw the site plan in 1:400 or 1:200 scale (1/32"=1'-0 or 1/16"=1'-0)
- 4.2 Draw the floor plans with furniture arrangement and rendering, scale 1:100 (1/8"=1'-0").
- 4.3 Draw the front elevation with rendering, scale 1:100 (1/8"=1'-0").
- 4.4 Make a mass model of the project building, scale 1:100 (1/8"=1'-0").
- 4.5 Make a brief description of the project with rough estimated cost.
- 4.6 Make a brochure with above topics (4:1 to 4:5) for approval of the client/owner.

5. Prepare approval sheet of the project.

- 5.1 Make a list of necessary drawings of the approval.
- 5.2 Make a list of necessary papers/documents for the approval of building.
- 5.3 Draw the approval sheet for the local authority (as RAJUK, CDA, KDA, RDA, SDA, Pourashava, City corporation etc.).

5.4 Make several copies (ammonia/computer print) of the approval sheet.

5.5 Fill up the necessary forms for approval the local authority.

6. Prepare working drawings of the project.

6.1 Draw ground floor plan with detail dimensions in 1:50 ($\frac{1}{4}''=1'-0''$) scale.

6.2 Draw 1st/typical floor plan with detail dimensions, scale 1:50 ($\frac{1}{4}''=1'-0''$).

6.3 Draw the roof plan showing rain water drainage system with detail dimensions in 1:50 ($\frac{1}{4}''=1'-0''$) scale.

6.4 Draw elevations of the building showing materials, scale 1:50 ($\frac{1}{4}''=1'-0''$).

6.5 Draw the long section of the building through staircase with detail dimensions, scale 1:50 ($\frac{1}{4}''=1'-0''$).

6.6 Draw the cross section of the building with detail dimensions, scale 1:50 ($\frac{1}{4}''=1'-0''$).

6.7 Draw necessary part sections (through verandah, sunshade etc.) with detail dimensions, scale 1:50 ($\frac{1}{4}''=1'-0''$).

7. Prepare detail drawings of the toilet.

7.1 Draw the detail plan of the different toilets of the project showing different fixtures used in toilet with detail dimensions and also showing plumbing lines in 1:25 ($\frac{1}{2}''=1'-0''$) scale.

7.2 Draw the necessary sections showing maximum fixtures, cabinet (if any) with detail dimensions in 1:25 ($\frac{1}{2}''=1'-0''$) scale.

7.3 Make a finishing schedule of the toilet.

8 . Prepare detail drawings of the kitchen.

8.1 Draw the detail kitchen plan of the project showing different fixtures/areas used in kitchen with detail dimensions and showing plumbing lines in 1:25 ($\frac{1}{2}''=1'-0''$) scale.

8.2 Draw the necessary sectional elevation showing maximum fixtures, cabinet and over head cabinet with detail dimensions in scale 1:25 ($\frac{1}{2}''=1'0''$)

8.3 Make a finishing schedule of the kitchen.

9. Prepare detail drawings of the stair.

9.1 Draw the detail plan of the stair with detail dimensions in 1:25 ($\frac{1}{2}''=1'-0''$) scale.

9.2 Draw the detail sections with detail dimensions in 1:25 ($\frac{1}{2}''=1'-0''$) scale.

9.3 Draw the section of the steps with nosing in 1:10 (1''=1'-0'') scale.

9.4 Draw the railing section and hand rail in 1:10 (1''=1'-0'') scale.

9.5 Draw the fixing arrangement of baluster in 1:10 (1''=1'-0'') scale

10. Prepare schedule of the project.

10.1 Make a finish schedule of the project.

10.2 Make door and window schedule of the project.

10.3 Arrange a CPM for the project.

10.4 Make a bar chart of the project

10.5 Estimate the detail cost /prepare the detail cost estimate of the project.

11. Prepare detail drawings of the door.

11.1 Draw the detail plan of the door used in the project with detail dimensions in 1:25 ($\frac{1}{2}''=1'-0''$) scale.

11.2 Draw the detail elevation in 1:25 ($\frac{1}{2}''=1'-0''$) scale.

11.3 Draw the vertical section of the door with detail dimensions in 1:25 ($\frac{1}{2}''=1'-0''$) scale.

11.4 Draw the necessary details (at least three) of the door in 1:10 (1''=1'-0'') scale.

11.5 Draw different fixing arrangement of the doors.

12. Prepare detail drawing of the window.

12.1 Draw the detail plan of the window used in the project with detail dimensions in 1:25 ($\frac{1}{2}''=1'-0''$) scale.

12.2 Draw the detail elevation in 1:25 ($\frac{1}{2}''=1'-0''$) scale.

12.3 Draw the vertical section of the window with detail dimensions in 1:25 ($\frac{1}{2}''=1'-0''$) scale.

12.4 Draw the necessary details of the window in 1:10 (1''=1'-0'').

12.5 Draw different fixing arrangements of the windows.

13. Prepare detail drawings of the utility services.

13.1 Draw the site plan of the project in 1:100 ($\frac{1}{8}''=1'-0''$) scale.

13.2 Draw the rain water disposal system of the site.

13.3 Draw the plumbing and sanitary system of the project.

- 13.4 Draw the detail drawing of the Septic Tank (ST) and Soak Well (SW).
- 13.5 Draw detail drawings of underground water reservoir.
- 13.6 Draw detail drawings of overhead water reservoir.

14. Prepare perspective drawings and model.

- 14.1 Draw a two point exterior perspective of the building/3D exterior (using computer software) of the building.
- 14.2 Draw the interior perspective of the living room/bed room/double height space (if any).
- 14.3 Draw an interior perspective of the bath/hand wash.
- 14.4 Draw an interior perspective of the kitchen.
- 14.5 Draw an interior perspective of the internal stair (for duplex).
- 14.6 Draw an interior perspective of the entrance/lobby/foyer.
- 14.7 Make a final detail model of the project in 1:100 ($\frac{1}{8}$ "=1'-0") or ($\frac{3}{16}$ "=1'-0") scale showing detail landscape and surroundings.

15. Prepare structural drawings of the project.

- 15.1 Draw the layout plan of the project.
- 15.2 Draw the foundation/footing/trench plan and section with detail dimensions.
- 15.3 Draw the reinforcement detail of column footing with dimensions and necessary information.
- 15.4 Draw the reinforcement detail of grade beams and other floor beams with dimensions and necessary information.
- 15.5 Draw the reinforcement detail of floor slab and roof slab with dimensions and necessary information.
- 15.6 Draw the reinforcement detail of stair with dimensions and necessary information.
- 15.7 Draw the reinforcement detail of underground and overhead water reservoir with dimensions and necessary information.
- 15.8 Draw the reinforcement detail of sunshade, railing, drop wall, lintel etc. with detail dimensions and necessary information.

16. Prepare electrical drawings of the project.

- 16.1 Draw the electrical fixture and conduit layout of different floors.
- 16.2 Make the chart with abbreviation and symbol of the electric layout.
- 16.3 Draw the necessary circuit diagrams.
- 16.4 Show the earthing and lightning arrester system of the project.

REFERENCE:

Architectural Drafting and Design

By Donald E Hepler

Paul L Wallach

Time saver standard for building type

By Joseph D Chira

Time saver standard for site planning

By Joseph D Chira

New Metric Hand Book

By Tutt/Adler

66172

PROFESSIONAL PRACTICE

T P C

3 0 3

AIMS

To be able to understand

- Architectural Professional.
- the role of Diploma Architect.
- importance of site visit.
- the controlling authority in Architectural field.
- Organizational set- up of Architectural firm.
- building By-laws of GOB.
- BNBC.

SHORT DESCRIPTION

Architectural Profession; Role of a diploma architect in building industry; Importance of site visit; controlling authority; Organizational set- up; Building By-laws, BNBC & Architect profession.

DETAIL DESCRIPTION:

THEORY

1. Understand the Architectural Profession and organizational set-up.

- 1.1 State the Architectural profession.
- 1.2 Define Architectural consulting firm.
- 1.3 Describe about organizational chart of Architectural consulting firm.
- 1.4 State professional Laws & ethics of Architecture.
- 1.5 Explain the role & responsibilities of a diploma Architect in developing an Architectural design.
- 1.6 State the relationship between a graduate Architect and a diploma Architect.
- 1.7 State the relationship between employees and professionals.
- 1.8 Describe the fees of Architects/ Architectural firm.

2. Understand the importance of site visit.

- 2.1 State site visit.
- 2.2 List the important features of site visit.
- 2.3 Discuss the importance of site visit.
- 2.4 State the stages of site visit by designers.
- 2.5 State the role of designers.
- 2.6 State shop drawing & as built drawing.

3. Understand the controlling authority.

- 3.1 List & define the controlling authority.
- 3.2 Describe about IAB, IEB & IDEB.
- 3.3 Describe different authorities for giving permission of building construction. (RAJUK, CDA, RDA, BDA, SDA, KDA, City Corporation, Pourashava, Union perished etc.)
- 3.4 Describe the membership procedure of IAB, IEB & IDEB.
- 3.5 Describe the laws of fire services, civil Aviation authority, Paribesh Adhidaptar & other authorities for the approval of building/ structure.

4. Understand the building By-laws & BNBC.

- 4.1 State briefly building by-laws.
- 4.2 Discuss the essential points in building by-laws.
- 4.3 Define FAR and calculation of FAR.
- 4.4 Discuss MGC and calculation of MGC.
- 4.5 Describe set-back procedure.
- 4.6 Discuss the fire exit allowance.
- 4.7 Describe the garage/parking space.
- 4.8 Describe NBC & BNBC.

5. Understand different terms for practice of Architect profession.

- 5.1 Define owner, consultant and client.
- 5.2 Distinguish earnest money and security money.
- 5.3 Differentiate between the schedule amount and contract money.
- 5.4 Describe running account bill and Bill of Qualities (BOQ).
- 5.5 Describe Force Majeure.
- 5.6 Describe maintenance period and certificate of payment.

6. Understand the public works accounts.

- 6.1 State the Public Works Department (PWD).
- 6.2 Discuss the organization of engineering department.
- 6.3 Describe the accounts & system of PWD accounts. Define the terms- Cash, Receipts of money, Treasury Challan, Revenue receipts, Payments, Cash book, Subsidiary cash book, Suspense accounts, Temporary Advance.
- 6.4 Discuss the payment to suppliers and contractors.
- 6.5 Differentiate the bills and vouchers.
- 6.6 Discuss payment on account, running account and closing of works accounts.
- 6.7 Discuss the financial aid to contractor.
- 6.8 Describe the schedule of rates.

7. Understand the Contracts & public procurement rules of Bangladesh.

- 7.1 Define contract
- 7.2 Describe the contractors and their qualifications.
- 7.3 List the different types of engineering contract.
- 7.4 Describe the advantages and disadvantages of engineering contract.
- 7.5 Explain the condition of contracts.
- 7.6 Define the Public procurement rule (PPR).
- 7.7 Explain different rules for procurement.
- 7.8 State the meaning of the following PPR, ITT, TDS, GCC, PCC, STD, NOA, BOQ, TOC, HOPE, CS etc.

8. Understand the tender.

- 8.1 Define tender, tender form, tender documents, tender notice and tender schedule.
- 8.2 Describe the time limits for tender notice and sale of tender documents.
- 8.3 Describe the submission process of tender and deposit of earnest money.
- 8.4 Describe the rules of tender opening.

- 8.5 Discuss the Comparative statement (CS) of tenders.
- 8.6 Write a tender notice to circulate at newspaper.
- 8.7 Define the terms: formal tender, informal tender, unbalanced tender, acceptance of tender, work order, contract documents, retention money, liquidated damage, unliquidated damage, compensation for delay in completion.

9. Understand writing up measurement books (MB)

- 9.1 Define the importance and issue of measurement book.
- 9.2 Describe the instructions in recording measurement & measurement of inadmissible items.
- 9.3 Explain the method of recording nomenclature of items.
- 9.4 Describe the test checking of measurement and dispute over measurement.
- 9.5 Describe writing of measurement book.
- 9.6 Discuss the contractor's bill and compare it with the MB.

10. Understand the Project Estimate.

- 10.1 Define rate analysis and estimating.
- 10.2 Discuss the estimating of quantity of materials.
- 10.3 Discuss the method of measurement of works.
- 10.4 Describe the project estimate.
- 10.5 Describe CPM, PERT and Bar Chart.

11. Understand the Specification.

- 11.1 Define specification.
- 11.2 Discuss the necessity of specification.
- 11.3 Describe the types of specification.
- 11.4 Describe the standard specification, special specification and general specification.
- 11.5 Discuss the advantages and disadvantages of different specification.
- 11.6 Describe about specification writing- on general specification and special specification of project works.
- 11.7 Show rate analysis of some common items. (CC work, Mass RCC work in structure, brick work, wooden doors and windows, aluminum doors and windows, tiles work, stone work, mosaic work, wood paneling, plastering, distempering, weather coat, varnishing on wooden surface etc.)

12. Understand the Arbitration.

- 12.1 Define arbitration and arbitrator.
- 12.2 Discuss the arbitration act.
- 12.3 Describe the arbitration agreement.
- 12.4 Describe the powers and qualifications of arbitrator.
- 12.5 Describe the different types of arbitration.

13. Understand the Valuation.

- 13.1 Define valuation.
- 13.2 Differentiate between valuation and cost.
- 13.3 Discuss the purpose of valuation.

- 13.4 Explain the terms: Gross income, Outgoings, Net income, Scrap value, Assessed value, Replacement value, Potential value, Monopoly value, Sentimental value, Accommodation value, Sinking fund, Capitalized value, & Reversionary Value.
- 13.5 Explain the basis of valuation for the purpose of mortgage.

14. Understand the related local authorities.

- 14.1 Define the local authority of Bangladesh.
- 14.2 Discuss the function of local authorities.
- 14.3 List the name of local authorities.
- 14.4 Explain LGRD, LGED, WASA, TITAS Gas, DNCC and DSCC.
- 14.5 Explain City Corporation and Pourashava.
- 14.6 Describe the electric supply authority (i.e. PDB, REB, DESA, DESCO, PGCB, etc.).

REFERENCE BOOKS

1. Architectural Practice

By Clinton H. Cowgill, A.I.A. & Ben John Small
২. বাংলাদেশ প্রজেক্ট (গনপূর্তি), ২২ জুন ২০১০

3. Bangladesh National Building Code (BNBC).

66173

INTERIOR DESIGN-2

T P C

2 6 4

AIMS

Students will be able to understand the-

- air conditioning system of an office/bank,
- building acoustics ,
- interior furniture,
- fire protection system of building.
- painting and wall paper, ceiling and floor covering.
- function of draperies, slip covers and wall composition.

SHORT DESCRIPTION

Room orientation, air conditioning, lighting system and building acoustics, furniture, fire fighting system, painting and wall paper, ceiling and floor covering, function of draperies, slip covers and wall composition, interior design of a bank or a studio office.

DETAIL DESCRIPTION

1.0 Understand the effects of room orientation on interior design.

- 1.1 State interior design.
- 1.2 Define various interior spaces.
- 1.3 Explain the climatic consideration of interior design.
- 1.4 Explain internal temperature and effect of orientation on internal temperature.
- 1.5 Explain the effect of door and window orientation on internal temperature.
- 1.6 Explain the effect of orientation and ventilation.

2.0 Understand the requirements of air conditioning in building.

- 2.1 Define Air conditioning, BTU, condensate, conductance, conductivity, convection, Enthalpy Heat transmission coefficient, Humidity, Psychometrics.
- 2.2 Define comfort.
- 2.3 Understand the effective temperature.
- 2.4 Describe the necessity of air conditioning in building.
- 2.5 Name different elements of an air conditioning unit suitable for use in all weather.
- 2.6 Name the factors to be considered in designing air conditions in a bed room.
Explain the heat load and cooling load of a building.

3.0 Understand the fundamentals of Architectural Acoustics.

- 3.1 Define sound propagation, frequency, velocity and wavelength.
- 3.2 Define sound reflection, absorption and transmission.
- 3.3 Discuss reverberation and reverberation time.
- 3.4 Explain behavior of sound in enclosed spaces.
- 3.5 Mention acoustical properties of building materials and special acoustical materials.
- 3.6 Explain scope of acoustical problems.

4.0 Understand the room acoustics.

- 4.1 Describe the room volume for acoustics.
- 4.2 Describe the room shaping for acoustics.
- 4.3 Discuss the necessary characteristics of a reflective panel; perforated absorptive panel.
- 4.4 Explain of room shaping and reverberation.

5.0 Understand Noise control.

- 5.1 Describe means of noise control.
- 5.2 Explain distance and screening for noise control.
- 5.3 Discuss the noise protection planning of the building.
- 5.4 Explain noise control requirement.
- 5.5 Explain ventilators for noise absorption & ventilator.

6.0 Understand the furniture of interiors, molding patterns & fasteners of furniture.

- 6.1 Define formal and informal style of furniture.
- 6.2 Describe the major styles (traditional, provincial and contemporary style) of furniture.
- 6.3 Discuss the fundamentals and principles of design for furniture.
- 6.4 Mention the steps in furniture design and common error in design.
- 6.5 Describe the scientific and artistic qualities of furniture.
- 6.6 Describe the criteria for selection of materials and color for furniture.
- 6.7 List the common molding pattern in interiors and their uses.
- 6.8 Define the fasteners of furniture and compare between them (nails & screw).
- 6.9 List the different finishing system of furniture or wooden works.
- 6.10 Describe the procedural steps of general finishing system for porous & nonporous wooden furniture.

7.0 Understand the fire protection system of building.

- 7.1 Define fire protection system in building.
- 7.2 Discuss about sprinkler and standpipe systems.
- 7.3 Fire protection systems using fogs and chemicals
- 7.4 Describe fire protection.
- 7.5 Explain -
 - 7.5.1 preventive measures,
 - 7.5.2 fire resisting
 - 7.5.3 construction

8.0 Understand the painting and the role of wall paper in interior decoration.

- 8.1 Discuss ingredients and types of paints.
- 8.2 Explain the painting process.
- 8.3 Explain common painting defects and remedies.
- 8.4 Describe the historical development of wall paper.
- 8.5 Describe the various types of wall paper and their uses.

9.0 Understand the role of ceiling and floor covering in interior decoration.

- 9.1 Describe the historical development of ceiling and floor covering.
- 9.2 List the various name of ceiling and false ceiling materials.
- 9.3 Describe the uses of the ceiling/false ceiling materials.
- 9.4 List the various name of floor covering materials.
- 9.5 Describe the uses of the floor covering materials.

10.0 Understand the function of draperies and slip covers.

- 10.1 State the classification of window draperies.
- 10.2 Describe the point to be considered for drapery design.
- 10.3 Describe the term "Valance" for drapery supports.
- 10.4 Discuss the selection of drapery materials.
- 10.5 Describe the function of trimming for the curtain.
- 10.6 Mention the use of slipcovers.
- 10.7 State the types of blinds and their uses.

11.0 Understand the wall composition.

- 11.1 Describe the problems of composition in the treatment of interior.
- 11.2 Describe the principles of wall design.
- 11.3 Describe the horizontal division of wall composition.
- 11.4 Describe the vertical division of wall composition.
- 11.5 Describe the contrast of vertical and horizontal lines and straight and curved lines.
- 11.6 Describe the contrast of light and dark colors.

PRACTICAL

Each student has to submit the following things of any one of the given projects (Bank/Studio Office):

- A brochure containing all necessary drawings, photographs, detail estimated cost, and a detail model of the project. (**PROJECT: Interior Design of a BANK or a STUDIO OFFICE**)

1. Perform the drawing of a Studio Office. (Size: 400- 500 SFT/100 SQM-150 SQM)

- 1.1 Visit a site and collect necessary measurement.
- 1.2 Prepare as built drawing of a given bank or office space.
- 1.3 Take necessary picture of the site.
- 1.4 Make a SWOT analysis for the given project.

2. Prepare preliminary sketch of the project.

- 2.1 Sketch line diagram of the floor plan of Bank/Studio office for approval of client.
- 2.2 Sketch the furniture layout of the Bank/Studio office.
- 2.3 Sketch the elevation/ free hand perspective view of the interior of given project.
- 2.4 Sketch the floor showing the detail of covering materials.
- 2.5 Sketch the ceiling showing the detail of materials.

3. Prepare presentation drawing of the project.

- 3.1 Draw the plan in a suitable scale.
- 3.2 Draw the floor plans with furniture arrangement and rendering in a suitable scale.
- 3.3 Draw the front elevation with rendering in a suitable scale.
- 3.4 Make a mass model of the project building in a suitable scale.
- 3.5 Make a brief description of the project with rough estimated cost.
- 3.6 Make a presentation of the project.

4. Prepare working drawings of the project.

- 4.1 Draw floor plan with detail dimensions.
- 4.2 Draw the detail of different furniture.
- 4.3 Draw the ceiling plan showing materials and detail dimensions.
- 4.4 Draw the detail of walls (Wood/ Board/PVC/ACP/Glass/Paint/Varnish/Wallpaper/Tiles/ Artificial Grass /wall paneling/ bone-tile, or any other wall treatment).
- 4.5 Draw the necessary detail section with detail dimensions.

5. Prepare perspective drawings and model.

- 5.1 Draw an interior perspective of the Bank/Studio office.
- 5.2 Draw the perspective view of the work station.
- 5.3 Draw perspective view of Reception/lobby.
- 5.4 Draw perspective view of the furniture.
- 5.5 Make the model of furniture.
- 5.5 Make a final detail model of the project showing furniture.

6. Prepare electrical drawings of the project.

- 6.1 Draw the electrical fixture and conduit layout of the Bank/Studio office.
- 6.2 Make the chart with abbreviation and symbol of the electric layout.
- 6.3 Draw the necessary circuit diagrams.

7. Prepare schedule of the interior project.

- 7.1 Make a finish schedule of the Bank/Studio office.
- 7.2 Make door and window schedule of the project.
- 7.3 Make a schedule of the electrical materials of the project.
- 7.4 Estimate the detail cost /prepare the detail cost estimate of the project.

Ref:

1. Environmental Technologies in Architecture, Kinzey and sharp
2. Architecture Drafting and design, Paul I wallach.
3. Manual of Tropical Housing and Building
 - O.H. Koenigs berger.
 - T.G. Ingersoll
 - Alan Mayhew
 - S.V. Szokolay
4. Man, climate and Architecture (2nd Edition) -- B. Givoni
5. এনভায়রনমেন্টাল ডিজাইন (বাংলাদেশ কারিগরি শিক্ষা বোর্ড)
(মোঃ রফিকুল ইসলাম মীর।

66174

URBAN PLANNING

T P C

2 3 3

AIMS

To be able to understand

- the basic concepts of town planning.
- the process of town development.
- zoning of town.
- the growth of town.
- slums, squatters.
- road systems & traffic control.
- the master plan of a town.

SHORT DESCRIPTION

Principles of town planning and its characteristics; Growth of town; Elements of city plan & surveying; Zoning system; Housing, Neighborhood unit and garden city; Slum & Squatter; Parks & Play grounds; Industries of a town; Systems of road communications, traffic control; Master plan.

DETAIL DESCRIPTION

Theory:

1 Understand the principles of town planning and its characteristics.

- 1.1 Define planning & necessity of planning.
- 1.2 Define Planning age, town & town planning.
- 1.3 Explain the aims of town planning.
- 1.4 State principles of town planning.
- 1.5 Describe necessity of town planning.
- 1.6 State the work and main features of famous town planners.
 - 1.6.1 Sir Patric Geddes.
 - 1.6.2 Sir Ebenezer Howard.
 - 1.6.3 Le Corbusier.
- 1.7 Define Individuality of town & forms of planning.

2 Understand the growth of town.

- 2.1 Define origin of town.
- 2.2 List the types of towns with definition.
- 2.3 State the stages in the growth of towns.
- 2.4 State the methods of external growth with details.
- 2.5 Explain the advantages & disadvantages of different external growth.
- 2.6 Explain the causes of expansion of towns.
- 2.7 State green belt of a town/city.

3 Understand the elements of city plan and surveying.

- 3.1 Define the elements of city plan.
- 3.2 List the elements of city plan.
- 3.3 Explain distribution of land.
- 3.4 Describe aesthetics of town planning with different measures.
- 3.5 Define necessity of surveying.
- 3.6 Explain different types of surveying used for town planning.

4 Understand the zoning system.

- 4.1 Define zoning.
- 4.2 Describe the purposes & importance of zoning.
- 4.3 Describe different zoning (use zoning & its types, height & density zoning) in modern town.
- 4.4 Calculate the maximum height for height zoning.
- 4.5 Discuss the net & gross density of a town.
- 4.6 Discuss advantages and disadvantages of zoning.
- 4.7 Discuss about zoning powers.

5 Understand Housing, Neighborhood unit and Garden city.

- 5.1 Define housing.
- 5.2 State the classification of housing.
- 5.3 State neighborhood unit.
- 5.4 Explain the principles of neighborhood planning.
- 5.5 State garden city.
- 5.6 Explain the advantages and disadvantages of garden city.
- 5.7 Make a presentation with a case study on Singapore as garden city.

6 Understand the slum & squatter.

- 6.1 Define slum & squatter.
- 6.2 Describe difference between slum and squatter.
- 6.3 List the causes of slums.
- 6.4 State the effects of slums on town life.
- 6.5 Define the precautions to be taken against formation of slums.
- 6.6 Describe the process of slum clearance.
- 6.7 Make a presentation with a case study on Hong Kong from slum to a modern city.

7 Understand parks and play grounds of a town.

- 7.1 Define the recreational facilities.
- 7.2 Describe necessity of recreational facilities.
- 7.3 State features of public recreational systems.
- 7.4 Describe selection of sites for parks and playfields.
- 7.5 State types of recreational systems.
- 7.6 Describe various forms of recreational amenities.
- 7.7 Describe park systems.
- 7.8 Discuss standards of open spaces.

8 Understand the industries of a town.

- 8.1 State the necessity of industries.
- 8.2 Describe the classification of industries.
- 8.3 Discuss the selections of sites for industries.
- 8.4 Describe industrial waste .
- 8.5 Discuss the effects of industrial waste.
- 8.6 Describe the treatments of industrial waste.

9 Understand the systems of road communications.

- 9.1 State road and road communications.
- 9.2 Describe the requirements of ideal city roads and aesthetics.
- 9.3 Describe the classification of roads.
- 9.4 Describe the types of road systems.
- 9.5 Describe right of way and different road kerbs.
- 9.6 Describe different types of road junctions & crossings.

10 Understand the systems of traffic control.

- 10.1 Define traffic management.
- 10.2 Describe traffic congestion in cities.
- 10.3 Describe disadvantages of traffic congestions.
- 10.4 Describe remedies of traffic congestions.
- 10.5 Define traffic control.
- 10.6 State different control devices (Traffic signs & signals).

11 Understand master plan.

- 11.1 State master plan.
- 11.2 Explain the objects of master plan.
- 11.3 Describe the necessity of master plan.
- 11.4 Identify different steps to be followed for preparation of master plan.
- 11.5 Describe the data to be collected for preparing of master plan.
- 11.6 Describe the procedure to prepare a map for master plan
- 11.7 Describe the implementation of master plan.

Practical:

1 Prepare a set of drawing of zoning of a town.

- 1.1 Draw a site of a town and distribute the land in different zone.
- 1.2 Draw the figures to show the laws of height zoning.
- 1.3 Draw the plan of a density zoning.
- 1.4 Draw the plan of a use zoning.
- 1.5 Draw a graph or chart to show the land distribution of a town.

2 Prepare a set of drawing of housing, neighbourhood unit, garden city & growth of town

- 2.1 Draw different types of housing.
- 2.2 Draw a neighbourhood unit.
- 2.3 Draw a plan of a garden city (partial).
- 2.4 Draw the locations of satellite town in respect of a town/city.
- 2.5 Draw a plan of scattered growth.
- 2.6 Draw a plan of ribbon development.
- 2.7 Draw a plan of planned growth of a town.
- 2.8 Draw a plan of Reill & Radburn.

3 Prepare a set of drawings of parks & play ground.

- 3.1 Draw a plan of children park.
- 3.2 Draw a plan of a neighbourhood park.
- 3.3 Draw a plan of a town park.
- 3.4 Draw a plan of a botanical park.
- 3.5 Draw a plan of a zoological park.
- 3.6 Draw a plan of a amusement park.
- 3.7 Draw different park system.
- 3.8 Draw different play fields.

4 Prepare the drawings of road system

- 4.1 Draw a plan of a road showing different amenities.
- 4.2 Draw different urban roads.
- 4.3 Draw different types of geometrical roads.
- 4.4 Draw a by-pass road.

- 4.5 Draw different types of circular roads.
- 4.6 Draw a rectangular street system.
- 4.7 Draw a rectangular combined with diagonal street system.
- 4.8 Draw a rectangular combined with radial street system.

5 Prepare the drawings of road communications

- 5.1 Draw a right of way.
- 5.2 Draw different road kerbs.
- 5.3 Draw different road junctions.
- 5.4 Draw different road crossings.
- 5.5 Draw a plan & elevation of a footover bridge.
- 5.6 Draw a plan & elevation of a over pass/ fly over.

6 Prepare the drawings of traffic control & master plan.

- 6.1 Draw a zebra crossing on road.
- 6.2 Draw different traffic signs.
- 6.3 Draw different instrumental singals.
- 6.4 Draw an island of a road system & render it.
- 6.5 Draw the lighting systems of a road.
- 6.6 Draw a master plan of a town.

REFERENCE BOOKS

- 1. Town Planning
by Rangwala
- 2. Fundamentals of Town Planning.
by G. K. HIRASKAR
- 3. The Architecture of Towns & Cities
By Paul D Spreiregen. A/A

66175

Computer Rendering & Animation-2

**T P C
0 6 2**

AIMS:

To be able to develop knowledge, skill and attitude in the field of Computer Rendering & Animation (3D Max and V-ray) with special emphasis on:

- 3D Modeling.
- Materials and mapping.
- Light, camera and render.
- V-Ray.
- Animation.

SHORT DESCRIPTION:

3D Modeling & Animation Software , 3D Modeling, Tool Panels & It's Sub Tools, Modeling with primitives, 3D Max main tool bar, Modeling with Spline, Compound Object and Modifier Stack , Setting and Preferences menu , Massing of Building Project , Doors, Windows, AEC Extended and Stair , Finishing of Massing , Materials Basics , Texture Mapping, Lighting Basic, Camera Basic, Rendering Basic, V-Ray, Render, V-ray Materials and Lights, Animation Basic, Key frame Animation, Work Throw Animation.

DETAIL DESCRIPTION:

PRACTICAL

1. Practice 3D Modeling & Animation Software (3D Studio Max).

- 1.1 Install & Start 3D Studio max software.
- 1.2 Identify the 3D max Interface.
- 1.3 Practice Viewport Navigation & Configuration.
- 1.4 Arrange Customize user interface.
- 1.5 Practice New Project, Reset, Save, Save as and Set project folder.

2. Perform Tool Panels & It's Sub Tools.

- 2.1 Practice create tool and its sub tools like as Geometry, Shapes, Lights, Cameras etc.
- 2.2 Practice sub tools & commands of standard primitives & extend primitives under Geometry tool.
- 2.3 Familiar with sub tools & commands of Splines under Shapes Tools.
- 2.4 Identify Modify tool.
- 2.5 Identify Modifier sets.
- 2.6 Identify Hierarchy, Motion, Display and Utilities tools.

3. Practice Modeling with primitives.

- 3.1 Draw Box, Cone, Sphere, Geosphere, Cylinder, Tube, Torus, Pyramid, Teapot and Plane by using Standard Primitives.
- 3.2 Draw Chamfer Box, Chamfer Cylinder, Oil Tank, Capsule etc. by using Extend primitives.
- 3.3 Modify the Size/Dimension of any object by using Modifier tool.
- 3.4 Apply Modifiers on an object such as Bend, Twist etc. from modifier list.
- 3.5 Create twisted gate way (by using bend & twist modifier).

4. Practice Main tool bar.

- 4.1 Identify select, select by name tool.
- 4.2 Practice selection Region, Window & Cross Selection.
- 4.3 Practice Move, Rotate, Scale Tool, Mirror, Align tool.
- 4.4 Apply Snap toggle and Axis Constrain and Layer management.

4.5 Practice Maximize & Minimize Viewport toggle, Orbit, Pan, Field of view, Zoom, Zoom All, Zoom Extents and Zoom Extents All.

5. Modeling with Spline.

- 5.1 Draw line, Rectangle, Circle, Ellipse, Arc, Donut, Star etc. by using spline under Shapes tool.
- 5.2 Apply modifier edit/editable spline on a 2D object (Rectangle/Star).
- 5.3 Practice the sub object of a modifier like vertex, Segment and Spline etc.
- 5.4 Create a free form Shape and Apply Extrude modifier to make 3D Object.
- 5.5 Apply Edit Mesh/Edit poly one 3D object and Familiar with sub objects line vertex, edge, Face, polygon and Element.

6. Practice the Compound Object and Modifier Stack.

- 6.1 Practice Boolean, ProBoolean, Loft etc. under compound object under Geometry.
- 6.2 Create a Pottery by using line, lathe modifier and Shell modifier.
- 6.3 Create a flower vase by using Loft (Compound Object), Edit mesh, Shell and turbo smooth (Modifier).
- 6.4 Create a Sofa by using Chamfer box and Modifier (Lattice, Noise and Smooth).

7. Practice Setting and Preferences menu.

- 7.1 Apply unit Setup on 3D Max.
- 7.2 Prepare a 2D Plan of CAD to import 3D Max (Apply Base and Purge Command for cad)
- 7.3 Import Cad plan to Max For the project and practice DWG/DXF import option Dialogue box.
- 7.4 Create necessary layer for the projects.

8. Perform Massing of Building Project.

- 8.1 Create line/Shape over the cad plan.
- 8.2 Extrude the line/Shape to create wall.
- 8.3 Create Opening for Door and Window.
- 8.4 Create Verandah, sunshade and Roof etc.
- 8.5 Apply Group Command to make Wall group, Verandah group etc.

9. Practice Doors, Windows, AEC Extended and Stair etc.

- 9.1 Create Door and modify it for the project.
- 9.2 Create window and modify it for the project.
- 9.3 Create Verandah & Roof, Railing and modify it for the project.
- 9.4 Create a stair.
- 9.5 Complete the Typical Floor massing.

10. Perform the Finishing of Massing.

- 10.1 Create the ground Floor plinth Ramp/Stair etc. for the Project.
- 10.2 Create GF wall, Column, stair Case, Boundary wall etc.
- 10.3 Create a main gate.
- 10.4 Create the Base, Road and Footpath etc.
- 10.5 Insert necessary landscape object for the project.

11. Perform Materials Basics

- 11.1 Practice Material Editor Dialogue box and its necessary Tools.
- 11.2 Prepare a material Slot by adding Color.
- 11.3 Apply a Material to an object.

- 11.4 Create a glass Material by using Refraction Map.
- 11.5 Create a MS/SS material and assign it to the railing of the Project.
- 11.6 Create a Multisub material for Windows and assign it to the Project.

12. Practice Texture Mapping.

- 12.1 Use Texture/Bitmap for material.
- 12.2 Practice tiling the texture, Real-world scale, bitmap rotate reload etc.
- 12.3 Assign Texture material slot to an object and apply UVW Map Modifier.
- 12.4 Create necessary numbers of texture materials and assign them to the project.

13. Perform Lighting Basic.

- 13.1 Practice standard and Photometric Light.
- 13.2 Create Standard Light (Target Spot, Target Direct, Omni etc.)
- 13.3 Practice general parameters, Intensity parameters, spot light parameters, Shadow parameters etc.
- 13.4 Apply 1 or 2 standard light to the project and adjust the necessary parameters for best output.

14. Perform Camera Basic.

- 14.1 Insert Target and free Camera.
- 14.2 Practice lens, FOV, Dolly camera etc.
- 14.3 Apply two cameras for the projects and adjust necessary parameters.
- 14.4 Set two Viewport for Rendering.

15. Perform Rendering Basic.

- 15.1 Practice Render Setup dialogue Box.
- 15.2 Practice render output size and apply it for the project.
- 15.3 Select a camera View and render it.
- 15.4 Save the Render Image in different formats such as BMP, JPEG, PNG, TIF, Targaimage etc.

16. Perform V-Ray Render.

- 16.1 Install V-ray software for 3d max.
- 16.2 Use v-ray as an assign render under common tab of render setup Dialogue box.
- 16.3 Practice V-ray tab and its Sub/Parameters.
- 16.4 Practice indirect illumination Tab and its Sub parameters.
- 16.5 Practice Setting tab and its sub parameters.

17. Perform V-ray Materials and Lights.

- 17.1 Create a V-ray material slot for color and assign it to an object.
- 17.2 Create a V-ray material slot for bitmap and assign it to an object.
- 17.3 Create material for glass, mirror, MS, SS.
- 17.4 Create Multisub material for window and door.
- 17.5 Create V-ray light.
- 17.6 Assign V-ray material & light to the Project and render it for output.

18. Perform Animation Basic

- 18.1 Practice time line & time track, Set Key, Auto key, play animation & time Configuration.
- 18.2 Create a simple animation of objects by changing its position (Move, Rotate)and by using auto key /set key.

18.3 Practice curve editor, Rope Sheet under graph editors menu.

18.4 Save an animation by using render setup.

19. Perform Key frame Animation.

19.1 Create a bouncing ball animation.

19.2 Create a 10 Second animation clip of 3 or 4 objects with changing their position, Shape etc.

19.3 Create an animation with a car moving to a straight road.

19.4 Create an animation with a car moving to a 90 degree bend road.

20. Perform Work Throw Animation.

20.1 Setup Camera with walk through assistant.

20.2 Animation camera rotation.

20.3 Rendering the walk through assistant.

REFERENCE BOOKS

1. Mastering Auto Desk 3ds Max 2013

by -Jeffrey Harper

2. Autodesk 3ds Max 2013 bible

by- Kelly L.Murdock

AIMS

- To be able to understand the properties of reinforced cement concrete (RCC).
- To be able to select the suitable size of reinforced concrete beams & lintels with reinforcement.
- To be able to supervise the placing of reinforcement for beams & lintel.

SHORT DESCRIPTION

Reinforced cement concrete; Theory of bending; Investigation of beam; Shear stress and bond stress; Design of reinforced cement concrete rectangular beam, T-beam, double reinforced beam and lintel.

DETAIL DESCRIPTION**Theory:****1 Understand the different type of cement concrete and structural safety.**

- 1.1 Describe and use of the plain concrete, reinforced concrete and pre-stressed concrete.
- 1.2 Mention the advantages, disadvantages & limitations of the plain Concrete, reinforced concrete and pre-stressed concrete.
- 1.3 Define and calculate young modulus of elasticity of concrete.
- 1.4 Describe test procedure of crushing cubes and cylinders for compression test.
- 1.5 Define Richter scale, tectonic plate and epicenter.
- 1.6 Explain the necessity of considering the seismic load and wind load in designing reinforced concrete works.
- 1.7 Mention the significant of the thrust (like tidal, cyclones etc.) to be consider in designing reinforced concrete structure in coastal zone.
- 1.8 Explain the need for structural safety and safety provision.

2 Understand the properties & behavior of reinforcing steel used in RCC.

- 2.1 List the different types & grades of steel used in RCC and pre-stressed concrete.
- 2.2 Mention the advantages of uses of mild steel in RCC.
- 2.3 Describe the scope of using welded wire fabric in RCC.
- 2.4 Mention the characteristics of plain bar, deformed bar and twisted bar and tendon.
- 2.5 Mention the advantages of uses of deformed and twisted bar in RCC.
- 2.6 State the minimum reinforcement used in RCC beam and slab.

3 Understand the concept of transformed section of beam.

- 3.1 Define transformed section.
- 3.2 Explain the theory of transformed section with sketches.
- 3.3 Express the derivation of the equation for investigating the stresses developed in concrete and steel by transformed section method.
- 3.4 Calculate the stresses developed in rectangular beam and T-beam in WSD method.
- 3.5 Explain balanced reinforced beam, under reinforced beam and over reinforced beam.
- 3.6 Mention the effect of under reinforcement and over reinforcement in RCC beams.

4 Understand the shear stress developed in RCC beams.

- 4.1 Explain the effects of shear force and stress in RCC beams.
- 4.2 State the meaning of diagonal tension.
- 4.3 Explain the causes of creating diagonal tension in RCC beams.

- 4.4 Express the derivation of the formula to determine shear stress developed in RCC beams.
- 4.5 Solve the problems on shear stress developed in WSD method.
- 4.6 Solve the problems on shear stress developed in USD method.
- 4.7 Mention the allowable shear stress for RCC beam (v) and shear stress for concrete (v_c).

5 Understand the functions of web reinforcement in RCC beams.

- 5.1 Define web reinforcement.
- 5.2 Classify web reinforcement with sketches.
- 5.3 Mention the functions of web reinforcement in RCC beams.
- 5.4 Determine the spacing of web reinforcement (vertical & inclined) in WSD method.
- 5.5 Determine the spacing of web reinforcement in USD method.
- 5.6 Determine the portion of the RCC beam requiring web reinforcement.

6 Understand the bond stress developed in RCC beams.

- 6.1 State the meaning of bond stress.
- 6.2 Express the derivation of the formula to determine bond stress developed in RCC beams.
- 6.3 State the allowable bond stress for plain bar and deformed bar in WSD and USD methods.
- 6.4 Determine the anchorage length of reinforcement in RCC.
- 6.5 Explain the necessity of standard hooks of reinforcement in RCC.

7 Understand the flexure formula and design of RCC rectangular beam in WSD method.

- 7.1 State the assumptions used in developing the flexure formula.
- 7.2 Explain the stress diagram of a loaded RCC beam.
- 7.3 Mention the notations used in flexure formula in WSD method.
- 7.4 Express the derivation of the flexure formula for RCC beam in WSD method.
- 7.5 Outline the design steps of RCC rectangular beam in WSD method.
- 7.6 State the minimum spacing of reinforcing bars in RCC beam.
- 7.7 Design a simply supported RCC rectangular beam in WSD method.
- 7.8 Design a semi-continuous RCC rectangular beam in WSD method.
- 7.9 Design a continuous RCC rectangular beam in WSD method.

8 Understand flexure formula and design of RCC rectangular beam in USD method.

- 8.1 Differentiate WSD and USD method.
- 8.2 Explain the stress diagram of loaded beam with showing the actual & equivalent rectangular stress distribution of ultimate load.
- 8.3 State the load and load factors used in USD method.
- 8.4 Mention the notations used in flexure formula in USD method.
- 8.5 Express the derivation of the flexure formula in USD method.
- 8.6 Outline the design steps of RCC rectangular beam in USD method.
- 8.7 Design a simply supported RCC rectangular beam in USD method.
- 8.8 Design a semi-continuous RCC rectangular beam in USD method.
- 8.9 Design a continuous RCC rectangular beam in USD method.

9 Understand the design of RCC cantilever & overhanging rectangular beams in WSD method.

- 9.1 Determine the design load, shear force and bending moment of RCC cantilever & overhanging beams.
- 9.2 Design a cantilever RCC rectangular beam.

- 9.3 Design an overhanging RCC rectangular beam.
- 9.4 Describe the technique of curtailment of reinforcement in cantilever RCC beams.

10 Understand the T-beam and design of RCC T-beams

- 10.1 Define T-beam.
- 10.2 Identify the different parts of a typical T-beam.
- 10.3 Determine the width of flange of T-beam considering span length and slab thickness.
- 10.4 State the ratio of width of web to the depth of web for T-beams.
- 10.5 Distinguish between RCC rectangular beam and T-beam.
- 10.6 Determine the depth and width of a simply supported T-beam in respect to shear force.
- 10.7 Outline the design steps of RCC T-beam in WSD method.
- 10.8 Design a simply supported RCC T-beam in WSD method.
- 10.9 Design a semi-continuous RCC T-beam in WSD method.
- 10.10 Design a continuous RCC T-beam in WSD method.

11 Understand the design of RCC beam with compression reinforcement.

- 11.1 State the meaning of double reinforced beam.
- 11.2 Differentiate between RCC single and double reinforced beam.
- 11.3 Outline the design steps of double reinforced beam.
- 11.4 Design a simply supported double reinforced beam.
- 11.5 Design a semi-continuous double reinforced beam.
- 11.6 Design a continuous double reinforced beam.

12 Understand the design of RCC lintel over doors & windows.

- 12.1 Determine the area of the wall to be considered in determining the design load for RCC lintels.
- 12.2 Outline the design steps of RCC lintel.
- 12.3 Design a RCC lintel over doors and windows.

Practical:

1. Perform compression test of concrete cylinder for particular proportion with different water-cement ratio.
2. Perform compression test of concrete cube for particular proportion with different water-cement ratio
3. Conduct tensile strength test of mild steel for plain bar of different diameters.
4. Conduct tensile strength test of mild steel for deformed bar of different diameters.
5. Prepare a model of simply supported RCC rectangular beam as per drawing.
6. Prepare a model of semi-continuous RCC rectangular beam as per drawing.
7. Prepare a model of continuous RCC rectangular beam as per drawing.
8. Prepare a model of double reinforced simply supported rectangular beam as per drawing.
9. Prepare a model of RCC lintel as per drawing.
10. Prepare a model of RCC lintel with sunshade as per drawing.

REFERENCE BOOKS

1. Simplified Design of Reinforced Concrete
-by H Parker
2. Design of Concrete Structures
-by G Winter, L C Urquhart, C E O'Rourke, A H Nilson
3. Treasure of R C C Designs
-by Sushil Kumar
4. R C C Design -by Abul Faraz Khan

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INNOVATION & ENTREPRENEURSHIP

T P C
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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 7th 5 years plan
- 11.9 Mention the link of 7th 5 years plan with SDGs
- 11.10 Write down the 5 ps of sustainable development goals

12. Understand SDG 4,8 and 17

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

Reference book :

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