BANGLADESH TECHNICAL EDUCATION BOARD

AGARGAON, SHER-E-BANGLA NAGAR

DHAKA-1207.

04-YEARS DIPLOMA IN ENGINEERING CURRICULUM

COURSE STRUCTURE & SYLLABUS

(PROBIDHAN-2022)

AUTOMOBILE TECHNOLOGY

TECHNOLOGY CODE:62

FIRST SEMESTER

(Effective from 2021-2022 Academic Session)

DIPLOMA IN ENGINEERING
COURSE STRUCTURE
PROBIDHAN-2022

AUTOMOBILE TECHNOLOGY (62) FIRSTSEMESTER

Sl	Subject		Period /Week		C	Marks Distribution						
						Theory Assessment			Practical Assessment			GT
	Code	Name	T	P		TC	TF	T	PC	PF	T	
1	21011	Engineering Drawing	-	6	2	-	-	-	50	50	100	100
2	25711	Bangla-I	2	-	2	40	60	100	-	-	-	100
3	25712	English-I	2	-	2	40	60	100	-	-	-	100
4	25911	Mathematics -I	3	3	4	60	90	150	25	25	50	200
5	25912	Physics -I	3	3	4	60	90	150	25	25	50	200
6	26211	Automobile Fundamentals	2	3	3	40	60	100	25	25	50	150
7	26711	Basic Electricity	3	3	4	60	90	150	25	25	50	200
Total			**15**	**18**	**21**	**300**	**450**	**750**	**150**	**150**	**300**	**1,050**

DIPLOMA IN ENGINEERING
DETAILED SYLLABUS
PROBIDHAN-2022

Subject Code	Subject Name	Period per Week		
		T	P	C
21011	ENGINEERING DRAWING	0	6	2

Rationale	Drawing is the language of engineers and technicians. Reading and interpreting engineering drawing is their day to day responsibility. The subject is aimed at developing basic graphic skills in the students so as to enable them to use these skills in preparation of engineering drawings, their reading and interpretation.
Learning Outcome (Practical)	**After undergoing the subject, the students will be able to:** • Identify and use of different grades of pencils and other drafting instruments which are used in engineering field. • Draw free hand sketches of various kinds of objects. • Utilize various types of lines used in engineering drawing. • Apply different dimensioning methods on drawing of objects. • Apply different types of scales and their utilization in reading and reproducing drawings of objects and maps. • Draw two-dimensional view of different objects viewed from different angles (orthographic views) • Draw and interpret complete inner hidden details of an object which are otherwise not visible in normal view • Prepare projections of Solid • Generate isometric (3D) drawing from different 2D (orthographic) views/sketches • Identify conventions for different engineering materials, symbols, sections of regular objects and general fittings used in Civil and Electrical household appliances.

Detailed Syllabus (Practical)

Unit	Topics with Contents	Class (3 Period)	Marks (Continuous)
1	**Practice with drawing instruments and materials** 1.1 Identify the different types of drawing instruments. 1.2 Apply different types of drafting equipment. 1.3 Identify the standard sizes of drawing board and sheets. 1.4 Draw the border lines in drawing sheets following standard rule. 1.5 Draw horizontal, vertical and inclined lines. 1.6 Draw 15-degree, 75-degree, 105 degree and 120-degree angles by using set squares. 1.7 Apply lettering guide, template, scale pantograph and French curve.	**2**	**4**
2	**Practice Letter and number 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 freehand inclined (75 degree) single stroke letters from A to Z (upper and lower case) and numbers from 0 to 9. 2.3 Draw block letters (Gothic) using 5: 4 proportions. 2.4 Select a suitable size of letters and write a few sentences using all the letters selecting suitable scale. 2.5 Draw title strip with proper placement using suitable size of letters and measurements.	**3**	**4**
3	**Draw lines.** 3.1 Select different lines in drawing. 3.2 Apply center line, hidden line, phantom line, break line, dimension line, extension line, section line and cutting plane line. 3.3 Apply different thickness of line to emphasize a part of drawing.	**2**	**4**
4	**Perform different dimensioning.** 4.1 Set dimensions in engineering drawing according to an accepted standard.	**2**	**4**

	4.2 Identify the elements of dimensions from a given dimensioned drawing. 4.3 Apply aligned and unidirectional system of dimensioning. 4.4 Draw size and location of dimension, continuous dimension, staggered dimension and dimensioning in limited space 4.5 Set necessary dimension to a given drawing with suitable arrows		
5	**Prepare scale for drawing application.** 5.1 Calculate representative fraction and interpret a scale reading. 5.2 Apply different types of scale to find full size dimension. 5.3 Draw a plain scale to show meter, centimeter and millimeter of a given distance on object 5.4 Draw a diagonal scale to show three units having given RF. 5.5 Calculate particular distance on plain and diagonal scale. 5.6 Apply scale of chord. 5.7 Draw angle of 49-degree, 78 degree and 95 degree with the help of scale of chord.	**4**	**6**
6	**Draw Geometric figures (regular polygons) & Construction of conic sections.** 6.1 Draw regular polygons i.e. pentagon, hexagon and octagon having given one side. 6.2 Draw an ellipse by concentric circle method. 6.3 Draw an ellipse by parallelogram method 6.4 Draw an ellipse by four center method. 6.5 Draw a parabola having given foci and director. 6.6 Draw a parabola from given abscissa and ordinate. 6.7 Maintain the record of performed task.	**3**	**6**
7	**Draw standard symbols in drawing.** 7.1 Identify symbols used in drawing 7.2 Draw a legend using symbols of different engineering materials. 7.3 Draw the symbols of different plumbing fittings and fixtures used in drawing. 7.4 Draw the symbols of different electrical fittings and fixtures used in drawing. 7.5 Interpret information from drawing containing standard symbols. 7.6 Maintain the record of performed task.	**2**	**4**
8	**Draw different views of engineering drawing.** 8.1 Identify and interpret different types of views. 8.2 Draw the isometric view of rectangular and circular lamina. 8.3 Draw the isometric projection of solids such as: cube, cylinder, pyramid, prism and steps from different orthographic views.	**4**	**6**

	8.4 Draw the isometric projection of three deterrent engineering parts from orthographic views 8.5 Draw the Oblique Projection of a square and rectangular solid. 8.6 Draw the Perspective Projection of a square and rectangular solid. 8.7 Convert of Orthographic Views to Isometric Views and Vice Versa.		
9	**Apply the Principles of orthographic projection to a straight line.** 9.1 Draw Line parallel to both planes 9.2 Draw Line perpendicular in vertical plane and parallel to horizontal plan 9.3 Draw Line parallel to vertical plane and perpendicular to horizontal plane 9.4 Draw Line inclined at given angle to horizontal plane and parallel to vertical plane 9.5 Draw Line inclined at given angle to vertical plane and parallel to horizontal plane	**4**	**4**
10	**Apply Orthographic projection of rectangular and circular planes (Lamina).** 10.1 Draw the orthographic projection of rectangular lamina Parallel to both planes. 10.2 Draw the orthographic projection of rectangular lamina inclined at given angle to Horizontal plane. 10.3 Draw the orthographic projection of circular lamina parallel to both planes. 10.4 Draw the orthographic projection of a cube kept at an angle with one of the planes in first angle method. 10.5 Draw the orthographic projection of a pyramid kept at an angle with both the planes in 1st angle method. 10.6 Draw the orthographic projection of a cone kept at an angle with both the planes in third angle method. 10.7 Draw the orthographic projection of a prism kept at an angle with vertical plane in third angle method.	**6**	**8**
	TOTAL	**32**	**50**

Necessary Resources (Tools, Equipment and Machinery):

SL	ITEM NAME	QUANTITY
1.	Drawing board	1 No
2.	Mini-draughter	1 No
3.	Instrument box	1 No
4.	Set squares	1 Set
5.	Protractor	1 No
6.	Set of scales	2 Set

7.	French curves	1 Set
8.	Drawing sheets	28 Nos
9.	Pencils (B,2B, HB)	12 No
10.	Templates	1 No

Recommended Books:

SL	BOOK NAME	WRITER NAME	PUBLISHER NAME
1.	Geometrical Drawing	Arun Vikran Kothapalli	I K International First Edition,2012
2.	Prathomic Engineering Drawing	Hemanta Kumar Bhattacharia	Somnath Book Agency Tenth **Edition**
3.	Civil Engineering Drawing	Guru Charan Singh	Standard Publications First Edition,2009
4.	Textbook of Engineering Drawing	K. Venkata Reddy	BS Publications Second Edition

Website References:

Sl	Web Link	Remarks
01	**https://www.ikbooks.com** **https://www.researchgate.net** **https://www.books.google.com**	

N.B.: If BTEB desires "Number Distribution" of Unit can be change.

Md. Shofiqul Islam
Chief Instructor
(Civil)

Md. Rashidul Amin
Chief Instructor
(Civil)

Md. Motahar Hossain
Chief Instructor
(Civil)

Md. Yasin
DC(Conf)
BTEB

Md. Jaynal Abden
Principal, BPI

বিষয় কোড	বিষয়ের নাম	টি	পি	সি
২৫৭১১	বাংলা-০১	২	০	২

উদ্দেশ্য:

বাংলা সাহিত্য পঠন পাঠনে ডিপ্লোমা পর্যায়ের শিক্ষার্থীদের জাতীয় চেতনাবোধ, দেশপ্রেম, মুক্তিযুদ্ধের চেতনা, মানবিকতা, অসাম্প্রদায়িক চেতনা, শুদ্ধাচার, নৈতিক মূল্যবোধ এবং দেশের সংস্কৃতি ও ঐতিহ্য সম্পর্কে সম্যক ধারণা পাবে।

শিখনফল:

- দেশপ্রেম ও মাতৃভাষার প্রতি মমত্ববোধ এবং ভাষা আন্দোলনের ইতিহাস জানা যাবে।
- সামাজিক মূল্যবোধ, মানবিকতা ও অসাম্প্রদায়িক জীবন বোধ জাগ্রত হবে।
- বালাদেশের মানুষ ও প্রকৃতি সম্পর্কে ধারণা লাভ করবে।
- নতুন শপথে আত্মপ্রত্যয়ী হয়ে এগিয়ে যাওয়ার ধারনা লাভে আনুপ্রানিত হবে।
- সকল মানুষের সমমর্যাদা অর্থাৎ নারী শিক্ষা ও নারীর ক্ষমতায়ন সম্পর্কে ধারণা লাভ করবে।
- ইতিহাস ও ঐতিহ্য সম্পর্কে ধারণা লাভ করতে পারবে।
- বাংলাদেশের গ্রামীণ জীবন চিত্র ও ঐতিহ্য সম্পর্কে ধারণা লাভ করবে।

	ক্লাস	নম্বর
বাংলা কবিতা		২০
০১। বঙ্গভাষা - মাইকেল মধুসূদন দত্ত।	৩	
১.১ মাতৃভাষার প্রতি মমত্ববোধ জাগ্রত করা।		
১.২ সনেট সম্পর্কে ধারণা লাভ।		
১.৩ অমিত্রাক্ষর ছন্দের প্রয়োগ।		
০২। সোনার তরী - রবীন্দ্রনাথ ঠাকুর।	২	
২.১ রূপক কবিতা সম্পর্কে ধারণা।		
২.২ মানব জীবনের গভীর সত্যকে উপলব্ধি করতে পারা।		
০৩। সাম্যবাদী - কাজী নজরুল ইসলাম।	৩	
৩.১ বৈষম্যহীন সমাজ গঠনের ধারণা ।		
৩.২ অসাম্প্রদায়িক চেতনার মাধ্যমে মানবতাবাদ প্রতিষ্ঠা।		
৩.৩ কথায়, আচরণে ও কাজে অসাম্প্রদায়িক মনোভাবের বহি:প্রকাশ ঘটানো।		

০৪। আঠারো বছর বয়স – সুকান্ত ভট্টাচার্য । ২

৪.১ মানব জীবনে বয়স উত্তরণকালীন পর্যায়ে অন্যদের ওপর নির্ভরশীলতা পরিহার করে নিজের পায়ে দাঁড়ানোর শিক্ষা সম্পর্কে ধারনা ।

৪.২ নতুন শপথে আত্নপ্রত্যয়ী হয়ে এগিয়ে যাওয়ার ধারনা লাভে আনুপ্রানিত করা।

০৫। স্বাধীনতা, এই শব্দটি কিভাবে আমাদের হলো - নির্মলেন্দু গুণ । ২

৫.১ স্বাধীনতার পটভূমি সম্পর্কে ধারণা ।

৫.২ ঐতিহাসিক ৭ই মার্চের ভাষণের তাৎপর্য ব্যাখ্যা ।

গদ্যাংশ (ছোট গল্প) ১২

০৬। অপরিচিতা - রবীন্দ্রনাথ ঠাকুর। ৩

৬.১ বাংলা ছোট গল্প সম্পর্কে ধারণা ।

৬.২ সমকালীন সমাজ জীবনের জটিল-কুটিল রূপ সম্পর্কে জানা।

৬.৩ বাল্য বিবাহ ও পণপ্রথার কু-প্রভাব সম্পর্কে সচেতনতা।

০৭। একুশের গল্প - জহির রায়হান । ২

৭.১ একুশে ফেব্রুয়ারির বাস্তব সত্য ঘটনাটি কীভাবে শিল্প সত্যে উত্তীর্ণ হলো তা জানা।

৭.২ ভাষার জন্য আত্মত্যাগের কাহিনী জানা।

০৮। বিলাসী - শরৎচন্দ্র চট্টোপাধ্যায়। ২

৮.১ সমাজের শ্রেণি বৈষম্য আলোচনা।

৮.২ চরিত্রের মধ্যেও আত্মত্যাগের দৃষ্টান্ত।

প্রবন্ধ ১০

০৯। জাগো গো ভগিনী - বেগম রোকেয়া সাখাওয়াত হোসেন। ৩

৯.১ নারী শিক্ষা সম্পর্কে সচেতনতা।

৯.২ নারী শিক্ষা ও নারীর ক্ষমতায়ন সম্পর্কে জানা।

১০। জাদুঘরে কেন যাব - আনিসুজ্জামান। ৩

১০.১ বর্তমান এবং ভবিষ্যত প্রজন্মের জন্য সানন্দে জ্ঞান ও কৌতুহল সৃষ্টি ।

১০.২ মানব সভ্যতা ও সংস্কৃতির বৈচিত্র্যপূর্ন নিদশনের মাধ্যমে মানব জাতির আত্নপরিচয় সম্পর্কে জ্ঞান লাভ ।

উপন্যাস ১০

১১। জননী সাহসিনী ১৯৭১ - আনিসুল হক। ৪

১১.১ মুক্তিযুদ্ধ সম্পর্কে ধারণা।

১১.২ মুক্তিযুদ্ধে নারীদের অংশগ্রহণ ও অবদান সম্পর্কে আলোচনা।

১১.৩ বীরাঙ্গনাদের জীবন চিত্র সম্পর্কে জানা।

নাটক ০৮

১২। মানুষ - মুনীর চৌধুরী। ৩

১২.১ একাঙ্কিকা নাটক সম্পর্কে ধারণা ।

১২.২ উপমহাদেশে সাম্প্রদায়িক দাঙ্গা সম্পর্কে ধারণা।

১২.৩ সাম্প্রদায়িকতার উর্ধ্বে মানবতার বিজয়।

মোটঃ ৩২ ৬০

সহায়ক গ্রন্থ:

০১। বঙ্গঁভাষা 'চতুর্দশপদী কবিতাবলী' - মাইকেল মধুসূদন দত্ত।

০২। সোনারতরী 'সোনারতরী' - রবীন্দ্রনাথ ঠাকুর।

০৩। সাম্যবাদী 'সাম্যবাদী' - কাজী নজরুল ইসলাম।

০৪। আঠারো বছর বয়স – সুকান্ত ভট্টর্চায , ছাড়পত্র, কাব্যগ্রন্থ ।

০৫। স্বাধীনতা, এই শব্দটি কিভাবে আমাদের হলো 'চাষাভূষার কাব্য' - নির্মলেন্দু গুণ ।

০৬। অপরিচিতা 'গল্পগুচ্ছ' - রবীন্দ্রনাথ ঠাকুর।

০৭। একুশের গল্প 'জহির রায়হানের রচনাবলী ২য় খন্ড' ।

০৮। বিলাসী 'শরৎচন্দ্র চট্টোপাধ্যায়ের ১ম প্রকাশ 'ভারতী' পত্রিকা ১৩২৫ বঙ্গাব্দ ১৯১৮খ্রি.' বৈশাখ সংখ্যা ।

০৯। জাগো গো ভগিনী - বেগম রোকেয়া সাখাওয়াত হোসেন - 'রচনাবলী' ।

১০। জাদুঘরে কেন যাব - আনিসুজ্জামান । স্মারক পুস্তিকা ,সংকলিত ।

১১। জননী সাহসিনী ১৯৭১ - আনিসুল হক রচিত ।

১২।মানুষ (নাটক) - মুনীর চৌধুরী রচনাসমগ্র ।

১৩। উচ্চ মাধ্যমিক বাংলা সংকলন - জাতীয় শিক্ষাক্রম ও পাঠ্যপুস্তক বোর্ড ।

১৪। বাংলা ব্যাকরণ ও নির্মিতি - জাতীয় শিক্ষাক্রম ও পাঠ্যপুস্তক বোর্ড ।

বি. দ্র.: বোর্ড প্রয়োজনে পাঠ্যসূচি ইউনিট ভিত্তিক নম্বরে কমবেশি করতে পারবে।

প্রণয়নে-

কনকেন্দু ভৌমিক	**শহিদা বিনতে বারী**	**কৃষিবিদ মোঃ মোস্তফা কামাল**	**হুমা আফরোজ**	**মোঃ আমিরুল ইসলাম**	**ওমর খালেদ**
ইন্সট্রাক্টর (বাংলা)	ইন্সট্রাক্টর (বাংলা)	কারিকুলাম বিশেষজ্ঞ	জুনিয়র ইন্সট্রাক্টর (বাংলা)	ইন্সট্রাক্টর (বাংলা)	ইন্সট্রাক্টর (বাংলা)
সিরাজগঞ্জ পলিটেকনিক ইন্স:	রংপুর পলিটেকনিক ইন্স:	বাংলাদেশ কারিগরি শিক্ষা বোর্ড	ঢাকা মহিলা পলিটেকনিক ইন্স:	এম এস জোহা কৃষি কলেজ	দিনাজপুর টেক্সঃ ইন্সঃ

Subject Code	Subject Name	Period per Week		Credit
25712	ENGLISH-I	T	P	C
		2	0	2

Rationale	The main aim of this syllabus is to provide an opportunity for the learners to use English for different situations. Every chapter of the syllabus is based on reading text and a range of tasks and activities, designed to enable the learners to practice the different skills, sometimes individually and sometimes in pairs or groups. This syllabus is allowing grammar to be used in a more meaningful role in learning language. Thus, the students develop their language skills by practicing language activities and not merely knowing the rules of the language.
Learning Outcomes	**After the completion of the course, learners will be able to:** • Develop Reading, Writing, Listening &Speaking Skills • Develop creative writing • Acquire grammatical accuracy • Communicate effectively

Unit Description:

Unit	Topics with Contents	Class (1 Period)	Final Marks
1. People or Institutions Making History	**THE UNFORGETTABLE HISTORY** 1.1. Read, know and share the history of war of independence 1.2. Know about the historical speech of Bangabandhu 1.3. Understand the meaning of confusing words **Listening Practice (Only for contentious assessment)** **Follow the link (please play 2/3 minutes customized video):** https://www.youtube.com/watch?v=K2guj3hhvNU	**1**	**15**
2. Greatest Scientific Achievements	**SOME OF THE GREATEST SCIENTIFIC ACHIEVEMENTS OF THE LAST 50 YEARS** 2.1. Participate in conversations and debates 2.2. Present information in a chart 2.3. Infer meaning from the context 2.4. surf the net https://www.youtu.be/7hU_iPFGTLI	**1**	

3. Art and Music	**CRAFTS AT OUR TIME** 3.1. Describe the history of crafts and cultures 3.2. Participate in discussion 3.3. Narrate something in writing https://www.youtu.be/f90p_sdxW9o	**1**	
4. Adolescence	**THE STORM AND STRESS AT ADOLESCENCE** 4.1.1. Identify the several sages of life 4.1.2. Know the storm and stress of adolescence	**1**	
	THE STORY OF SHILPI 4.2.1. Think about the adverse effects of child marriage 4.2.2. Know the activities of the NGOs	**1**	
5. Peace and Conflict	**WHAT IS CONFLICT?** 5.1.1. Define conflict 5.1.2. Identify the reason of conflict 5.1.3. Follow lectures and take notes	**1**	
	THE PEACE MOVEMENT 5.2.1. Define peace 5.2.2. Ask for and give opinion regarding peace	**1**	
6. Tours and Travels	**TRAVELLING TO A VILLAGE IN BANGLADESH** 6.1. Infer meaning from the context 6.2. narrate something in writing	**1**	
7. Environment and Nature	**WATER, WATER EVERYWHERE** 7.1. Know the importance of water and resources of water 7.2. Know how the rivers are polluted 7.3. Ask for and give suggestions and opinions (listening, speaking and writing)	**1**	
8. Food Adulteration	**EATING HABIT AND HAZARDS** 8.1. Describe the eating hazards 8.2. Know the importance of eating habits 8.3. Kescribe people, places and their food habits	**1**	
9. Grammar	**9.1 Parts of Speech** 9.1.1. Utilize the words properly in the sentence	**2**	**15**
	9.2 Word Formation	**1**	

	9.2.1.1. Prefixes 9.2.2. Suffixes 9.2.3. Synonyms 9.2.4. Antonyms		
	9.3 Study of Verbs 9.3.1. Learn different kinds of verbs utilize the verbs properly in the sentence 9.3.2. Transitive and intransitive verbs 9.3.3. Infinitives, gerund, participles 9.3.4. Modals	**2**	
	9.4 The Sentence 9.4.1. Types of Sentence (affirmative, negative, interrogative, imperative, optative, exclamatory) 9.4.2. Components of sentences (subject, appositive, object, complement) 9.4.3. Modifiers (pre-modifiers and post-modifiers) 9.4.4. Questions (with WH words)	**3**	
	9.5 Use of Tenses 9.5.1. Learns all kinds of tenses 9.5.2. Use tense in different context	**3**	
	9.6 Adverbs and Adverbials	**1**	
10. Composition	**Letters** 1. Formal and Informal letters 2. Inquiry letter 3. Cancelation letter	**3**	**30**
	Paragraphs 1. Paragraph answering question 2. Paragraph with clues/without clues 3. Paragraph Comparing and contrasting	**3**	
	Greetings and Farewell	**1**	
	Describing situation	**1**	
	CV & Cover Letter	**2**	
		32	**60**

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
01	**English For Today** **Classes XI – XII & Alim**	Quazi Mustain Billah Fakrul Alam M Shahidullah Shamsad Mortuza Zulfeqar Haider Goutam Roy	**NATIONAL CURRICULUM AND TEXT BOOK BOARD, BANGLADESH**

Website References:

Sl	Web Link	Remarks
01	www.nctb.gov.bd	

Marks Distribution (100)	
Attendance	05
Class Test(Listening Test)	06
Quiz Test (Speaking)	04
Presentation and Assignment	05
Midterm	20
Final	60
Total	**100**

Assessment:

1. Test Items: Students will be evaluated on the basis of following criteria.

Skills	Total Marks	Test Items	Notes
Listening	**06**	**MCQ, Gap filling, Matching**	Test items must be newly prepared for each test by the question setters themselves on their own.
Speaking	**04**	Describing/narrating answering questions based on everyday familiar topics/events/situations such as family, school, home city/village,	Five to ten sentences used coherently with acceptable English with understandable pronunciation

		books, games and sports, movie/TV show, recent events and incidents etc.	
		MCQ	
		Answering questions (open ended and close	
		ended questions)	
		Gap filling without clues	
		Substitution tables	
		Information transfer	

2. Grammar Test Items:

- Identification of parts of speech
- Gap filling activities without clues
- Cloze test with/without clues
- Substitution tables
- Identify sentence
- Sentence analyzes
- Table matching

3. Composition Test Items:

- Writing process
- Completing an incomplete story
- Writing dialogue on a given situation
- Preparing an attractive poster on a given topic and describing it
- Preparing report on given context
- Describing a given graph/chart (descriptive, analyzing, analytic)
- Writing summary (given seen comprehension) with title

N.B: If BTEB desires "Number Distribution" of unit can changed.

Prepared by:

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DIPLOMA IN ENGINEERING
DETAILED SYLLABUS
PROBIDHAN-2022

Subject Code	Subject Name	Period per Week		
		T	P	C
25911	MATHEMATICS-I	3	3	4

Rationale	Mathematics is the study of order, relation and pattern. Essential Mathematics provides students with the mathematical knowledge, skills and understanding to solve problems in real contexts, in a range of workplace, personal, further learning and community settings. Beside Mathematics help students to develop creativity and the ability to think, communicate, and solve problems. To resolve those Mathematics-I subject added in this curriculum. Mathematics-I subject is prerequisite of Mathematics-II. This subject will cover determinants and matrix, polynomial, quadratic equations, permutation and combination, measurement of angles, area of circle and equation of straight lines.
Learning Outcome (Theoretical)	**After undergoing the subject, students will be able to:** ➢ Solve determinants & matrix. ➢ Explain polynomial. ➢ Solve quadratic equations. ➢ Explain permutation and combination. ➢ Determine measurement of angles. ➢ Find area of circle. ➢ Find equation of straight lines.
Learning Outcome (Practical)	**After undergoing the subject, students will be able to:** • Solve related to algebra problems. • Solve related to trigonometry problems. • Solve related to geometrical problems.

Detailed Syllabus (Practical)

Unit	Topics with Contents	Class (1 Period)	Final Marks
1	**ALGEBRA (Determinants)** 1.1 Explain 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.	3	4
2	**ALGEBRA (Matrix)** 2.1 Define matrix, null matrix, unit matrix, square matrix. column matrix, row matrix, inverse matrix, transpose matrix, adjoin matrix, rank of a matrix, singular matrix. 2.2 Explain equality, addition and multiplication of matrix. 2.3 Find the rank of a matrix (2×3,3×2,3×3 order 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, adjoin and inverse matrix of a given matrix.	3	5
3	**ALGEBRA (Polynomial and Polynomials Equations)** 3.1 Define polynomials and polynomial equation. 3.2 Explain the roots and co-efficient of polynomial equations. 3.3 Find the relation between roots and co-efficient of the polynomial equations. 3.4 Determine the roots and their nature of quadratic polynomial equations. 3.5 Form the equation when the roots of the quadratic polynomial equations are given. 3.6 Find the condition of the common roots of quadratic polynomial equations. 3.7 Solve the problems related to the above.	4	8
4	**ALGEBRA (Complex numbers)** 4.1 Define complex numbers. 4.2 Perform algebraic operation (addition, subtraction, multiplication, division, square root) with complex number of the form a + ib.	2	4

	4.3 Find the cube roots of unity. 4.4 Apply the properties of cube root of unity in solving problems.		
5	**ALGEBRA (Permutation)** 5.1 Explain permutation. 5.2 Find the number of permutations of n things taken r at a time when, i. Things are all different. ii. Things are not all different. 5.3 Solve problems related to permutation: i) Be arranged so that the vowels may never be separated.	**3**	**5**
6	**ALGEBRA (Combination)** 6.1 Explain combination. 6.2 Find the number of combinations of n different things taken r at a time. 6.3 Explain $\mathbf{n_{c_r}}$, $\mathbf{n_{c_0}}$, $\mathbf{n_{c_n}}$ 6.4 Find the number of combinations of n things taken r at a time in which p particular things i) Always occur ii) never occur. 6.5 Establish i) $\mathbf{n_{c_r}} = \mathbf{n_{c_n}}$-r ii) $\mathbf{n_{c_r}} + \mathbf{n_{c_{r-1}}} = \mathbf{n+1_{c_r}}$ 6.6 Solve problems related to the combination. Exp: 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.	**3**	**5**
7	**TRIGONOMETRY (Associated Angles):** 7.1 Define associated angles. 7.2 Find the sign of trigonometrical function in different quadrants. 7.3 Calculate trigonometrical ratios of associated angle. 7.4 Solve the problems using above.	**3**	**5**
8	**TRIGONOMETRY (Trigonometrical Ratios)** 8.1 Define compound angles. 8.2 Establish the following relation geometrically for acute angles. i) $\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$. ii) $\cos(A \pm B) = \cos A \cos B \pm \sin A \sin B$. 8.3 Deduce formula for $\tan(A \pm B)$, $\cot(A \pm B)$. 8.4 Apply the identities to work out the problems: i. Find the value of sin 750, tan 750. ii. Show that $\frac{\sin 75^\circ + \sin 15^\circ}{\sin 75^\circ - \sin 15^\circ} = \sqrt{3}$ iii. if $\alpha + \beta = \theta$, $\tan\alpha + \tan\beta = b$, $\cot\alpha + \cot\beta = a$, Show that $(a - b) = ab \cot\theta$.	**4**	**5**

9	**TRIGONOMETRY (Transformation of formulae):** 9.1 Express sum or difference of two sines and cosines as a product and vice-versa 9.2 Solve problems of the Following types: I. Show that, $\sin55° + \cos55° = \sqrt{2}\cos10°$ II. Prove that, $\cos80° \cos60° \cos40° \cos20° = \frac{1}{16}$	**4**	**4**
10	**TRIGONOMETRY (Multiple Angles)** 10.1 State the identities for sin 2A, cos 2A and tan 2A. 10.2 Deduce formula for sin 3A, cos 3A and tan 3A. 10.3 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, $\tan(\alpha + \beta) = \frac{3 \sin 2\alpha}{1 + 3 \cos 2\alpha}$	**4**	**8**
11	**TRIGONOMETRY (Inverse circular function)** 11.1 Explain the term inverse circular function and principal value of a trigonometrical ratio. 11.2 Deduce mathematically the fundamental relations of different circular functions. 11.3 Convert a given inverse circular function in terms of other functions. 11.4 Prove mathematically I. $\tan^{-1} x + \tan^{-1} y = \tan^{-1} \frac{x+y}{1-xy}$ II. $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \tan^{-1} \frac{x+y+z-xyz}{1-xy-yz-zx}$ III. $\sin^{-1} x + \sin^{-1} y = \sin^{-1}\left(x\sqrt{1-y^2} + y\sqrt{1-x^2}\right)$ IV. $2\tan^{-1} x = \sin^{-1} \frac{2x}{1+x^2} = \cos^{-1} \frac{1-x^2}{1+x^2} = \tan^{-1} \frac{2x}{1-x^2}$ 11.5 Solve problems of the following types. a) $2\tan^{-1}\frac{1}{3} + \tan^{-1}\frac{1}{4} = \frac{\pi}{4}$ b) $\cos \tan^{-1} \cot \sin^{-1} x = x$.	**3**	**8**

12	**TRIGONOMETRY (Trigonometrical Properties of triangles)** 12.1 Prove the followings identities: I. $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C} = 2R$ II. $a^2 = b^2 + c^2 - 2bc \cos A$ III. $a = b \cos C - c \cos B$. **IV.** $\Delta = \frac{1}{2} bc \sin A$.	**2**	**8**
	12.2 Establish the followings. a) $\tan \frac{A}{2} = \sqrt{\frac{(s-b)(s-c)}{s(s-a)}}$ b) $\tan \frac{B-C}{2} = \frac{b-c}{b+c} \cot \frac{A}{2}$, c) $\Delta = \frac{abc}{4R}$ 12.3 Solve the problems of the following types: Prove $\cos(B - C) + \cos A = \frac{bc}{2R}$ 12.4 An object experiences two forces F_1 and F_2 of magnitude 9 and 12.5 Newtons with an angle 100^0 between their directions. Find the magnitude of the resultant R.		
13	**CO-ORDINATE GEOMETRY (Co-ordinates to find lengths and area)** 13.1 Explain the co-ordinates of a point. 13.2 State different types of co-ordinates of a point. 13.3 Find the distance between two points (x_1, y_1) and (x_2, y_2). 13.4 Find the co-ordinates of a point which divides the straight line joining two points in certain ratio. 13.5 Find the area of a triangle whose vertices are given. 13.6 Solve problems related to co-ordinates of points and distance formula.	**2**	**5**
14	**GEOMETRY (The equation of straight lines in calculating various Parameter)** 14.1 Define straight line. 14.2 Find the locus of a point 14.3 Solve problems for finding locus of a point under certain conditions. 14.4 Describe the Equation x=a and y=b and slope of a straight line. 14.5 Find the slope of a straight line passing through two point $(x_1, y_1,)$ and (x_2, y_2).	**4**	**8**
	14.6 Find the equation of straight lines: (i) Point slope form. (ii) Slope Intercept form. (iii) Two points form. (iv) Intercept form. (v) Perpendicular form.		

	14.7	Find the point of intersection of two given straight lines.		
	14.8	Find the angle between two given straight lines.		
	14.9	Find the condition of parallelism and perpendicularity of two given straight lines.		
	14.10	Find the distances of a point from a line.		
	14.11	Solve problems related to above.		
15	**CO-ORDINATE GEOMETRY (Circle)**		**4**	**8**
	15.1	Define circle, center and radius.		
	15.2	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) $x^2 + y^2 + 2gx + 2fy + c = 0$		
	15.3	Find the equation of a circle described on the line joining (x_1, y_1) and (x_2, y_2).		
	15.4	Define tangent and normal.		
	15.5	Find the condition that a straight line may touch a circle.		
	15.6	Find the equations of tangent and normal to a circle at any point.		
	15.7	Solve the problems related to equations of circle, tangent and normal.		
		Total	**48**	**90**

Detailed Syllabus (Practical)

Unit	Topics with Contents		Class (3 Period)	Marks (Continuous)
1	**Solve problems related to Determinants.**		**2**	**3**
	1.1	Solve determinants Problems as per instruction.		
	1.2	Maintain the record of performed job.		
2	Solve problems related to Matrix		**2**	**2**
3	Solve problems related to polynomials and polynomials equations.		**2**	**3**
4	Solve problems related to Complex numbers		**1**	**2**
5	Solve problems related to permutation		**2**	**2**
6	Solve problems related to Combination		**2**	**3**
7	Solve problems related to Associated Angles		**1**	**2**
8	Solve problems related to Trigonometrical Rations of Compound angle.		**1**	**2**
9	Solve problems related to Multiple angles		**2**	**3**
10	Solve problems related to Inverse circular functions		**1**	**3**
		TOTAL	**16**	**25**

Recommended Books:

SL	BOOK NAME	WRITER NAME	PUBLISHER NAME
1.	Companian to basic Maths	G. V. Kumbhojkar	Phadke Prakashan
2.	Co-ordinate Geometry & Vector Analysis	Rahman & Bhattacharjee	H.L. Bhattacharjee
3.	Higher Mathematics	Md. Nurul Islam	Akkhar Patra Prakashani
4.	Mathematics for Polytechnic Students	S. P Deshpande	Pune Vidyarthi Graha Prakashan
5.	Mathematics for Polytechnic Students (Volume I)	H. K. Das	S.Chand Prakashan
6.	Engg.Maths Vol I & II	Shri Shantinarayan	S.Chand & Comp
7.	Higher Mathematics	Dr. B M Ekramul Haque	Akshar Patra Prakashani
8.	Differential & Integral Calculus	Md. Abu Yousuf	Mamun Brothers
9.	Higher Mathematics	Ashim Kumar Saha	Akshar Patra Prakashani
10.	Higher Mathematics	S.U Ahamed & M A Jabbar	Alpha Prakashani

Website References:

Sl	Web Link	Remarks
01	**Web Link:** www.YouTube.com	

Subject Code	Subject Name	Period per Week		Credit
25913	CHEMISTRY	T	P	C
		3	3	4
Rationale	**Chemistry is the branch of science that deals with study of matter, its composition, physical and chemical properties and applications. It is important for diploma engineers to have knowledge of chemistry as those may face problems in fields as diverse as design and development of new materials, quality control and environmental engineering that are basically chemistry oriented in nature. Chemistry is the backbone in designing and understanding the nature of various engineering materials. Many advances in engineering and technology either produce a chemical demand. The subject covers atomic structure, chemical reaction, ionic equilibrium, organic and vocational chemistry to understanding and application. The emphasis will be more on teaching practical aspect rather than theory.**			
Learning Outcome (Theoretical)	**After undergoing the subject, students will be able to:** **Describe Atomic Structure** **Describe Symbol, valency and radical** **Describe Properties of gas and its law** **Different types of bonds** **Define Acid, base and salt** **Describe Buffer solution, pH and its application** **State Different types of reaction and catalyst** **Calculate oxidation and reduction number** **Describe Hardness of water and its removing process** **Illustrate Electrolysis process** **State organic chemistry** **Describe Various type of hydrocarbon** **State Different types of alcohol** **Describe Aromatic compound and its use** **Explain Food security and processing**			
Learning Outcome (Practical)	**After undergoing the subject, students will be able to perform:** **Use laboratory equipment's and safety measure** **Perform Preparation of various strength of solution** **Calculate the strength of unknown solution** **Identify Nature of different type of solution** **Perform Qualitative analysis of radicals and salt** **Perform Preparation of vinegar and sanitizer**			

Detailed Syllabus (Theory)

Unit	Topics with Contents	Class (1 Period)	Final Marks
1	**ATOMIC STRUCTURE** 1.1 Define Element, atoms and molecules. 1.2 Define molecular mass, atomic number, mass number, mole and Aveogadro's number. 1.3 Distinguish between atom and molecule. 1.4 Describe Fundamental particle of atom. 1.5 Define isotope, isobar and isotone. 1.6 Define Orbit and Orbital. 1.7 Explain Quantum number. 1.8 Describe Electronic configuration based on Aufbau principle, Hunds rule and Paulis exclusion principle.	6	10
2	**SYMBOL, VALENCY AND FORMULA** 2.1 Define Symbol, Valency and formula. 2.2 Discuss the variations of valency. 2.3 Describe active and latent valency. 2.4 Describe Radicals.	3	6
3	**GAS** 3.1 Define gas and vapor. 3.2 Mention the Characteristic of gas. 3.3 Distinguish between gas and vapor. 3.4 Define STP, NTP and Absolute temperature. 3.5 Mention the Boyle's, Charle's and Avogadro's law. 3.6 Establish the ideal gas equation (PV=nRT)	4	7
4	**CHEMICAL BOND** 4.1 Define Chemical Bond. 4.2 Define Octet rule. 4.3 Explain Ionic bond, Covalent bond and Co-ordinate covalent bond. 4.4 Mention the Characteristic of ionic and covalent compound. 4.5 Differentiate between ionic and covalent compounds.	3	7
5	**ACID, BASE AND SALT** 5.1 State Modern concept of Acid and Base. 5.2 List the properties of acid and base. 5.3 Classify Salt 5.4 Explain Basicity of an acid and acidity of a base.	3	6
6	**IONIC EQUILIBRIUM** 6.1 Explain pH and pH scale. 6.2 Define Normality, Molarity and Molality. 6.3 Define Primary and Secondary Standard Substances. 6.4 Define Standard Solution, Titration and Indicator. 6.5 Define Buffer Solution and Its Mechanism. 6.6 Describe Importance of pH in Agriculture and Chemical Industries.	3	6

7	**CHEMICAL REACTION** 7.1 Define Exothermic and endothermic reaction. 7.2 Define Chemical Reaction 7.3 Classify Chemical Reaction. 7.3 Describe Catalyst and Catalysis. 7.5 Mention the uses of Catalyst in Industries.	**3**	**7**
8	**OXIDATION AND REDUCTION** 8.1 Describe Modern concept of Oxidation and Reduction. 8.2 Define Oxidizing agent and Reducing agent. 8.3 Describe Simultaneous process of Oxidation and Reduction. 8.4 Explain the Oxidation number / state. 8.5 Distinguish Between Oxidation number and Valency.	**3**	**6**
9	**WATER** 9.1 Define Hard and Soft water. 9.2 Define Hardness of water. 9.2 Describe permutit process to removal the hardness of water. 9.3 Mention the Advantage and disadvantage of Soft and Hard water. 9.4 Describe Reverse Osmosis process.	**3**	**6**
10	**ELECTRO-CHEMISTRY** 10.1 Define Electrolyte, Electrolysis and Electrode. 10.2 State the Mechanism of Electrolysis process. 10.3 Mention the Process of Chrome Electro-plating. 10.4 Define Galvanizing. 10.5 Mention the importance of Galvanizing.	**3**	**5**
11	**Basic concept of organic chemistry** 11.1 Define organic chemistry. 11.2 Classify organic compound 11.3 Mention the Catenation properties of Carbon 11.4 Distinguish between organic & inorganic compound 11.5 Explain homologous series of organic compound 11.6 State molecular & structural formula of methane, ethane, propane & butane. 11.7 Describe functional group of organic compounds	**3**	**6**
12	**Aliphatic Hydrocarbon** 12.1 Define hydrocarbon, saturated and unsaturated hydrocarbon 12.2 Describe nomenclature of alkane, alkene and alkyne IUPAC system. 12.3 Mention the uses of hydrocarbon methane, ethane and ethyne.	**3**	**4**
13	**Alcohol** 13.1 Define alcohol. 13.2 Describe the classification of alcohol. 3.3 Define absolute alcohol, rectified sprit and power alcohol. 4.4 Define enzyme and fermentation.	**3**	**4**
14	**Aromatic Compound** 14.1 Define aromatic compound. 14.2 Define aromaticity and Hackle's Theory. 14.3 Describe Synthesis Benzene from phenol, acetylene and benzoic acid. 14.4 Mention the uses of benzene.	**3**	**5**
15	**VOCATIONAL CHEMISTRY** 15.1 Define Food security, Natural and approved chemical preservatives.	**2**	**5**

	15.2 Describe canning process of Mango and Pineapple. 15.3 Describe canning process of Fish and Meat.		
	Total	**48**	**90**

Detailed Syllabus (Practical)

Sl.	Experiment name with procedure	Class (3 Period)	Marks (Continuous)
1	Safe Use of Laboratory and Familiar with instrument 1.1 Follow Laboratory Rules and OSH 1.2 Wear Apron, Safety Glass, Mask and Gloves. 1.3 Use of Conical flask, Wash bottle, Burette, Pipette 1.3 Use Flammable substance according to instruction 1.4 Importance of minimum use of chemical. 1.5 Use of Fast aid box. 1.6 Follow DO's or Don't in laboratory.	**2**	**2**
2	Perform Preparation of decimolar (0.1M) Na_2C0_3 Solution	**1**	**2**
3	Determine the strength of H_2SO_4 Solution by decimolar (0.1M)	**1**	**2**
4	Perform Preparation of decimolar (0.1M) NaOH Solution.	**1**	**2**
5	Determine the strength of Hydrochloric acid (HCl) Solution by decimolar (0.1M) NaOH Solution	**1**	**2**
6	Measure the pH value of unknown solution using pH meter and paper.	**1**	**3**
7	Identify Radicals: Cu^{2+}, Al^{3+}, Fe^{2+}, Fe^{3+}, Ca^{2+}, Zn^{2+}, NO_3^-, Cl^-, SO_4^{2--}, CO_3^{2-}	**3**	**3**
8	Identify salt: ($Cu(NO_3)_2$, $AlCl_3$, $FeSO_4$, $FeCl_3$, $CaCO_3$, $ZnCl_2$)	**4**	**4**
9	Perform Preparation of vinegar from Acetic acid	**1**	**2**
10	Perform Preparation of Sanitizer using Isopropyl Alcohol	**1**	**3**
	Total	**16**	**25**

Necessary Resources (Apparatus and equipment's):

Sl	Item Name	Quantity
01	Test tube, Test tube holder, Test tube Stand, Test tube brush, Bunsen burner , Cork borer, Spatula, Droper, Clamp	
02	Beaker, Conical flask, Round bottomed flask, Volumetric flask, Distillation flask , Pneumatic trough	
03	Porcelain basin, Crucible, Mortar and pastle	
04	Thistle funnel, Buchner funnel, Common funnel, Dropping funnel	
05	Woulfsbottle, Wash bottle, Reagent bottle,	
06	Retort, Gas gar, Gas chamber, War gauge, Watch glass, Capillary tube, Platinum wire, Copper wire,	

07	Tripod stand, Burette stand, Ring stand, Crucible tong, Gas generator/ Gas Cylinder	
08	Burette, Pipette, Measuring cylinder, Glass rod	
09	Digital balance, Analytical balance, Weight box, pH meter, pH paper, Litmus paper, Filter paper, Kipp's apparatus	
10	Safety glass, Gloves, Apron, Mask, Fire estighguser, First aid box	

Required Chemicals:

Sl	Item Name (Consumables Materials)	Quantity
01	Distilled water, Petrol, Grease etc	
02	Different type of acid : HCl, H_2SO_4, HNO_3, H_3PO_4, CH_3C00H etc.	
03	Different type of base such as NaOH, KOH, $Ca(OH)_2$, $Al(OH)_3$, NH_4OH, etc	
04	Different type of salt :[$Cu(NO_3)_2$, $AlCl_3$, $FeSO_4$, $FeCl_3$, $CaCO_3$, $ZnCl_2$, NH_4Cl etc]	
05	Different type of indicator	
06	Different type of reagent such as Potassium Ferro cyanide, Potassium iodide , Nessler's solution, Potassium pyroantimonate solution, Ammonium oxalate solution, etc	

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
01	Higher secondary chemistry	Dr. Sarozkantishinghahazari	Hasan book house
02	Higher secondary chemistry	Mahbub hasnlinkon	Akharpatro
03	Engineering chemistry	Uppal	Khanna publishers
04	Chemistry practical	Dr. Sarozkantishinghahazari	Hasan book house

Website References:

Sl	Web Link	Remarks
01	www. researchgate. net	

Prepared by:

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Subject Code	Subject Name	Period per Week		Credit
26111	CREATIVITY AND CONCEPT DEVELOPMENT	T	P	C
		1	3	2

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Rationale	The subject will enable the diploma Architects students to improve creativity in design education allows the student to gain different perspectives by enhancing his imagination and accumulation of knowledge. Concept and mind maps that are some of these methods guide students to think and explore. The student to establish an analysis–synthesis–evaluation relationship and improve his intellectual and visual perception abilities.
Learning Outcome (Theoretical)	**After undergoing the subject, students will be able to:** ▪ Associate Creativity in Architecture ▪ Interpret the Techniques for Creative Thinking & Creativity ▪ Explain Architectural Concepts. ▪ Explain Origami. ▪ Describe Anthropometry. ▪ Describe Composition in Architecture.
Learning Outcome (Practical)	**After undergoing the subject, students will be able to:** ▪ Prepare the Form Transformation. ▪ Construct Origami. ▪ Illustrate Metamorphosis. ▪ Prepare the Anthropometric data ▪ Prepare the Anthropometrics data. (Different working position.) ▪ Develop composition.

Detailed Syllabus (Theory)

Unit	Topics with Contents	Class (1 Period)	Final Marks
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 Environment for creativity. 1.8 Describe the effective management for creativity. 1.9 Mention the guidelines to encourage creativity.	**3**	**6**
2	**TECHNIQUES FOR CREATIVE THINKING** 2.1 Define Creative thinking. 2.2 Define brainstorming & cataloging. 2.3 Describe checklists & attribute list of Creative thinking. 2.4 Describe free association & forced relationship. 2.5 State Morphological analysis & Input-output technique of Creative thinking. 2.6 Explain Model for problem solving. 2.7 State creativity organization.	**2**	**6**
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.	**2**	**6**
4	**ORIGAMI** 4.1Define Origami. 4.2 Explain Technique and Materials for Origami. 4.3 Explain Types of Origami. 4.4 Explain Importance of Origami for Architecture Students.	**2**	**2**
5	**ANTHROPOMETRY** 4.1 State the meaning of anthropometric data. 4.2 Mention anthropometric data for the children. 4.3 Mentionanthropometric data for the Adults. 4.4 Mention the comparative dimension of different portion of a male and female body. 4.5 State the comparative dimension of different working position of a human body (male and female).	**3**	**4**

6	**COMPOSITION IN ARCHITECTURE** 6.1 Describe composition. 6.2 List Elements of composition. 6.3 State form, Shape, Size, Mass, color, and texture of composition. 6.4 Explain necessity of composition in Architectural design. 6.5 State 2- dimensional and 3- dimensional compositions. 6.6 Explain the role of color in composition. 6.7 State role of texture in composition. 6.8 State balance. 6.9 Describe classification of balance. 6.10 Explain the role of balance in Architectural design.	**4**	**6**
	Total	**16**	**30**

Detailed Syllabus (Practical)

Sl.	Experiment name with procedure	Class (3 Period)	Marks (Continuous)
1	**PERFORM FORM AND SHAPE 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 pyramid. 1.5 Make Different Shape of transformation. 1.6 Maintain the record of Performed of Job.	**2**	**2**
2	**PREPARER 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. 2.5 Maintain the record of Performed of Job.	**2**	**3**
3	**PREPARE METAMORPHOSIS OF BIRD AND INSECTS.** 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 Maintain the record of Performed of Job.	**2**	**3**
4	**PREPARE METAMORPHOSIS OF GEOMETRICAL OBJECTS.** 4.1 Make metamorphosis by Block. 4.2 Make metamorphosis by Cylinder. 4.3 Make metamorphosis by Prism. 4.4 Maintain the record of Performed of Job.	**1**	**2**
5	**PREPARE A SET OF THE ANTHROPOMETRIC DATA.** 5.1 Draw different standing dimension of male. 5.2 Draw different standing dimension of female. 5.3 Draw the various positions with dimension for the child.	**1**	**2**

	5.4 Maintain the record of Performed of Job.		
6	**PREPARE A SET OF THE ANTHROPOMETRICS DATA** FOR MALE**.** 6.1 Draw different dimension of working positions of a male. 6.2 Calculate the comparative dimension of different portion of a male in the context of Bangladesh. 6.3 Calculate the comparative dimension of different working position of a male in the context of Bangladesh. 6.4 Maintain the record of Performed of Job.	**2**	**3**
7	**PREPARE A SET OF THE ANTHROPOMETRICS DATA FOR FEMALE.** 7.1 Draw different dimension of working positions of the female. 7.2 Calculate the comparative dimension of different portion of a female in the context of Bangladesh. 7.3 Calculate the comparative dimension of different working position of a female in the context of Bangladesh. 7.4 Maintain the record of Performed of Job.	**2**	**3**
8	**MAKE COMPOSITION WITH DIFFERENT ELEMENTS.** 8.1 Make composition with dots. 8.2 Make composition with circle. 8.3 Make composition with square. 8.4 Make composition with rectangle. 8.5 Make composition with other geometrical shape. 8.6 Maintain the record of Performed of Job.	**2**	**3**
9	**MAKE COMPOSITION WITH 3-DIMENSIONAL ELEMENTS.** 9.1 Make a composition with 3-dimensional cubes. 9.2 Make a composition with 3-dimensional prisms. 9.3 Make a composition with 3-dimensional pyramids. 9.4 Make a composition with 3-dimensional cylinders. 9.5 Make a 3-dimensional composition with different elements applying color and texture. 9.6 Display a composition on a selected space. 9.7 Maintain the record of Performed of Job.	**2**	**4**
	Total	**16**	**25**

Necessary Resources (Tools, equipment's and Machinery):

Sl	Item Name	Quantity
01	Drawing sheet (Size A2)	3 reems
02	Poster Color (12 nos set, different color)	45 set
03	Origami Paper (Size A4,A3,different color)	10 reems
04	Chopstick, Toothpick	20 packets (per packet 100 sticks)
05	Composite materials (foam ball, ice-cream sticks, foam paper, silk paper)	

06	Model making board (different color), Size 20"x30"	2 reems
07	Transparent sheet (Blue, white and green) ,Size A4,A3	2 reems
08	Wooden Pencil (HB,B,2B,4B)	16 Dozens
09	Eraser (soft)	4 Dozens
10	Wooden glue (259 gm pot)	4 Dozens
11	Paper Tape (3/4")	4 Dozens
12	Cloth Duster (18"x24")	48 pcs
13	Anti cutter (300 sl)	48 pcs
14	Steel Scale (12")	48 pcs
15	Color bush(2,3,5 no.)	12 Dozens

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
01	Design in Architecture	Geoffrey Broadbent.	
02	Conceptual Blockbusting	J. L. Adams	
03	Top International Architects - Design Concepts in Architecture (4 volumes, English)	Jihad Awad	
04	Creativity and Concept Design	Robin Roy	
05	The Architecture concept.	James Tait	
06	The Thames and Hudson Manual of Rendering with Pen and Ink	Gill, Robert W	
07	Architectural Composition	Rob KRIER	**Academy edition**

Website References:

Sl	Web Link	Remarks
01	https://fractory.com/product-design-concept-generation/	
02	https://en.wikipedia.org/wiki/Origami	
03	https://robkrier.de/architectural-composition.php#page-001	
04	https://pdfcoffee.com/how-to-develop-architectural-concepts-1pdf-pdf-free.html	

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Subject Code	Subject Name	Period per Week		Credit
26711	BASIC ELECTRICITY	T	P	C
		3	3	4

Rationale	Diploma in Engineering Level students are required to acquire the knowledge and skill on concept of nature of electricity, electrical house wiring, Earthing and Electrical wiring tests. By the completion of this course student will be able to perform different types of joints and splices, Fittings of electrical installation works such as lamp circuit, Tube light circuit and Calling bell circuit. As such the knowledge of basic electricity the pre-requisite for these fields for effective discharge of their duties. These necessities the introduction of Electrical Engineering subject in the curriculum of Diploma in Engineering level. The subject covers only such topics which will enable the diploma engineers to identify and classify the different types of Hand tools used in electrical house wiring, Different types of switches, Lamps, Electrical Fittings and fixtures Conductor, Insulator, Semiconductor, Wires and cables, Joint and splices. They will be able to verify and apply Ohms law, Joules law, Series and Parallel circuit. Have been given more emphasis on practical aspect rather than theory in teaching learning approach.
Learning Outcome (Theoretical)	**After Completing the subject, students will be able to:** ▪ Classify various types Materials used in electrical works ▪ Describe Capacitance, Inductance and the Laws of resistance ▪ State the Ohms law and Joules law ▪ Describe Series, parallel and combined circuit ▪ Acquire the knowledge of joints and splices ▪ Achieve knowledge of Controlling and protective devices ▪ Acquaint the knowledge of House wiring
Learning Outcome (Practical)	**After undergoing the subject, students will be able to:** ▪ Identify various types hand tools and Materials used in electrical works ▪ Verify the Ohms law and Joules law ▪ Verify the characteristic of Series and parallel circuit ▪ Identify the types of wires and cables ▪ Perform different types of joints and splices ▪ Operate Controlling and protective devices ▪ Perform House wiring (Channel wiring)

Detailed Syllabus (Theory)

Unit	Topics with contents	Class (1Period)	Final Marks
1.	**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 Mention units of current, voltage and resistance.	2	**3**
2	**CONDUCTOR, SEMI-CONDUCTOR AND INSULATOR.** 2.1 Define conductor, semiconductor and insulator. 2.2 Explain the conductor, semiconductor, and insulator according to electron theory. 2.3 List different types of conductors, semiconductors and insulators. 2.4 Describe the factors affecting the resistance of a conductor. 2.5 State laws of resistance. 2.6 Prove the relation, $R= \rho \frac{L}{A}$ 2.7 Explain the meaning of resistivity 2.8 Mention the unit of resistivity. 2.9 Solve problems relating to laws of resistance.	**3**	**6**
3	**CAPACITORS AND INDUCTORS.** 3.1 Define capacitor and capacitance. 3.2 Mention the unit of capacitance. 3.3 Name the different types of capacitors. 3.4 Define inductor and inductance. 3.5 Mention the unit of inductance 3.6 Classify the different types of inductors. 3.7 List the uses of capacitor and inductor. 3.8 Determine the equivalent capacitance of a number of capacitors connected in series and parallel. 3.9 Explain the energy storage in a capacitor. 3.10 Solve the problems relating to capacitors.	**3**	**8**
4	**OHM'S LAW & JOULE'S LAW** 4.1 State Ohm's law. 4.2 Explain the limitations of Ohm's law 4.3 Deduce the relation among current, voltage and resistance. 4.4 Solve problems relating to Ohm's law. 4.5 Describe the heating effect of electricity. 4.6 Explain Joule's law regarding heat produce in electric circuit. 4.7 Describe mechanical equivalent of heat (J) 4.8 Solve problems relating to Joule's law.	**3**	**9**

5	**ELECTRICAL CIRCUIT** **5.1** Define electric circuit. 5.2 State the elements of electric circuit 5.3 Classify electric circuits. 5.4 Define series circuit, parallel circuit and combined circuit. 5.5 Describe the characteristics of series circuit and parallel circuit. 5.6 Calculate the equivalent resistance of series circuit, parallel circuit and combined circuit. 5.7 Solve problems relating to series, parallel and combined circuit.	**6**	**10**
6	**ELECTRICAL POWER AND ENERGY** 6.1 Define electrical power and energy. 5.2 State the unit of electrical power and energy. 5.3 Show the relation between electrical power and energy. 5.4 List the name of instruments for measuring electrical power and energy. 5.5 Draw the connection diagram of wattmeter and energy meter in an electric circuit. 5.6 Solve problems relating to electrical power and energy.	**3**	**8**
7	**ELECTRICAL WIRES, CABLES, JOINT AND SPLICES** 7.1 Define electrical wires and cables. 7.2 Distinguish between wire and cable. 7.3 Describe the construction and uses of PVC, VIR, TRS or CTS and flexible wires 7.4 Describe the procedure of measuring the size of wires and cables by wire gauge. 7.5 Describe the current carrying capacity of a wire. 7.6 Define the meaning of joints and splices. 7.7 State the five steps of making a joint. 7.8 Explain the procedure to make a pig tail joint, western union joint, Britannia joint, duplex joint, tap joint and simple splice. 7.9 List uses of joints.	**3**	**6**
8	**METHODS OF HOUSE WIRING** 8.1 State the meaning of wiring. 8.2 List the types of wiring. 8.3 State the procedure for channel wiring, surface conduit wring and concealed wiring. 8.4 State the types of wiring used in Residential building and Cinema Hall/Auditorium 8.5 State the types of wiring used in State the types of wiring used in Temporary Sed and Workshop	**4**	**8**

	8.6 List the name of fittings used in different types of electrical wiring. 8.7 Explain the different tests of electrical wiring such as Polarity test, Continuity test, short circuit test, Insulation resistance test and Earth test		
9	**ELECTRICAL CONTROLLING DEVICES.** 9.1 Define controlling device. 9.2 Mention different types of controlling device. 9.3 Describe the constructional features and uses of tumbler switch, iron clad switch, push button switch and gang switch. 9.4 Sketch the wiring diagram of one lamp controlled by one SPST switch and describe its uses. 9.5 Sketch the wiring diagram of one lamp controlled by two SPDT switches and describe its uses. 9.6 Draw the wiring diagram of a calling bell. 9.7 Draw the wiring diagram of a calling bell with more than one lamp controlled from more than one point. 9.8 Draw the wiring diagram of a fluorescent tube light circuit. 9.9 Illustrate the working principle of fluorescent tube light.	**2**	**4**
10	**ELECTRICAL PROTECTIVE DEVICES.** 10.1Define protective device. 10.2 List the different types of protective device. 10.3 List the different types of fuses used in house wiring. 10.4 Describe the construction and uses of renewable fuse. 10.5 Mention the different types of circuit breaker used in house wiring. 10.6 Describe safety procedure against electrical hazards. 10.7 List the performance of safety practices for electrical equipment, machines and accessories. 10.8 Explain the meaning and uses of SPST, SPDT, DPST, DPDT, TPST, Sliding switch, MCB and MCCB. 10.9 Describe the construction of MCB and its advantages.	**3**	**6**
11	**ELECTRICAL EARTHING** 11.1 Define earthing and mention the elements of earthing. 11.2 Explain the necessity of earthing. 11.3 List the different types of earthing. 11.4 List the value of earthing resistance in different conditions. 11.5 Discuss the factors to be considered in performing earthing. 11.6 Explain the working principles of pipe earthing with diagram. 11.7 Narrate the working principles of plate earthing with diagram. 11.8 Explain the working principles of sheet earthing with diagram. 11.9 Describe the working principles of rod earthing with diagram.	**4**	**5**
12	**MODERN ELECTRIC LAMPS**	**4**	**6**

	12.1 Explain the working principle of a fluorescent lamp describing the function of the choke coil and starter. 12.2 Describe constructional details of Sodium Vapor & Mercury Vapor lamps. 12.3 Explain working principle of a Compact Fluorescent lamp with circuit diagram. 12.4 Describe constructional details of a Compact Fluorescent lamp. 12.5 Explain working principle of a Light Emitting Diode (LED) lamp and LED tube light with circuit diagram. 12.6 Describe constructional details of LED lamp and LED tube light. 12.7 Explain working principle of Liquid Crystal Diode (LCD) lamp with circuit diagram. 12.8 Describe constructional details of LCD lamp. 12.9 Describe constructional details of a Cold Cathode Filament (CCF) lamp.		
13	**ELECTROMAGNETISM** 13.1 Describe magnetic field, magnetic lines of force and its properties. 13.2 Describe field intensity and magnetic flux density. 13.3 Distinguish between absolute permeability and relative permeability. 13.4 Describe the concept of magnetic effect of electrical current. 13.5 States Maxwell's cork screw rule and Fleming's left-hand rule. 13.6 Explain the force experienced in a current carrying conductor in a magnetic field. 13.7 Explain the work done by a moving conductor in a magnetic field 13.8. Explain the force between two parallel current carrying conductors.	**4**	**5**
14	**ELECTROMAGNETIC INDUCTION** 14.1 Define Faraday's laws of electromagnetic induction. 14.2 Describe the magnitude of dynamically induced emf and statically induced emf. 14.3 Solve problems relating to emf generation. 14.4 Define Lenz's law and Fleming's right-hand rule for determining the direction of induced emf and current. 14.5 Define self-induced emf and self-inductance. 14.6 Explain inductance of an iron cored inductor. 14.7 Define mutual inductance and co-efficient of coupling	**4**	**6**
	Total	**48**	**90**

Detailed Syllabus (Practical)

Sl.	Experiment name with procedure	Class (3Period)	Marks (Continuous)
1	**OBSERVE ELECTRICAL HAND TOOLS AND MEASURING INSTRUMENTS** 1.1 Identify hand tools used in electrical wiring. 1.2 Justify the function of the hand tools used in electrical wiring. 1.3 Draw neat sketches of hand tools used in electrical wiring. 1.4 Identify Voltmeters, Ammeters, Ohmmeter, Wattmeter, Energy meter, AVO meter and Frequency meter, Power factor meter, Lux meter. 1.5 Select & read the scale of given meters. 1.6 Connect correctly voltmeter, ammeter, wattmeter and energy meter to a given circuit. 1.7 Maintain the record of performed task.	**1**	**2**
2	**VERIFY 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 and calculations. 2.6 Maintain the record of performed task.	**1**	**2**
3	**VERIFY THE CHARACTERISTICS OF SERIES AND PARALLEL CIRCUITS.** 3.1 Draw the working circuit diagram. 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 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. 3.6 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 and total	**2**	**2**

	conductance is equal to the summation of branch conductance. 3.7 Maintain the record of performed task.		
4	**MEASURE THE POWER OF AN ELECTRIC LOAD.** 4.1 Sketch the necessary circuit diagram of an electrical circuit with electrical load, ammeter, voltmeter and wattmeter. 4.2 Prepare the circuit according to the circuit diagram using ammeter, voltmeter and wattmeter. 4.3 Record the power, measured by the wattmeter and verify the reading with that of calculated from ammeter and voltmeter. 4.4 Compare the measured data with that of calculated and rated power. 4.4 Maintain the record of performed task.	**1**	**2**
5	**MEASURE THE ENERGY CONSUMED IN AN ELECTRICAL LOAD.** 5.1 Sketch the necessary diagram of an electric circuit with wattmeter, energy meter and electrical load. 5.2 Prepare the circuit according to the circuit diagram user wattmeter and energy meter. 5.3 Record the energy measured by the energy meter and verify with that of calculated from wattmeter for a fixed time. 5.4 Maintain the record of performed task.	**1**	**2**
6	**MAKE A PIGTAIL JOINT, T-JOINT, DUPLEX JOINT, TAP JOINT AND SIMPLE SPLICE.** 6.1 Sketch a pigtail joint, t-joint, duplex joint, tap joint and simple splice. 6.2 Collect required tools, equipment and materials. 6.3 Perform skinning and scraping of two pieces of PVC cables and two pieces of simplex PVC cables. 6.4 Make the joints according to sketches. 6.5 Maintain the record of performed task.	**1**	**2**
7	**PERFORM WIRING CIRCUIT OF ONE LAMP CONTROLLED FROM ONE POINT** 7.1 Sketch a working diagram of one lamp controlled by one switch. 7.2 Collect required tools, equipment and materials. 7'.3 Complete the wiring circuit using required materials and equipment on wiring board. 7.4 Test the connection of circuit by providing proper supply. 7.5 Maintain the record of performed task.	**1**	**2**
8	**PERFORM WIRING CIRCUIT ONE LAMP CONTROLLED FROM TWO POINTS.**	**1**	**2**

	8.1Sketch a working circuit of one lamp controlled by two SPDT tumbler switches. 8.2 Collect required tools, equipment and materials. 8.3Make the wiring circuit using required materials and equipment on a wiring board. 8.4 Test the connection of circuit by providing proper supply. 8.5 Maintain the record of performed task.		
9	**PERFORM THE WIRING CIRCUIT OF ONE BELL WITH TWO INDICATING LAMPS CONTROLLED FROM TWO POINTS** 9.1 Sketch a working diagram of one bell with two indicating lamps controlled by two push button switches. 9.2 Collect required tools, equipment and materials. 9.3 Make the wiring circuit using required materials and equipment on wiring board. 9.4 Test the connection of circuit by providing proper supply. 9.5 Maintain the record of performed task.	**2**	**2**
10	**PERFORM THE WIRING CIRCUIT OF A FLUORESCENT TUBE LIGHT.** 1O.1Sketch a working diagram of a fluorescent tube light circuit. 10.2 Collect required tools, equipment and materials. 10.3 Make the connection of a fluorescent tube light circuit using required materials and equipment. 10.4 Test the connection of the circuit by providing supply. 10.5 Maintain the record of performed task.	**2**	**2**
11	**PERFORM THE CHANNEL WIRING CIRCUIT OF ONE LAMP, ONE TUBE AND ONE FAN WITH REGULATOR INCLUDING ENERGY METER LIGHT.** 11.1Sketch a circuit diagram of one lamp, one tube light and one fan with regulator including energy meter light. 11.2 Sketch a working diagram on the working board 11.3 Collect necessary tool, equipment and materials. 11.4Make the connection according to the circuit diagram. 11.5 Set Channel, fittings and Fixture on the working board 11.6 Test the connection of the circuit by providing supply. 11.6 Maintain the record of performed task.	**3**	**4**
	Total	**16**	**25**

Necessary Resources (Tools, equipment's and Machinery):

Sl. No.	Item Name	Quantity
01	Screw drivers, Neon tester, Pliers, Chisels, Hammer, Mallet, Hack saw, Hand saw, Soldering Iron, Electrician Knife, Wire strippers, Poker, Plumb bob,	Each item 25 no's
02	Ammeter, Voltmeter, Ohm meter, AVO meter, Wattmeter, Energy meter, Frequency meter, Power factor meter, Lux meter, Megger	Each item 15 no's
03	Resistor, Inductor, Capacitor	Each item 50 no's
04	Different types of Wires and Cables (1.0 to 3.5rm	5 coils of different sizes
05	Switches (SPST, SPDT, SPTT, DPST, DPDT, DPTS, TPST, TPDT, TPTT, Tumbler switch, Push buttom switch, Piano switch, Gang switch, two pin socket, Tree pin socket, Combined switch and socket, two pin plug, Tree pin Plug, Adaptor,	Each item 10 no's
06	Incandescent Lamp, Fluorescent lamp, Mercury lamp, Vapor lamp, LED, LCD, LED tube light, Hydrogen lamp, Halogen lamp	Each item 25 no's
07	Calling bell, Choke coil, Starter	Each item 25 no's
08	Batten holder, Pendent holder, Bracket holder, Tube light holder set	Each item 25 no's

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
01	A text book of Electrical Technology	B. L. Theraja	S.Chand, 2021
02	Basic Electricity	Charles W. Ryan	S.Chand2021
03	Basic Electrical theory and Practice	E. B. Babler	S.Chand, 2020
04	Solved Examples in Electrical Calculation	D. K. Sharma	S.Chand2021
05	Introduction to Electrical Engineering	V.K. Mehta	S.Chand2021

Website References:

Sl	Web Link	Remarks
01	http//www.electricalengineering.org	
02	http//www.electrical-installation.org	
03	http//www.eetiimes.eu	
04	http//www.interestingengineering .com	
05	http//www.electrical-engineering-portal.com	
06	http//www.electrical4u.com	