BANGLADESH TECHNICAL EDUCATION BOARD

Agargaon, Sher-E-Bangla Nagar

Dhaka-1207.

4-YEAR DIPLOMA IN ENGINEERING CURRICULUM
COURSE STRUCTURE & SYLLABUS
(PROBIDHAN-2022)

SURVEYING TECHNOLOGY
TECHNOLOGY CODE: (78)

2nd SEMESTER
(Effective from 2022-2023 Academic Sessions)

DIPLOMA IN ENGINEERING CURRICULUM

COURSE STRUCTURE

(PROBIDHAN-2022)

TECHNOLOGY NAME: SURVEYING TECHNOLOGY (78)

(2nd SEMESTER)

Sl	Subject		Period		Credit	Marks Distribution						
						Theory Assessment			Practical Assessment			Grand Total
	Code	Name	Theory	Practical		Continuous	Final	Total	Continuous	Final	Total	
1	25721	Bangla -II	2	-	2	40	60	100	-	-	-	100
2	25722	English -II	2	-	2	40	60	100	-	-	-	100
3	25812	Physical Education & Life skills Development	-	3	1	-	-	-	25	25	50	50
4	25921	Mathematics-II	3	3	4	60	90	150	25	25	50	200
5	25922	Physics -II	3	3	4	60	90	150	25	25	50	200
6	28511	Computer Office Application	-	6	2	-	-	-	50	50	100	100
7	26811	Basic Electronics	2	3	3	40	60	100	25	25	50	150
8	27821	Basic Surveying	2	3	3	40	60	100	25	25	50	150
Total			**16**	**15**	**21**	**320**	**480**	**800**	**125**	**125**	**250**	**1,050**

বিষয় কোড	বিষয়ের নাম	টি	পি	সি
২৫৭২১	বাংলা-০২	২	০	২

উদ্দেশ্য:

বাংলা ব্যাকরণ অংশে সকল ডিপ্লোমা পর্যায়ের শিক্ষার্থীদের মধ্যে ব্যাকরণ ও ভাষা দক্ষতা বৃদ্ধির সাথে দেশপ্রেম ও মূল্যবোধকে উজ্জীবিত করবে। পঠনে ও লেখনিতে শিক্ষার্থীদের দক্ষতা অর্জন, সৃজনশীল প্রতিভার বিকাশ সাধন, সাহিত্য সংস্কৃতির প্রতি আগ্রহ সৃষ্টি এবং দৃষ্টিভঙ্গির কাঙ্খিত পরিবর্তন আনয়নে সম্যক ধারণা পাবে।

শিখনফল:

- ব্যবহারিক জীবনে ভাষা শিক্ষার প্রয়োজনীয়তার বিভিন্ন দিক বর্ণনা করতে পারবে।
- ব্যাকরণের সংজ্ঞা, পরিচয়, বিষয়বস্তু ও পরিধি সম্পর্কে অবহিত হবে।
- বাংলা সাহিত্যের যুগবিভাগ সম্পর্কে ধারণা লাভ।
- যতিচিহ্নের বহুমুখী ও ব্যাপক ব্যবহার জেনে তা প্রয়োগ করতে পারবে।
- প্রমিত বাংলা বানানের নিয়মের আলোকে বাংলা শব্দ ও বাক্য শুদ্ধভাবে প্রয়োগ করতে পারবে।
- প্রশাসনিক, দাপ্তরিক ও বিভিন্ন শিক্ষা সংশ্লিষ্ট প্রয়োজনীয় শব্দ ও পরিভাষা ব্যবহার করতে পারবে।
- চিঠিপত্র, চাকরির দরখাস্ত, প্রতিবেদন, মুঠোফোন ও ই-মেইলে যোগাযোগের জন্য বাংলা ভাষায় বার্তা ও চিঠি লিখতে পারবে।
- পাঠ্যসূচিভুক্ত এবং পাঠ্য বহির্ভূত ভাষা-সাহিত্য পাঠ করে নিজের অনুভূতি প্রকাশ করতে ও লিখতে পারবে।

	ক্লাস	নম্বর
০১। বাংলা ব্যাকরণ ও ব্যাকরণ পাঠের গুরুত্ব।	০৩	০৩
১.১ বিষয়বস্তু ও পরিধি।		
১.২ ব্যাকরণ পাঠের গুরুত্ব ও প্রয়োজনীয়তা।		
০২। বাংলা ভাষা	০৩	০৫
২.১ ভাষার সংজ্ঞা, উৎপত্তি ও ক্রমবিকাশ।		
২.২ বাংলা সাহিত্যের যুগবিভাগ।		
২.৩ বাংলা ভাষার রূপ ও রীতি।		
০৩। বাংলা ধ্বনিতত্ত্ব	০৩	১০
৩.১ ধ্বনি ও বর্ণ, উচ্চারণ স্থান ও উচ্চারণ প্রকৃতি।		
৩.২ বাংলা একাডেমি কর্তৃক প্রমিত বাংলা বানানের নিয়ম।		
৩.৩ ণ-ত্ব বিধান ও ষ-ত্ব বিধান।		
০৪। রূপতত্ত্ব	০৩	০৯
৪.১ শব্দ, শব্দের শ্রেণিবিভাগ (সংজ্ঞা, উৎপত্তি, গঠন ও অর্থ অনুযায়ী)।		
৪.২ সমার্থক শব্দ, বিপরীত শব্দ, সমোচ্চারিত ভিন্নার্থক শব্দ ও পারিভাষিক শব্দ।		
০৫। বাক্যতত্ত্ব	০৩	০৫
৫.১ বাক্য গঠন রীতি ও বাক্য প্রকরণ।		
৫.২ বাক্যান্তর।		
৫.৩ যতিচিহ্ন।		
০৬। বাক্য সংকোচন, বাগধারা, প্রবাদ প্রবচন	০৩	০৫
৬.১ বাক্য সংকোচন।		

৬.২ বাগধারা।
৬.৩ প্রবাদ-প্রবচন।

০৭। বিরচন (ভাবসম্প্রসারণ, সারাংশ/সারমর্ম) ০৩ ০৫

৭.১ ভাবসম্প্রসারণ।
৭.২ সারাংশ/সারমর্ম।

০৮। ভাষণ ও প্রতিবেদন ০৩ ০৬

৮.১ জাতীয় দিবস বিষয়ক।
৮.২ প্রাতিষ্ঠানিক ও সংবাদপত্রে প্রকাশের উপযোগী।

০৯। পত্র লিখন ০৪ ০৬

৯.১ আবেদনপত্র ।
৯.২ যোগদানপত্র ও স্মারকলিপি ।
৯.৩ সংবাদপত্রে প্রকাশ ও যোগাযোগের জন্য ই-মেইল, ক্ষুদেবার্তা ।

১০। প্রবন্ধ রচনা ০৪ ০৬

১০.১ দেশপ্রেম, মুক্তিযুদ্ধ, স্মরণীয় দিবস ।
১০.২ প্রকৃতি, শিক্ষা, খেলাধুলা ।
১০.৩ বিজ্ঞান, জীবনী ।

সহায়ক গ্রন্থ:

০১। উচ্চতর স্বনির্ভর বিশুদ্ধ ভাষা শিক্ষা - ড. হায়াৎ মামুদ

০২। ভাষা সৌরভ
ব্যাকরণ ও রচনা - মাহবুবুল আলম

০৩। বাংলা লেখার নিয়ম কানুন - হায়াৎ মামুদ

০৪। প্রমিত বাংলা বানানের নিয়ম - বাংলা একাডেমি

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

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

Subject Code	Subject Name	Period per Week		Credit
25722	English-II	T	P	C
		2	0	2

Rationale	The main objective of this syllabus is to provide ample opportunities for the students to use English for a variety of purposes in different situations. Each chapter is based on a theme that contains reading text and a range of tasks and activities, designed to enable the students to practice the different skills, sometimes individually and sometimes in pairs or groups. This syllabus has integrated grammar items into the activities allowing grammar to assume 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 • Acquire grammatical accuracy • Develop creative writing • Communicate effectively

Unit Description:

Unit	Topics with Contents/Lesson	Skills	Class (1 Period)	Final Marks
1. People or Institutions Making History	**NELSON MANDELA, FROM APARTHEID FIGHTER TO PRESIDENT** 1.1. Talk about the world famous personality. 1.2. Know some renowned. speeches of Nelson Mandela. 1.3. Understand the meaning of confusing words. 1.4. Develop reading, speaking & listening skills. **Listening Practice (Only for contentious assessment)** **Follow the link(please play 2/3 minutes customized video):** https://www.youtube.com/watch?v=w42rHdvFpVM	Develop Reading, Writing Speaking & Listening skills	**1**	**15**

Unit	Topics with Contents/Lesson	Skills	Class (1 Period)	Final Marks
2. Human Relationships	**ETIQUETTE AND MANNERS** 2.1. Define etiquette's and manners. 2.2. Know how to behave with elders and visitors. 2.3. Learn the sources of learning etiquettes and manners. 2.4. Interpret and critically appreciate stories, short plays. https://www.youtube.com/watch?v=jPj0Z2lb8jg	Enhance Reading, Writing Speaking & Listening skills	**1**	
3. Adolescence	**ADOLESCENCE AND SOME (RELATED) PROBLEMS IN BANGLADESH** 3.1. Define adolescence. 3.2. Know the adolescence related problems in Bangladesh. 3.3.Interpret and appreciate the information critically. https://www.youtube.com/watch?v=S05PBOIdSeE	Develop Reading, Writing Speaking & Listening skills	**1**	
4. Human Rights	**AMERIGO, A STREET CHILD** 4.1. Think about the life of street children. 4.2. Know their activities. 4.3. Describe the problems that they have in their lives. 4.4. Listen for specific information on radio, television and other announcements.	Develop Reading, Writing Speaking skills	**1**	
5. Diaspora	**WHAT IS DIASPORA?** 5.1.1. Learn new vocabulary. 5.1.2. Talk about simple present to express state. 5.1.3. Identify complex and compound sentences. 5.1.4. Describe people, places and different cultures.	Strengthen Reading, Writing Speaking & Listening skills	**1**	

Unit	Topics with Contents/Lesson	Skills	Class (1 Period)	Final Marks
	https://www.youtube.com/watch?v=awPKGBzCcXY			
	'BANGLATOWN' IN EAST LONDON 5.2.1. Learn narrative sentences. 5.2.2. Make casual connection, express attitudes. 5.2.3. Learn new words and vocabulary. 5.2.4. Describe people, places and different cultures.	Develop Reading, Writing Speaking skills	**1**	
6. Peace and Conflict	**"THE OLD MAN AT THE BRIDGE" BY ERNEST HEMINGWAY** 6.1. Learn synonyms. 6.2. Apprehend text. 6.3. develop higher-order thinking ability. 6.4. Read, tell and analyze stories.	Develop Reading, Writing Speaking skills	**1**	
7. Environment and Nature	**THREATS TO TIGERS OF MANGROVE FOREST** 7.1. Prepare report on particular matter. 7.2. Write slogans for posters. 7.3. Participate in conversation, discussions and debates.	Develop Reading, Writing Speaking skills	**1**	
8. Myths and Literature	**THE LEGEND OF GAZI** 8.1. Learn myth. 8.2. Learn simple past tense. 8.3. Read, tell and analyze stories.	Enhance Reading, Writing Speaking skills	**1**	
9. Path to Higher Education	**21ST CENTURY HIGHER EDUCATION** 9.1. Know 21st century education. 9.2. Learn the factors that. Determine the nature of higher education. 9.3. Know about the entrepreneurial thinking skills. 9.4. Ask for and give opinion/suggestions.	Develop Reading, Writing Speaking & Listening skills	**1**	

Unit	Topics with Contents/Lesson	Skills	Class (1 Period)	Final Marks
10.Grammar	**USE THE RIGHT FORM OF VERBS** 10.1.1. Use the verbs in correct form maintain the tense of the verb.	Learn grammar as sub-skill	**3**	**15**
	CHANGING VOICE FROM ACTIVE TO PASSIVE & VISE-VERSA 10.2.1. Change active voice to passive and vise-versa. 10.2.2. Use voice in sentence.	Learn grammar as sub-skill	**3**	
	APPROPRIATE PREPOSITIONS 10.3.1. Learn the appropriate usage of preposition. 10.3.2. Apply the appropriate Prepositions in sentence.	Learn grammar as sub-skill	**1**	
	COMPLETING SENTENCE 10.4.1. Gather knowledge of sentence structure. 10.4.2. Develop writing skills.	Learn grammar as sub-skill	**2**	
	PUNCTUATION AND CAPITALIZATION 10.5.1.Use punctuation's and capital letters appropriately in the Sentence.	Learn grammar as sub-skill	**1**	
	SENTENCE STRUCTURE 10.6.1. Analyze different type's grammatical terms. 10.6.2. Apply sentence correctly.	Learn grammar as sub-skill	**3**	
	PHRASE 10.7.1. Use phrases in conversation.	Learn grammar as sub-skill	**1**	
11.Composition	**PROCESS WRITING** 11.1.1.Use writing elements(prewriting, drafting, Revising and editing).	Strengthen Writing & Speaking skills	**1**	**30**
	DESCRIPTIVE, NARRATIVE AND CREATIVE WRITING (SUCH AS TELLING / COMPLETING STORIES) 11.2.1. Develop speaking fluency. Develop creative writing ability.	Develop Writing & Speaking skills	**1**	

Unit	Topics with Contents/Lesson	Skills	Class (1 Period)	Final Marks
	DIALOGUE WRITING	Develop Speaking & Writing skills	**1**	
	POSTER 11.3.1. Prepare poster. 10.10.2. Describe poster.	Extend creative thinking ability, Develop presentation and speaking skills	**1**	
	REPORT WRITING 11.4.1. Write reports on newspaper and problem identification.	Develop Reading & Writing skills	**2**	
	ACADEMIC WRITING 11.5.1.Analyze graphs and charts Summary writing. 10.12.2. Extend analytical skills.	Enhance Reading & Writing ability	**2**	
		Total	**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	https://www.youtube.com/watch?v=w42rHdvFpVM	
02	https://www.youtube.com/watch?v=jPj0Z2lb8jg	
03	https://www.youtube.com/watch?v=S05PBOIdSeE	
04	https://www.youtube.com/watch?v=awPKGBzCcXY	

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: Unseen Comprehension: (No text will be borrowed from the seen comprehension given in the text book, but the given assessment criterion can be followed. Texts may be taken from contemporary journals)**

Skills	Total Marks	Test Items	Notes
Listening	**06**	**MCQ, Gap filling, Taking Notes**	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, books, games and sports, movie/TV show, recent events and incidents etc.	Five to ten sentences used coherently with acceptable English with understandable pronunciation

2. **Grammar Test Items:**
   - Gap filling activities without clues
   - Cloze test without clues
   - Using preposition in sentence
   - Use of punctuation and capitalization
   - Making sentence with given structure
   - Making sentence with phrase
3. **Composition Test Items:**
   - Writing process
   - Completing an incomplete stories
   - 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

DIPLOMA IN ENGINEERING
DETAILED SYLLABUS
PROBIDHAN-2022

Subject Code	Subject Name	Period per Week		
		T	P	C
25812	PHYSICAL EDUCATION & LIFE SKILLS DEVELOPMENT	0	3	1

Rationale	To enhances body fitness by regular exercise that promotes strong muscles and bones. It will help students to develop as patriotic citizen by acquiring knowledge about liberation war and different national days. It will also increase the unity, patience, obedience, discipline and punctuality of students through regular physical exercise. Student will be able to acquaint with the common games, sports and make aware of first aid procedure and develop life skill.
Learning Outcome	**After undergoing the subject, students will be able to:** ➢ Perform daily assemble & National Anthem in the right way. ➢ Apply different technique of exercise for developing body fitness. ➢ Identify the various kinds of physical exercise and practice properly. ➢ Select correct equipment of exercise and use them for particular physical Development.

Unit Description:

Unit	Experiment Name & Procedure	Class (3 Period)	Mark (Continuous)
1	**PERFORM ASSEMBLY** 1.1 Lifting National Flag according to Rules of measurement. 1.2 Perform Line, File and Squad Drill. 1.3 Perform assembly. 1.4 Recite national anthem. 1.5 Recite National anthem in music.	**1**	**2**
2	**PERFORM WARM-UP WITH PICTORIAL** 2.1 Perform Spot running (Slow, Medium & Fast), Neck rotation and Hand rotation of general Warm-up. 2.2 Perform Side twisting, Toe touching, Hip rotation, Ankle twisting, sit up and Upper body bending (Front & Back) of general Warm-up. 2.3 Perform Legs raising one by one, Leg raising in slanting position, Knee bending and nose touching of Specific warm up. 2.4 Perform Heels rising, toes touching (standing and laying position), Hand stretch breathing (Tad asana, Horizontal, Vertical) of Specific warm up. 2.5 Perform Hand rising, Side twisting, Front and Back bending, Front curl of Mass physical Exercise. 2.6 Perform Straight arm curl two hand, Hands rising overhead and Push up of Mass physical Exercise.	**2**	**2**
3	**PERFORM YOGA** 3.1 Perform Dhyanasan, Shabasan, Padmasan, Gomukhasan, Sharbangasan, Shashangasan, Shirshan. 3.2 Perfrom Shasthyasan, Halasan, Matshasan, Paban Muktasan, Ustrasan. 3.3 Perfrom Prana and Pranyama, Nadisuddhi Pranayma, cooling pranaymas(Sitali pranayama, Sitkari pramayama, Sadanta pranayama),Ujjayi Pranayama.	**1**	**2**

4	**DEVELOP MUSCLE** 4.1 Practice Dumbbell Front curl, Hand sidewise, stretches, Arms raising overhead. 4.2 Practice Front press, Leg press and owing motion by using Barbell. 4.3 Practice Straight way climbing, Leg rising climbing of Rope climbing. 4.4 Practice Chinning the bar with front grip, Chinning the bar with wide back grip by using Horizontal bar. 4.5 Practice Slow Medium and Fast running by using Trade Mill. 4.6 Practice Sit up by using Sit up bench. 4.7 Perform Push-up with Push-up Bar. 4.8 Perform Dips behind the back with Flat Bench or Iron Stolls.	**1**	**2**
5	**PERFORM GAMES AND SPORTS** 5.1 Perform Kabadi 5.2 Perform Football 5.3 Perform Cricket 5.4 Perform Volleyball 5.5 Perform Badminton 5.6 Perform Athletics 5.7 Perform Swimming.	**1**	**3**
6	**PRACTICE SPORTS SCIENCE** 6.1 Demonstrate Exercise physiology 6.2 Identify Function of muscles. 6.3 Define work, Energy and power. 6.4 Mention Effect of exercise on Heart and Circulatory system. 6.5 Mention the Motor components for physical fitness. 6.6 Define Sports Biomechanics. 6.7 Define Sports Psychology. 6.8 Define Nutrition, Diet and Balanced diet. 6.9 Define Test, Measurement and Evaluation.	**1**	**2**
7	**CELEBRATE LIBERATION WAR AND NATIONAL DAYS OF BANGLADESH** 7.1 Liberation war of Bangladesh (Short Histor) 7.2 Celebrate Martyr"s Day (21 February). 7.3 Celebrate Birth day of Bangabandhu (17 March). 7.4 Celebrate Independence Day (26 March). 7.5 Celebrate Bangali New Year Day (1st Boishakh).	**1**	**2**

	7.6	Celebrate National Mourning Day (15 August).		
	7.7	Celebrate Victory Day (16 December).		
	7.8	Celebrate Martyred Intellectual Day (14 December).		
	7.9	Celebrate Others Historical Days selected by government.		
8	**MAINTAIN HUMAN RELATION AND PERFORM SOCIAL WORK** 8.1 Identify tools of First Aid. 8.2 Apply First Aid. 8.3 Identify Responsibilities of a First Aider. 8.4 Identify Different types of Equipment of First Aid. 8.5 Apply Muscle Cramp-Ice Application (Remedy). 8.6 Apply Dislocation-Ice Application (Remedy).		**2**	**2**
9	**ELASTICITY** 9.1 Maintain Family Relation 9.2 Maintain Relation with neighbor. 9.3 Provide Humanitarian Service. 9.4 Provide Service for handicapped (Intelligent, Physical, Social 9.5 Provide Service for Orphan/Patient 9.6 Perform Tree plantation 9.7 Perform Blood Donation, Campus Cleaning, recycling, Gardening, Green Campus of Community Service 9.8 Perform Rover Scout 9.9 Perform Sanitation and Pure Drinking Water 9.10 Perform Social Culture.		**3**	**4**
10	**CONTROL STRESS MANAGEMENT AND PRACTICE INTERVIEW TECHNIQUE** 10.1 Identify Habit to be a man of Humor 10.2 Keep Brain Always Cool. 10.3 Practice Positive Thinking. 10.4 Identify Factors that Determine our Attitude 10.5 Identify benefits of a Positive Attitude. 10.6 Identify Steps to Building a Positive Attitude. 10.7 Prepare Mentally and physically to face an interview 10.8 Select Dress for interview 10.9 Practice Introduce myself to the interview 10.10 Practice Coping Interview.		**3**	**4**
		Total	**16**	**25**

Necessary Resources (Tools, Equipment's, machinery)

SL	ITEM	QUANTITY
01	Football	
02	Volleyball	
03	Volleyball Net	
04	Badminton Racket	
05	Badminton Shuttle Cork	
06	Badminton Net	
07	Cricket Ball	
08	Cricket Bat	
09	Cricket Stamp	
10	Push-up Bar	
11	Adjustable Dumbbell	
12	Adjustable Barbell	
13	Thick Rope for Climbing with Hanging Set-up	
14	Horizontal Bar (Custom Made)	
15	Flat Bench/Tool with Foam Sit	
16	Sit-up Bench	

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
1.	Modern Yoga	Kany Lal Shah	
2.	Rules of games and Sports	Kazi abdul Alim	
3.	Yoga	Sobita Mallick	
4.	Iron Man	Nilmoni Dass	

Subject Code	Subject Name	Period per Week		Credit
25921	Mathematics-II	T	P	C
		3	3	4

Rationale	To be able to understand the functions. 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 a 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.
Learning Outcome (Theoretical)	To express partial fractions, understand geometric Express meaning of $\frac{dy}{dx}$ Develop differential of integral calculus. To understand vectors in Physics.
Learning Outcome (Practical)	**To able to solve problems related to limit, differentiation, integration and vector operations.**

Detailed Syllabus (Theory)

Unit	Topics with Contents	Class (1 Period)	Final Marks
1.	**ALGEBRA(Partial Fractions):** 1.1 Define proper and improper fractions. 1.2 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.	**3**	
2	**ALGEBRA (Exponential series):** 2.1 Define e. 2.2 Prove that e is finite and lies between 2 and 3. 2.3 Prove that $e^x = 1 + \frac{x}{L^1} + \frac{x^2}{L^2} + \frac{x^3}{L^3} + \frac{x^4}{L^4}$ ..... to ∞ 2.4 Solve problems of the followings types: i) $1 + \frac{1}{L^2} + \frac{1}{L^4} + \frac{1}{L^6}$ + ... to ∞ ii) $\frac{1}{L^2} + \frac{1+2}{L^3} + \frac{1+2+3}{L^4} + \frac{1+2+3+4}{L^5}$ + ... to ∞	**3**	
3	**ALGEBRA(Binomial theorem):** 3.1 State binomial expression. 3.2 Express the binomial theorem for positive, negative and fractional index. 3.3 Find the general term, middle term, equidistant term and term independent of x. 3.4 Solve the problems related to above.	**3**	

4	**DIFFERENTIAL CALCULAS (Functions and Graph of Functions):** 4.1 Define constant, variable, function, domain, range 4.2 Solve problems related to functions.	**3**	
5	**DIFFERENTIAL CALCULAS (Limit):** 5.1 Define limit and continuity of a function. 5.2 Distinguish between $\lim_{x \to a}$ f(x) and f(a). 5.3 Establish (i) $\lim_{x \to 0} \frac{\sin x}{x} = 1$ (ii) $\lim_{x \to 0} \frac{\tan x}{x} = 1$	**2**	
6	**DIFFERENTIAL CALCULAS (Differential co-efficient and differentiation):** 6.1 Prove that $\frac{dy}{dx} = \lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$ 6.2 Find the differential co-efficient of algebraic and trigonometrical functions from first principle.	**2**	
7	**DIFFERENTIAL CALCULAS (Apply the concept of differentiation):** 7.1 State the formulae for differentiation: (i) sum or difference (ii) product (iii) quotient (iv) function of function (v) logarithmic function 7.2 Find the differential co-efficient using the sum or difference formula, product formula and quotient formula. 7.3 Find the differential co-efficient function of function and logarithmic function.	**3**	
8	**DIFFERENTIAL CALCULAS (Geometrical meaning of $\frac{dy}{dx}$):** 8.1 Interpret $\frac{dy}{dx}$ geometrically. 8.2 Explain $\frac{dy}{dx}$ under different conditions. 8.3 Solve problems related to above.	**3**	
9	**DIFFERENTIAL CALCULAS (Use Leibnitz's theorem to solve the problems of successive differentiation):** 9.1 Find 2nd, 3rd and 4th derivatives of a function and hence find n-th derivatives. 9.2 Express Leibnitz's theorem. 9.3 Solve the problems of successive differentiation and Leibnitz's theorem.	**4**	
10	**DIFFERENTIAL CALCULAS (Partial differentiation):** 10.1 Define partial derivatives. 10.2 State formula for total differential. 10.3 State formulae for partial differentiation of implicit function and homogenous function. 10.4 State Euler's theorem on homogeneous function. 10.5 Solve the problems of partial derivatives.	**4**	

11	**INTEGRAL CALCULUS (Indefinite integrals):** 11.1 Explain the concept of integration and constant of integration. 11.2 State fundamental and standard integrals. 11.3 Write down formulae for: (i) Integration of algebraic sum. (ii) Integration of the product of a constant and a function. 11.4 Integrate by method of substitution, integrate by parts and by partial fractions. 11.5 Solve problems of indefinite integration.	**4**	
12	**INTEGRAL CALCULUS (Definite integrals):** 12.1 Explain definite integration. 12.2 Interpret geometrically the meaning of $\int_a^b f(x)\,dx$ 12.3 Solve problems of the following types: (i) $\int_0^{\pi/2} \cos^2 x\,dx$. (ii) $\int_0^1 \frac{(\sin^{-1}x)^2}{\sqrt{-x^2}}dx$	**4**	
13	**VECTOR(Vector algebra):** 13.1 Define scalar and vector. 13.2 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. 13.3 Prove the laws of vector algebra. 13.4 Resolve a vector in space along three mutually perpendicular directions. 13.5 Solve problems involving addition and subtraction of vectors.	**4**	
14	**VECTOR (Dot product of Vectors):** 14.1 Define dot product of Vectors. 14.2 Interpret dot product of vector geometrically. 14.3 Deduce the condition of parallelism and perpendicularity of two vectors. 14.4 Prove the distributive law of dot product of vector. 14.5 Explain the scalar triple product and vector triple product. 14.6 Solve problems involving dot product.	**4**	
15	**VECTOR (Cross product of vectors):** 15.1 Define cross product of vectors. 15.2 Interpret cross product of vector geometrically. 15.3 Deduce the condition of parallelism and perpendicularity of two vectors. 15.4 Prove the distributive law of cross product of vector. 15.5 Explain the scalar triple product and vector triple product. 15.6 Solve problems involving cross product.	**2**	
	Total	**48**	**90**

Detailed Syllabus (Practical)

Sl.	Experiment name with procedure	Class (3 Period)	Continuous Marks
1	**Practical:** Solve problems related to following Topics: 1. Partial fractions 2. Exponential series	**16**	**25**

	3. Functions 4. Limits 5. Differential co-efficient of Differentiation 6. Geometrical meaning of $\frac{dy}{dx}$ 7. partial differentiation 8. Indefinite Integral 9. Definite Integral 10. Vector dot & cross product		
	Total	**16**	**25**

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

Sl	Item Name	Quantity
01	**Scale**	**1 no**
02	**Geometric Box**	**1 no**

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
1.	Companian to basic Math's	G. V. Kumbhojkar	Phadke Prakashan
2.	Vector & Tensor Analysis	Murary R Spigel	Schaum's Outline Series
3.	Vector & Tensor Analysis	Md. Abu Yousuf	Mamun Brothers
4.	Co-ordinate Geometry & Vector Analysis	Rahman & Bhattacharjee	H.L. Bhattacharjee
5.	Higher Mathematics	Md. Nurul Islam	Akkhar Patra Prakashani
6.	Mathematics for Polytechnic Students	S. P Deshpande	Pune Vidyarthi Graha Prakashan
7.	Mathematics for Polytechnic Students (Volume I)	H. K. Das	S.Chand Prakashan
8.	Engg. Math's Vol I & II	Shri Shantinarayan	S.Chand & Comp
9.	Higher Mathematics	Dr. B M Ekramul Haque	Akshar Patra Prakashani
10.	Differential & Integral Calculus	Md. Abu Yousuf	Mamun Brothers
11.	Mathematics for Polytechnic Students (Volume I)	H. K. Das	S.Chand Prakashan
12.	Higher Mathematics	Ashim Kumar Saha	Akshar Patra Prakashani
13.	Higher Mathematics	S.U Ahamed & M A Jabbar	Alpha Prakashani

Website References:

Sl	Web Link: www.youtube.com	Remarks

Subject Code	Subject Name	Period per Week		Credit
25922	PHYSICS-II	T	P	C
		3	3	4

Rationale	Physics is the basic science for all engineering students as well as diploma engineering students. To develop a foundation in scientific principles and processes for the understanding and application of various technology. It will help the students to study in technical subject of diploma engineering students.
Learning Outcome (Theoretical)	After undergoing the subject students will be able: 1. Identify and classify various types of source of heat and temperature. Describe determination procedure temperature of materials and heat capacity of solid and liquid. 2. Describe second law of thermodynamics, heat engine. 3. Describe static electricity current electricity, magnetism, reflection of light. Refraction of light, photoelectric effect, structure of atom, Theory of relativity, semiconductor and electronics.
Learning Outcome (Practical)	After undergoing the subject (Practical) the students will be able to: 1. Compare the operation of common thermometers. 2. Determine the co-efficient of liner expansion of solid. 3. Measure the specific heat capacity of Bruss, steel etc. 4. Determine the latent heat of fusion of ice. 5. Verify the Ohm's Law. 6. Determine the Mechanical Equivalent of Heat by using Joule's Calorimeter. 7. Verify the laws of reflection. 8. Find out the focal length of a concave minor. 9. Determine the refractive index of a glass slab 10. Determine the angle of minimum deviation & refractive index of prism.

Detailed Syllabus (Theory)

Unit	Topics with Contents	Class (1 Period)	Final Marks
1.	**THERMOMETRY** 1.1 Define Heat & Temperature 1.2 Mention the unit of Heat & Temperature 1.3 Relate between different scale of Temperature 1.4 State the construction and graduation of mercury Thermometer 1.5 Define specific heat, thermal capacity and water equivalent 1.6 Mention units of specific heat, thermal capacity and water equivalent 1.7 Explain the principle of Calorimetry, 1.8 Discuss various kinds of specific latent heat	3	5
2	**EFFECT OF HEAT ON MATERIALS** 2.1 Define linear, superficial and cubical expansion of solid. 2.2 Define Coefficient of linear, superficial and cubical expansion of solid. 2.3 Relate between coefficient of linear, superficial and cubical	4	7

	expansion of solid. 2.4 Explain the methods of heat transfer by conduction, convection and Radiation with example. 2.5 Define Thermal conductivity and Coefficient of the thermal conductivity 2.6 List the factors which determine the quantity of heat (Q) flowing through a material and Show that the quantity of heat flowing through a material can be found from $Q = \frac{KA(\theta_H - \theta_C)t}{d}$ 2.7 State Stefan-Boltzman Law. 2.8 State Newton's law of cooling. 2.9 State wine's law. 310 Explain Greenhouse effect.		
3	**NATURE OF HEAT AND MECHANICAL EQUIVALENT** 3.1 Describe the caloric theory and kinetic theory of heat 3.2 State the limitation of the caloric theory of heat 3.3 Explain the mechanical equivalent of heat 3.4 Explain the first law of thermodynamics 3.5 Explain Isothermal and adiabatic change. 3.6 Describe Specific heat of a gas, Molar specific heat or molar heat capacity. 3.7 Relate between pressure and volume of a gas in adiabatic change i, e; PV^{γ}=const. 3.8 Relate between C_P and C_V for and ideal gas (C_P-C_V=R)	**4**	**6**
4	**SECOND LAW OF THERMODYNAMICS** 4.1 Explain Reversible process and irreversible process. 4.2 Explain 2nd law of thermodynamics 4.3 Define heat engine 4.4 Explain the principle of Carnot's cycle 4.5 Mention the formula thermal efficiency of a heat engine 4.6 Distinguish between internal combustion engine and external combustion engine. 4.7 Describe Entropy 4.8 Mention the significant of entropy 4.9 Describe Change of entropy in a reversible and irreversible process.	**4**	**6**
5	**ELECTROSTATIC** 5.1 Define Charge and Nature of charge. 5.2 State the Law of attraction and repulsion of charge. 5.3 Explain the Coulomb's Law 5.4 Define Electric field and electric intensity. 5.5 Define Electric Potential and Potential difference 5.6 Relate between electric intensity and electric Potential. 5.7 Define Capacitor and capacitance. 5.8 Explain Energy of Capacitor. 5.9 Mention the Uses of capacitor.	**3**	**5**
6	**MAGNETISM** 6.1 Describe Earth's Magnetism. 6.2 Define Magnet, Magnetic Substance, Non-magnetic Substance, Magnetic Pole 6.3 Define Magnetic field, Magnetic Intensity. 6.4 Explain Magnetic Permeability, Magnetic Susceptibility 6.5 Explain Declination & inclination, Horizontal Component of	**4**	**7**

	Earth's Magnetic field B_H or H of Magnetic Elements of Earth 6.6 Classify Magnetic Materials 6.7 Compare among Diamagnetic, Paramagnetic and Ferromagnetic substance. 6.8 Describe Magnetic Domain.		
7	**REFLECTION OF LIGHT** 7.1 Define mirror (plane and spherical), image (real and virtual) and magnification. 7.2 Classify mirror and image 7.3 Describe the reflection of light 7.4 State the laws of reflection of right 7.5 Describe the verification of laws of reflection 7.6 Define pole, principal axis, center of curvature, radius of curvature, Principal focus in case of concave and convex mirrors 7.7 Express the general equation of concave and Convex mirror 7.8 Mention the uses of mirror and identify of Mirror.	3	6
8	**REFRACTION OF LIGHT** 8.1 Describe refraction of light 8.2 State the laws of refraction 8.3 Express the verification of laws of refraction 8.4 Describe critical angle and total internal refract reflection. 8.5 Relate between refractive index, minimum deviation of angle of the prism. 8.6 Define lens 8.7 Mention the kinds of lens. 8.8 Define center of curvature, radius of Curvature, Principal axis, first and second Principal focus, Optical center. 8.9 Derive general equation of the lens (Concave and convex) 8.10 Explain power of lens and equivalent of lens.	3	8
9	**PHYSICAL OPTICS** 9.1 Describe Electromagnetic Wave 9.2 Define Poynting Vector 9.3 Describe Electromagnetic Spectrum 9.4 Mention the wavelength of visible light spectrum 9.5 Define Light Year 9.6 Define Wave and Wave front 9.7 State the Huygens' Principle 9.8 Define Coherent Source 9.9 Define Interference of Light, Diffraction of Light and Polarization of Light. 9.10 Classify Interference of Light, Diffraction of Light and Polarization of Light.	4	8
10	**PHOTO ELECTRIC EFFECT** 10.1 Describe Electrical conductivity of gases. 10.2 Describe Discharge tube. 10.3 Define Cathode ray and X- Ray 10.4 Mention the properties of Cathode ray and X- Ray 10.5 Mention the use of X- Ray 10.6 Discuss photo electric effect 10.7 Derive Einstein's photo electric equation.	4	6

11	**STRUCTURE OF ATOM** 11.1 Describe the concept of structure of Atom 11.2 Discuss Thomson of Atomic models 11.3 Discuss Rutherford model of Atomic models 11.4 Discuss Bohr model of Atomic models 11.5 Derive the equation of Radius and Energy by using Bohr model 11.6 Explain Energy level of Electron 11.7 Derive the frequency of Photon by using Hydrogen atom Spectrum	**3**	**6**
12	**NUCLEAR PHYSICS** 12.1 Explain radioactivity 12.2 Describe radioactive rays 12.3 Deduce Radioactive decay law 12.4 Define half- life and mean-life of radioactive atom 12.5. Relate between half-life and radioactive decay constant 12.6 Describe Nuclear Reactor 12.7 Explain nuclear fission & fusion.	**3**	**7**
13	**MODERN PHYSICS** 13.1 Describe the concept of Modern Physics 13.2 Discuss about Reference frame 13.3 Explain Inertial and Non-Inertial Reference 13.4 Describe reference frame and Motion 13.5 Postulates of special Theory of Relativity 13.6 Explain the Galilean Transformation 13.7 Describe Lorentz Transformation 13.8 Define Black Holes and black body radiation.	**3**	**7**
14	**THEORY OF RELATIVITY AND ASTRO PHYSICS** 14.1 Describe Relativity 14.2 Discuss the types of Relativity 14.3 Explain Einstein's theory of Relativity 14.4 Describe the Relativity of time: Time Dilation 14.5 Discuss Relativity of Length : Length Contraction 14.6 Discuss Relativity of mass 14.6 Relate between mass and Energy ($E=mc^2$)	**3**	**6**
	Total	**48**	**90**

Detailed Syllabus (Practical)

Unit	Topics with Contents	Class (3 Period)	Continuous Marks
1	COMPARE THE OPERATION OF COMMON THERMOMETERS 1.1 Observe the different types of thermometer 1.2 Apply relation formula 1.3 Measure the temperature of liquid such normal water, hot water & ice 1.4 Calculate and compare the operation of thermometer 1.5 Maintain the record of the performance of experiment.	**1**	**1**

2	DETERMINE THE CO-EFFICIENT OF LINEAR EXPANSION OF A SOLID BY PULLINGER'S APPARATUS 2.1 Collect Pullinger's Apparatus , Thermometer and screw gauge 2.2 Apply heat to boil producer 2.3 Calculate the Linear expansion of solid 2.4 Maintain the record of the performance of experiment.	1	1
3	MEASURE THE SPECIFIC HEAT CAPACITY OF VARIOUS SUBSTANCES. (BRASS, STEEL) 3.1 Collect Calorimeter, Thermometer, Brass, Balance 3.2 Apply the formula for specific heat 3.3 Measure various terms according to formula 3.4 Calculate Specific heat capacity 3.5 Maintain the record of the performance of experiment.	1	2
4	DETERMINE THE LATENT HEAT OF FUSION OF ICE 4.1 Collect Calorimeter, Thermometer, Brass, Balance and ice 4.2 Apply the formula for latent heat of fusion 4.3 Measure various terms according to formula 4.4 Calculate latent heat of fusion 4.5 Maintain the record of the performance of experiment.	1	2
5	DETERMINE THE LATENT HEAT OF FUSION OF ICE 5.1 Collect Calorimeter, Thermometer, Brass, Balance and Vapor producer 5.2 Apply the formula for latent heat of Vapor 5.3 Measure various terms according to formula 5.4 Calculate latent heat of fusion 5.5 Maintain the record of the performance of experiment.	1	2
6	DETERMINE THE MECHANICAL EQUIVALENT OF HEAT BY USING JOULE'S CALORIMETER 6.1 Collect Joule's Calorimeter, Thermometer, Voltmeter 6.2 Apply Joule's formula for heat equivalent 6.3 Measure various terms according to formula 6.4 Determine the Mechanical Equivalent of Heat 6.5 Maintain the record of the performance of experiment.	2	2
7	VERIFY THE LAWS OF REFLECTION 7.1 Collect Plane mirror, pin and drawing board 7.2 Apply the laws of reflection 7.3 Measure the incident angle and reflection angle 7.4 Verify the laws of reflection 7.5 Maintain the record of the performance of experiment.	2	4
8	FIND OUT THE FOCAL LENGTH OF A CONCAVE MIRROR 8.1 Collect Optical bench & concave mirror 8.2 Apply focal length formula.	2	4

	8.3 Measure the object length & Image length 8.4 calculate the focal length by using formula 8.5 Maintain the record of the performance of experiment.		
9	DETERMINE THE REFRACTIVE INDEX OF A GLASS SLAB 9.1 Collect glass slab, pin, drawing paper and drawing board 9.2 Apply the Snell's law 9.3 Measure incident and refractive angle 9.4 calculate the refractive index 9.5 Maintain the record of the performance of experiment.	3	4
10	DETERMINE THE ANGLE OF MINIMUM DEVIATION AND REFRACTIVE INDEX OF A GLASS PRISM BY USING 1-D GRAPH 10.1 Collect prism, pin, drawing paper and drawing board 10.2 Apply the laws of minimum deviation 10.3 Measure incident angle and minimum deviation 10.4 Calculate the refractive index of prism 10.5 Maintain the record of the performance of experiment.	2	3
	Total	16	25

Recommended Books:

Sl	Book Name	Writer Name
	REFERENCE BOOKS: 1. Higher Secondary Physics - Second Part 2. A Text Book of Heat and Thermodynamics 3. A Text Book of Optics 4. Higher Secondary Physics - Second Part 5. Higher Secondary Physics -Second Part 6. Thermodynamics	- by Dr. Shahjahan Tapan - by N Subrahmanyam and Brij Lal - by N Subrahmanyam and Brij Lal - by Prof. Golam Hossain Pramanik - by Ishak Nurun Nabi - by K K Ramalingam

Website References:

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

Subject Code	Subject Name	Period Per Week		Credit
28511	COMPUTER OFFICE APPLICATION	T	P	C
		0	6	2

Rationale	**This is a generic course for all diploma programs required to enable the graduates to use and work with ICT competently. It includes typing in Bangla and English, using the internet for e-communication & e-interaction, operating a computer and allied devices, Operating Word Processing, Spreadsheet Analysis, and Presentation software. This course also enables a graduate to adopt further study in upper-level courses using IT and other sectors. This course is designed to emphasize practical aspects rather than theory.**
Course Learning Outcome	**After undergoing the subject, students will be able to:** • **type Bangla and English smoothly** • **use internet for e-communication & interaction** • **operate a computer and allied devices** • **perform the operation of Word Processing App, Spreadsheet Application, and Presentation Package.**

Detailed Syllabus (Practical)

CLO	Experiment name with the procedure	Class (3 Periods per class)	Marks
1	**TYPE TEXT AND DOCUMENTS IN ENGLISH AND BANGLA.** **1.1 Startup and Shutdown of a computer.** 1.1.1 Identify Basic ***Computer Hardware*** devices ***Computer Hardware*****:** System Unit, Motherboard, Processor, Power supply, SSD, Hard Disk, RAM, ROM 1.1.2 Check Peripherals and connect with the system unit. ***Peripherals*****:** Monitor, Keyboard, Mouse, Modem, Scanner, Printer, Multimedia Projector 1.1.3 Connect Power cords/adapter properly with computer and power outlets socket. 1.1.4 Switch on the Computer gently. 1.1.5 Arrange and customize PC ***Desktop / GUI settings*** as per requirement. ***Desktop / GUI settings***: Icons, Taskbar, View, Resolutions 1.1.6 Close Unsaved files and folders 1.1.7 Close Open software and switch off hardware devices. 1.1.8 Switch off Computer gently. 1.1.9 Switched off Power at the respective power outlets. **1.2 Install the Typing Tutor software.**	**3**	**5**

	1.2.1. Identify Required *Hardware* and *software* of typing Tutor software. ***Software****:* Operating System, Microsoft Office, Open Office, Typing Tutor, Bangla Typing Software, Google doc, Avro, Bijoy. 1.2.2. Install English and Bangla Typing tutor software. 1.2.3. Install Bangla Unicode Typing Tutor Software. 1.2.4. Install Required fonts for typing of Bangla and English. **1.3 Practice text Typing in English and Bangla.** 1.3.1 Start Typing tutor software. 1.3.2 Practice English Home key drilling systematically. 1.3.3 Practice Typing in English as per Standard procedure (30 WPM). 1.3.4 Install Specialized Bangla Typing tutor software. 1.3.5 Practice systematically Bangla Home key typing. 1.3.6 Type Bangla document as per standard procedure (20 WPM). 1.3.7 Type Text documents repeatedly to increase typing speed in both English and Bangla. **1.3 Maintain the record of the performed job.**		
2	**USE THE INTERNET FOR E-COMMUNICATION & INTERACTION** **2.1 Access resources from the internet** 2.1.1. Interpret ***Internet Terms*** and their uses. ***Internet Terms:*** Browser, web page, URL, HTML and http/https, E-mail, social media, IP, Download, Malware, Router, Bookmark, E-commerce 2.1.2. Select and install Appropriate ***internet browsers*** ***Internet browsers:*** Microsoft Edge, Google Chrome, Internet Explorer, Opera, Safari, QQ Browser, UC, Yandex 2.1.3. Carry out ***Browser Settings*** for smooth operation. ***Browser Settings:*** Synchronization, Privacy and Security, Auto fill, Appearance, Language, Download, Accessibility 2.1.4. Open the Internet browser and write/select a web address / URL in /from the address bar to access ***Information.*** ***Information:*** Text Information, Graphics, Video 2.1.5. Use ***Search engines*** to access information. ***Search engines:*** Google, Yahoo, Alta Vista, Msn, Bing 2.1.6. Use internet resources (Free and Paid Platform) 2.1.7. Share/download/upload Video / Information From/to web site/***social media.*** ***social media:*** Facebook, Twitter, LinkedIn, YouTube 2.1.8. Communicate using social media and professional's Media. 2.1.9. Search and follow Netiquette' (or web etiquette) Principles. **2.2 Use Web Services.**	**4**	**6**

	2.2.1. Identify ***Web Services*** and service provider as per job requirement. ***Web Services:*** Communication (Zoom, Bip, Meet), Storage (Drop box, Mega, One Drive, Google Drive) 2.2.2. Interpret the Function of the web services 2.2.3. List Information for creating an account in web Services. 2.2.4. Identify ***Google services***. ***Google services:*** Drive, Calendar, Map, Translator, Docs, Sheets, Slide, Forms, Search, Contact, Classroom, Image Search, Blogger, Meet 2.2.5. List Functions of Google services. 2.2.6. Demonstrate Google Services. **2.3 Use and manage E-mail.** 2.3.1 Identify and select ***E-mail services*** to create a new e-mail address. ***E-mail services:*** Free mail services (Gmail, Yahoo, Hotmail), Webmail Services 2.3.2 Compose E-mail and attach prepared document. 2.3.3 Send E-mail to different types of recipients using the CC and BCC option. 2.3.4 Read, forward, reply, and delete E-mail as per requirement. 2.3.5 Create and manipulate custom email folders. 2.3.6 Print E-mail message. **2.4 Maintain the record of the performed job.**		
3	**OPERATE A COMPUTER AND ALLIED DEVICES** **3.1 Perform Basic Setting** 3.1.1 Change power options properties as per requirement. 3.1.2 Terminate Non-responding application as specified. 3.1.3 Identify and adjust System information, operating system version, date & Time display system, color settings, and available RAM as per job requirement. 3.1.4 Set Keyboard Language according to the instructions. 3.1.5 Install Fonts following standard procedures. 3.1.6 Adjust Screen Resolution as per job requirement. 3.1.7 Identify Basic ***Hardware and Software problems*** and take the remedy. ***Hardware and Software problem***: Can't Open, Slow, Hang, Display Problem, Setting Problem, Keyboard and Mouse Problem, Sound Problem, Input devices are not working, No network, Slow internet, Printer is not working, Software installation problem **3.2Operate Computer** 3.2.1 Create Files and folders 3.2.2 ***Manipulate*** Files and folders as per requirement. ***Manipulated***: Opened, Copied, Renamed, Deleted, Sorted. 3.2.3 View and search Properties of files and folders. 3.2.4 Practice Control panel settings. 3.2.5 Format and defragment ***Storage devices*** as per requirement. ***Storage devices***: Hard drive, Flash Drive, Flash Memory 3.2.6 Take Backups as required. 3.2.7 use and change Password as per job requirement	**3**	**5**

	3.3 Manage Security of Hardware and Software. 3.3.1 Installed Custom software and Antivirus software according to standard operating procedure. 3.3.2 Scan Storage devices using antivirus software. 3.3.3 Scan Folders and Files using the current version of Software. 3.3.4 Update Scanning software or virus definition regularly. 3.3.5 Identify ***Cyber Security issues*** or hardware and software. ***Cyber Security issues***: Hacking, Phishing, Data Leakage, Threat 3.3.6 Recognize and avoid Cyber threats and attacks. **3.4 Manage Printer and Printer settings** 3.4.1 Install Printers on the computer according to the manufacturer's instructions. 3.4.2 Print Documents from an application. 3.4.3 Print, pause, restart, or cancel using print manager. **3.5 Maintain the record of performed job**		
4	**OPERATE WORD PROCESSING APPLICATION** **4.1 Create documents.** 4.1.1. Open ***Word-processing application.*** ***Word-processing application***: MS Word, Open Office 4.1.2. Create ***Documents.*** (Word documents, Standard CV with different text & Fonts, image, and table, Application / Official letter with proper paragraph and indenting, spacing, styles, illustrations, tables, header & footers and symbols, Standard report/newspaper items with column, footnote, and endnote drop cap, indexing and page numbering) 4.1.3. Add Text and Data according to information requirements. 4.1.4. Use Document templates as per the job required. 4.1.5. Use ***Formatting Tools*** when creating the document. ***Formatting Tools***: (Bold, Italic, Underline, Strikethrough, Subscript, Superscript, Change case, Text highlight color, Font color, Font, Font size, Clear formatting, Format painter, Illustrations and styles, Text, Table, Symbols, Header & footer, Text alignment) 4.1.6. Insert and edit Equation as per job requirement. 4.1.7. Save Documents are as per job requirements. **4.2 Customize basic settings to meet page layout conventions** 4.2.1 Adjust Page layout to meet information requirements 4.2.2 Open and use User interface and ***toolbars*** as per job requirement. ***Toolbars:*** File tab, Title bar, Ribbon, Ruler, Status bar, View button, Zoom control, Document area, Dialog box launcher, Backstage view 4.2.3 Change ***Font Format*** to suit the purpose of the document. ***Font Format:*** Times New Roman, Arial, Nikosh, NikoshBan, Kalpurush,	**8**	**16**

SutonnyMJ, Century, Century gothic, Vrinda

4.2.4 Change ***Alignment*** and line spacing according to document requirements.

Alignment: Left, Right, Center, Top, Text direction, Cell margins

4.2.5 Modify Margins to suit the purpose of the document.

4.3 Format documents

4.3.1 Use formatting features, Symbols, and styles as per requirement.

4.3.2 Highlight and Copy Text from other areas in the document or form another active document.

4.3.3 Insert headers and footers to incorporate necessary data.

4.3.4 Save Documents in another ***file format***

file format: .doc, .docx, .pdf, . xps , .xml

4.3.5 Save and close document to ***Storage device.***

Storage device: Flash Drive, Hard Disk Drive, Memory Card, CD/DVD

4.4 Create a table.

4.4.1 Insert the standard table into the document.

4.4.2 Split and /or merge the cells to meet the Information requirement.

4.4.3 Insert, delete, modify and move columns and rows if Necessary.

4.4.4 Insert Text into the table.

4.4.5 Operation carried for ***Data Handled*** as per job Requirement.

Data Handled: Sort, Repeat Header row, convert to Text, Formula, Autofit.

4.4.6 Use Styling tools according to style requirements.

4.4.7 Add formula to the table as per job requirement.

4.5 Add illustrations

4.5.1 Insert appropriate ***illustrations*** into the document and Customize if necessary.

Illustrations: Picture, clip art, Shapes, Smart Art, Chart

4.5.2 Position and resize images according to the Document formatting requirements.

4.6 Perform mail merge operation

4.6.1 Determine sender and recipients as per job Requirements.

4.6.2 Follow preparatory steps for mail merge.

4.6.3 Add recipients for mail merge.

4.6.4 Perform Mail merge operation.

4.6.5 Send mail.

4.7 Create references

4.7.1 Plan Footnote, endnote, and citation.

4.7.2 Create Footnote and endnote.

4.7.3 Create citation.

4.8 Print information

4.8.1 Connect ***printer*** with computer and power outlet Properly.

Printer: Dot matrix printer, Laser Printer, Inkjet printer

4.8.2 Switch on power at both the power outlet and

	printer. 4.8.3 Install and add printer. 4.8.4 Select correct printer settings and print the document or selected part as per job requirements. 4.8.5 View or cancel print from the printer spool. **4.9 Maintain the record of the performed job.**		
5	**OPERATE SPREADSHEET APPLICATION** **5.1 Create spreadsheets** 5.1.1. Open ***Spreadsheet Application***, 5.1.1. Create spreadsheet files and enter numbers, text, and symbols into cells according to information requirements. 5.1.2. Enter simple ***formulas and functions*** using cell Referencing where required. ***Formulas:*** SUM, AVERAGE, IF, MAX, MIN, COUNT, RANK, Date and Time, Math and Trig, AND, OR, NOR, Between, ABS, Greater than, less than ***Functions:*** Mathematics, Logical, Simple statistical 5.1.3. Correct formulas when error messages occur. 5.1.4. Use a range of common tools during spreadsheet development. 5.1.5. Edit columns and rows within the spreadsheet. 5.1.6. Use the auto-fill function to increment data where required. 5.1.7. Save spreadsheet file to directory or folder. **5.2. Customize basic settings:** 5.2.1. Adjust page layout to meet user requirements or special needs. 5.2.1. Open and view different toolbars. 5.2.2. Change font settings so that they are Appropriate for the purpose of the Document. 5.2.3. Change ***alignment*** options and line spacing according to spreadsheet formatting features. ***Alignment: Right, Left, Centre, Top, Middle, Bottom*** 5.2.4. ***Format*** cell to display different styles as required. ***Format:*** Bold, Italic, Underline, Font size, color, change case, Alignment, and intend 5.2.5. Modify margin sizes to suit the purpose of the spreadsheets. 5.2.6. View multiple spreadsheets concurrently. **5.3. Format spreadsheet:** 5.3.1. Use formatting features as per job requirements. 5.3.2. Copy selected formatting features from another cell in the spreadsheet or from another active spreadsheet. 5.3.3. Use formatting **tools** as required within the spreadsheet. 5.3.4. Align information in a selected cell as required. 5.3.5. Insert headers and footers using formatting features. 5.3.6. Save the spreadsheet in another format. 5.3.7. Save and close the spreadsheet to the storage device. **5.4. Sort and filter data in worksheet** 5.4.1. Create worksheets. 5.4.2. Insert data into the sheet. 5.4.3. Sort data with different criteria. 5.4.4. Filter data with different conditions, 5.4.5. Print sorted or filtered data **5.5. Incorporate object and chart in the spreadsheet:**	**6**	**10**

	5.5.1. Import an object into an active spreadsheet. 5.5.2. Manipulate imported objects by using formatting features. 5.5.3. Create a chart using selected data in the spreadsheet. 5.5.4. Display selected data in a different chart. 5.5.5. Modify chart using formatting features. **5.6. Create worksheets and charts** 5.6.1. Create Worksheets as pre-requirement. 5.6.2. Enter Data as per job requirement. 5.6.3. use function for calculating and editing logical operations. 5.6.4. Format ***Sheets*** as per requirement. ***Sheets:*** Salary Sheet with sorting, filtering, and chart, Mark/Grade/Tabulation sheets for simple result processing. 5.6.5. Create ***Charts and Graphs*** as per job requirements. ***Charts and Graphs:*** Column, Pie, Line, Bar, Table, Scatter 5.6.6. Preview and print Charts/ Sheets. **5.7. Print spreadsheet:** 5.7.1. View spreadsheet in print preview mode. 5.7.2. Select basic printer options. 5.7.3. Print spreadsheet or selected part of the spreadsheet. 5.7.4. Submit the spreadsheet to the appropriate person for approval or feedback. **5.8. Maintain the record of the performed job.**		
6	**OPERATE PRESENTATION PACKAGE:** **6.1. Create presentations:** 6.1.1 Open ***Application package*** for presentation and create a simple design for a presentation according to organizational requirements. ***Application package***: PowerPoint, Prezi 6.1.2 Open a blank presentation and add text and graphics using the user interface and toolbar. 6.1.3 Apply existing styles within a presentation. 6.1.4 Use presentation templates and slides to create a presentation. 6.1.5 Use various ***Illustrations,*** audio, video, and ***effects*** in the presentation. ***Illustrations***: Picture, Clip art, Photo, Shape, Smart art, Chart ***Effects***: Entrance, Emphasis, Exit, Motion path, Sound 6.1.6 Add design, transition, and animation as per job requirement 6.1.7 Save the presentation to the correct directory. **6.2 Customize basic settings:** 6.2.1 Adjust display to meet user requirements. 6.2.2 Open and view different ***toolbars*** to view options. 6.2.3 Ensure ***font settings*** are appropriate for the purpose of the presentation. 6.2.4 Select necessary font tools as per job requirements. 6.2.5 View multiple slides at once. **6.3 Format presentation** 6.3.1 Use and incorporate organizational charts, bulleted lists and modify as required. 6.3.2 Add and manipulate ***objects*** to meet presentation purposes. ***Objects***: image, chart, worksheet, equation, slide 6.3.3 Import and modify ***objects*** for presentation purposes. 6.3.4 Modify slide layout, including text and colors to meet presentation requirements. 6.3.5 Use ***formatting tools*** as required within the presentation. 6.3.6 Duplicate slides within and/or across a presentation. 6.3.7 Record the sequence of slides and/or delete slides for presentation purposes.	**4**	**8**

	6.3.8 Save the presentation in another ***format.*** 6.3.9 Save and close presentation to disk. **6.4 Add Slide show effects** 6.4.1 Incorporate animation and multimedia effects into the presentation as required to enhance the presentation and present the presentation. 6.4.2 Add ***Slide transition effect to*** ensure a smooth presentation. 6.4.3 Test the presentation for overall impact 6.4.4 Use on-screen navigation tools to start and stop slide shows or move between different slides. **6.5 Create a template using a master slide** 6.5.1 Open Blank presentation and click the slide master form view tab. 6.5.2 Create slide layout and/or customized as per requirements. 6.5.3 Add Theme based colors, fonts, effects, backgrounds and style to the presentation. 6.5.4 Set page orientation for all of the slides. 6.5.5 Save and close presentation **6.6 Print presentation and notes** 6.6.1 Select the appropriate print format to print presentation. 6.6.2 Select preferred slide orientation. 6.6.3 Add notes and slide numbers. 6.6.4 Preview slide and check spells before presentation. 6.6.5 Print selected slides. **6.7 Maintain the record of performed job.**		
	Total	**28**	**50**

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

Sl	Item Name	Quantity
01	Computer System / Laptop	01 per student
	Accessories	
02	Extra Key Board	05 Piece
03	Extra Mouse	05 Piece
04	Extra System / Laptop Unit	02 Piece
05	Extra Mother Board	02 Piece
06	Extra RAM	05 Piece
07	Extra Hard Disk	02 Piece
08	Extra SSD	02 Piece
09	Multimedia Projector	01 Piece
10	Multimedia pointer	01 Piece
11	Potable wireless Sound System	01 set
12	Network Adapter	02 Piece
13	VGA cable	02 Piece
14	Printer (LASER)	01 Piece
15	Printer (Dot Matrix)	01 Piece
16	Printer (Inkjet)	01 Piece
17	Printer Cable	01 Piece
18	Monitor	01 Piece
19	Modem	01 Piece
20	Scanner	01 Piece

21	Power cords/Power adapter	01 Piece
22	UPS/ IPS	01 Piece

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
01	MOS 2010, Study Guide	Joan ambert, Joyce Cox	**Up-to-date Edition**
02	Computer Application in Business	R. Parameswaran	

Website References:

Sl	Web Link	Remarks
01	**https://teachers.tech/microsoft-office-tutorials/**	
02	**https://www.javatpoint.com/ms-word-tutorial**	
03	**https://www.tutorialspoint.com/word/index.htm**	

Subject Code	Subject Name	Period per Week		Credit
26811	BASIC ELECTRONICS	T	P	C
		2	3	3

Rationale	Electronic devices have become an important part of our day-by-day life. Now a days it is difficult for us to live without electronic device. We live in a generation that uses electronics and smart technologies. Where robots and artificial intelligence is capable of doing human works in all technological equipment with more ease and efficiency. Operation of all machines, devices and equipment are controlled by electronic device and circuits. This subject covers only such topics which will enable the diploma engineers to identify and maintenance the electronics parts and able to proper fault finding.
Learning Outcome (Theoretical)	**After undergoing the subject, students will be able to:** • Describe soldering • Determine the value of Capacitor & Resistor using numeric and color code. • Describe Semiconductor and Semiconductor Diode. • Describe Rectifier circuits • Explain Construction and characteristics of PNP and NPN Transistor. • Explain the construction and operation of Single and Multi stage amplifier
Learning Outcome (Practical)	**After undergoing the subject, students will be able to:** • Perform soldering. • Calculate values of different resistors and capacitors with the help of color code. • Check the semiconductor diode and Determine characteristics of Diode • Verify the wave-shape of half-wave and full wave rectifier circuit • Test special diodes. • Verify the bipolar junction transistor characteristics. • Determining Q-Point and gain of transistor amplifier. • Determining frequency response of single stage R-C coupled transistor amplifier.

Detailed Syllabus (Theory)

Unit	Topics with Contents	Class (1 Period)	Final Marks
1.	SOLDERING AND COLOR CODE 1.1Define soldering. 1.2List the materials of soldering. 1.3Describe the steps of soldering. 1.4Mention the properties of a good soldering joint. 1.5Describe the active and passive components used in electronic circuits. 1.6Mention the function of resistor, capacitor and inductor in electronic circuits. 1.7Describe the procedure of determining the value of Capacitor, & Resistor using numeric and color code.	3	4
2	SEMICONDUCTOR 2.1Define conductor, semiconductor and insulator. 2.2Describe semiconductor with atomic structure. 2.3Describe the effect of temperature on conductivity of Semiconductor. 2.4Classify Semiconductor. 2.5List the commonly used semiconductor 2.6Describe the formation of P-type and N-type semiconductor. 2.7Describe the charges on N-type and P-type Semiconductor 2.8Explain the majority & minority charge carriers of P-type & N-Type Semiconductor.	3	4
3	SEMICONDUCTOR DIODE 3.1Define PN junction diode 3.2Describe the formation of PN junction. 3.3Explain forward and reverse bias in PN junction. 3.4Explain the forward and reverse Voltage-Current (VI) characteristics curve of PN junction diode. 3.5Define load line, static resistance, (iii) dynamic resistance, 3.6Define forward breakdown voltage, (v) Peak inverse voltage (PIV) and (vi) Reverse break down voltage. 3.7Describe the specification of PN Junction diode.	3	4
4	SPECIAL DIODES 4.1Define Zener Diode. 4.2Describe the operation of Zener diode. 4.3Explain Volt-Ampere(VI) characteristics of Zener diode. 4.4 Describe the application of Zener diode in, voltage stabilization, meter protection and peak clipper circuits. 4.5Describe the construction, operation and application of Tunnel diode, Varactor diode,	3	4

	Schottky diode, Step-Recovery diode, PIN diode, LED, LCD, photo diode and Solar cell.		
5	**DC POWER SUPPLY** 5.1 Define dc power supply 5.2 Describe importance of dc power supply . 5.3 Compare regulated and unregulated power supply. 5.4 Describe the operation of a typical regulated dc power supply with block diagram. 5.5 Define rectifier and rectification. 5.6 Explain the operation of half wave, full wave and bridge rectifier circuit. 5.7 Determine the ripple factor, efficiency and TUF of half wave, full wave and bridge rectifier. 5.8 Explain the operation of capacitor; inductor-capacitor and pi (π) filter circuit. 5.9 Solve problem related to ripple factor, efficiency and TUF.	3	8
6	**BIPOLAR JUNCTION TRANSISTOR (BJT)** 6.1 Define Transistor. 6.2 Describe the construction of PNP and NPN Transistor. 6.3 Explain the mechanism of current flow of PNP and NPN Transistor. 6.4 State the biasing rules of BJT. 6.5 Establish the relation among Base, Emitter and Collector current ($I_E = I_C + I_B$).	2	4
7	**Transistor Characteristics** 7.1 Describe three basic transistor configuration (CB, CC, CE) circuits. 7.2 Explain the characteristics curve of CB, CC and CE transistor configurations. 7.3 Describe current amplification factor α, β and γ. 7.4 Establish the relation among α, β and γ. 7.5 Solve problem related to I_E, I_C, I_B, α, β and γ	3	4
8	**TRANSISTOR BIASING AND STABILIZATION** 8.1 Define load line, Operating point, stability and stabilization. 8.2 State the biasing rule of transistor. 8.3 Describe faithful amplification. 8.4 Describe the methods of drawing DC load line. 8.5 Explain the leakage current in CB & CE circuits. 8.6 List the factors affecting stability of Q-points. 8.7 Describe various methods of transistor biasing. 8.8 Determine the stability factor of various transistor biasing circuits. 8.9 Solve problem related to components values, Q-Points and stability factor.	4	8

9	**SINGLE STAGE TRANSISTOR AMPLIFIER** 9.1 Define amplifier and single stage amplifier. 9.2 Mention the types of amplifier. 9.3 Explain operation of transistor as amplifier with graphical demonstration. 9.4 Describe the operation of voltage divider biased CE amplifier circuit. 9.5 Explain the phase reversal of CE amplifier. 9.6 Draw DC and AC equivalent circuit of voltage divider biased CE amplifier circuit. 9.7 Determine the AC equivalent load resistance of the CE amplifier circuit. 9.8 Determine voltage and power gain of the CE amplifier circuit. 9.9 Solve problem related to voltage and power gain where β and input resistance of the transistor are given.	4	10
10	**MULTISTAGE TRANSISTOR AMPLIFIER** 10.1 Define Multi stage amplifier. 10.2 Describe role of capacitor in single stage amplifier. 10.3 Describe gain, decibel gain frequency response, half power point, 3db point and bandwidth. 10.4 Mention the advantages of dB gain. 10.5 Describe the operation of RC coupled, Transformer coupled and direct coupled multistage amplifier. 10.6 Explain the frequency response of RC coupled, Transformer coupled and direct coupled multistage amplifier. 10.7 Mention the advantages and disadvantages of RC coupled, Transformer coupled and direct coupled multistage amplifier. 10.8 Solve problem related to voltage and power gain where β and input resistance of the transistor are given.	4	10
	Total	32	60

Detailed Syllabus (Practical)

Unit	Experiment name with procedure	Class (3 Period)	Continuous Marks
1	**Solder & de-solder of electronic components and wires to the other components and circuit boards.** 1.1. Select electronic components, wires and PCB. 1.2. Select the rating of the soldering iron suitable for the work piece. 1.3. Clean and tin both iron & work piece. 1.4. Feed new soldering materials to the tinned and	1	3

	heated joint in order to produce a correct soldering. 1.5. Check the quality of soldering. 1.6. Clean and tin iron and de-solder the joint and components. 1.7. Use solder suckers and solder braid for de-soldering. 1.8. Maintain the record of performed job.		
2	**Determine the values of different resistors, capacitors and inductor.** 2.1 Select resistors, capacitors and inductors of different values. 2.2 Identify the colors or numeric code 2.3 Determine the value of resistors, capacitor **and inductor** with tolerance. . 2.4 Maintain the record of performed job.	1	2
3	**Sketch forward and reverse characteristics curves of a semiconductor diode.** 3.1 Select meter, power supply, components and materials. 3.2 Complete circuit according to circuit diagram for forward bias. 3.3 Check all connections. 3.4 Apply different forward voltage and measure corresponding forward current. 3.5 Record results in tabular form. 3.6 Connect circuit according to circuit diagram of reverse bias. 3.7 Apply different reverse voltage and measure corresponding forward current. 3.8 Record results in tabular form. 3.9 Sketch the VI curves from collected data. 3.10 Maintain the record of performed job.	1	2
4	**Sketch waves of half-wave and full-Wave rectifier circuit** 4.1 Select meter, component, oscilloscope and materials. 4.2 Complete circuit of a half wave rectifier according to the circuit diagram. 4.3 Check the circuit before operation. 4.4 Measure the input and output voltage and observe wave shapes in the oscilloscope. 4.5 Sketch the input and output voltage wave shapes. 4.6 Maintain the record of performed job.	1	3
5	**Testing special diodes.** 5.1 Select different types of special diodes. 5.2 Set the AVO meter in the ohm scale. 5.3 Measure resistances for each of two terminals. 5.4 Determine the condition (good and bad). 5.5 Determine the different terminals.	2	2

	5.6 Maintain the record of performed job.		
6	**Identifying the type and terminals of bipolar junction transistor.** 6.1 Select PNP and NPN bipolar junction transistors. 6.2 Take AVO and manufacturer's literature of transistor. 6.3 Identify transistor terminals. 6.4 Measure base-emitter and base-collector resistance. 6.5 Determine the specifications with the help of manufacturer's literatures. 6.6 Identify PNP, NPN transistors. Base, Collector and Emitter. 6.7 Maintain the record of performed job.	2	3
7	**Determining input and output characteristics of a transistor in common emitter connection.** 7.1. Select DC power supply units, AVO meters, circuit board, components, and required materials. 7.2. Construct the circuit. 7.3. Adjust the voltage to appropriate point. 7.4. Record input and output voltage and current. 7.5. Plot the curve with recorded data. 7.6. Determine the value of β. 7.7. Maintain the record of performed job.	2	2
8	**Determine the Q- point of R-C coupled CE transistor amplifier.** 8.1. Draw the circuit diagram for the experiment. 8.2. Collect tools, equipment and materials. 8.3. Make all the connections according to the circuit diagram. 8.4. Check the connections. 8.5. Energize the circuit and record the Collector emitter voltage and collector current. 8.6. Draw the load line and locate the Q-Point on the load line. 8.7. Maintain the record of performed job.	2	3
9	**Determine the voltage gain of CE transistor amplifier.** 9.1. Draw the circuit diagram of CE transistor amplifier. 9.2. Collect required tools, equipment and materials. 9.3. Make all the connections according to the circuit diagram. 9.4. Check the connections and Q-Point. **9.5.** Energize the circuit and record the input and output voltage. **9.6.** Calculate the voltage gain. **9.7.** Maintain the record of performed job.	2	2
10	**Demonstrate the frequency response of single stage R-C coupled CE transistor amplifier.** 10.1. Draw the circuit diagram for the experiment. 10.2. Collect required tools, equipment and materials. 10.3. Make all the connections according to the circuit diagram. 10.4. Check the connections.	2	3

	10.5. Energize the circuit and record the data. 10.6. Draw the frequency response curve from the data. 10.7. Maintain the record of performed job.		
	Total	16	25

Necessary Resources (Tools, Equipment and Machinery):

Sl. No.	Item Name	Quantity
1	Soldering Iron with Stand, De-soldering gun, Third Hand , Hot air gun, Iron Sponge, AVO Meter, Flat screw driver, Philips screw driver, Cutting pliers, Nose pliers, Automatic multifunction wire stripper. Tester, Knife, Power extension board.	30 Nos
2	DC power Supply, Function generator, Oscilloscope, Analog Electronics Trainer, Power project board/ bread board, Center tap Transformer (220/12V, 2A, 5A)	10 nos
3	Diode, Resistor, Potentiometer, Inductor, Capacitor, Transistor, LED, Zener Diode, Photo Diode.Tunnel diode, Varactor diode, Schottky diode, Step-Recovery diode, PIN diode, LCD and Solar cell.	50 nos
4	Resin, Soldering lead, Soldering tip, Fixable wire, Wire Brush	as required

Recommended Books:

Sl No.	Book Name	Writer Name	Publisher Name & Edition
1	Principles Of Electronics	V. K. Mehta	S.Chand
2	Basic Electronics (Solid State)	B. L. Theraja	S. Chand

Website References:

Sl. No.	Web Link	Remarks
1	https://www.youtube.com/channel/	
2	https://youtu.be/qsWkA-5grogo	
3	https://youtu.be/eXyGIPrD5Qk	
4	https://you.be/f-WiulYIrow	

Subject Code	Subject Name	Period/Week		Credit
67821	**Basic Surveying**	T	P	C
		2	3	3

Rationale	**AIMS:** To provide the student with the opportunity to acquire knowledge and skill to: • work with chain, plane table and compass; • record surveyed data and plotting map; • locate unknown points; • calculate the area usinginstruments; • learn about modern surveying equipment.
Learning Outcome	Introduction to surveying, chain surveying, plane table surveying, compass surveying, modern surveying equipment.

Detailed Content(Theory)

Unit	Topics with Contents	Period	Marks
1	**1. Introduction to surveying.** 1.1 Definesurveying. 1.2 Describe the importance of surveying. 1.3 Mention the classification of surveying. 1.4 Differentiate between plane survey and geodeticsurveying. 1.5 Explain the reconnaissancesurveying.	3	10
2	**2. Chain surveying** **2.1** Define chain surveying **2.2** Describe the purpose of chain surveying. **2.3** Define chain line, reference line, tie line, check line and station points. **2**.4 Describe among Gunter's chain, Engineer's chain and meter chain **2**.5 State the procedure of conducting chainsurveying. **2**.6 Describe the procedure of setting out a perpendicular by using chain and tape when the point is inaccessible. **2**.7 Recognize survey symbols. 2.8 Mention the causes for which a chain may be too long or short.	6	20
3	**3. Different methods of computing in surveying.** 3.1 State the importance of computing in surveying. 3.2 Describe methods of computing within regular and irregular perimeters. 3.3 Mention the procedure of computation of area. 3.4 Compute the area along boundary by mid-ordinate rule, average ordinates rule, trapezoidal rule and Simpson's rule. 3.5 Calculate the area of a map with the help of planimeter by using map scale.	6	20

	3.6 Mention the procedure of computation of area by using triangulation method.		
4	**4. Plane table survey.** 4.1 Define plane table surveying. 4.2 Describe the purposes of plane table surveying. 4.3 State the method of plane table surveying. 4.4 Describe the uses of optical square, alidade, pole and prismatic compass. 4.5 Explain the various methods of plane table surveying. 4.6 Describe the advantages and disadvantages of plane table surveying.	**5**	**17**
5	**5. Compass surveying.** **5.**1 Define compass surveying. 5.2 Describe the purpose of compass surveying. 5.3 Define terms- meridian, true meridian, magnetic meridian,arbitrary meridian, bearing, true bearing, magnetic bearing, arbitrary bearing, magnetic declination, dip of the needle, deflected angle, exterior angle, interior angle. 5.4 State the method to determine the direction of magnetic meridian by using compass needle. 5.5 Describe the different scale using mouza map. **5.5** Describe the procedure of compass surveying by using prismatic compass. **5.6** Find out local attraction and correct the observed bearings.	**5**	**17**
6	**6. Cadastral surveying.** 6.1 Define cadastral surveying. 6.2 Describe the history of cadastral surveying in Bangladesh. 6.3 Describe the purpose of cadastral surveying. 6.4 State the meaning of mouza and mouza map.	**3**	**10**
7	**7. Surveying Equipment.** 7.1 List the name of surveying tools and equipment. 7.2 Describe chain, compass, digital level and theodolite. 7.3 Describe Total station, GPS and DGPS receiver.	**2**	**6**
	Total	**30**	**100**

Detailed Content (Practical):

Unit	Practical works with performance	Period	Marks
1	1. **I dentify the different instruments and accessories used in chain survey.** 1.1 Have a look on different instruments and accessories. 1.2 Make a rough sketch of different instruments and accessories. 1.3 Make a note on different instruments and accessories. 1.4 Discuss among your group members. 1.5 Ask question (if any) to your teacher.	**1×3**	**50**

2	**2. Test and adjust of chain.** 2.1 Collect the chain. 2.2 Place the chain on a flat land following instruction. 2.3 Check physically each of every links, connecting rings and tags. 2.4 Measure and adjust links as required. 2.5 Verify your adjustment with a corrected chain.	**1×3**	
3	**3. Collect the different types of chain and tape & prepare a comparison among them.** 3.1 Collect different types of chain and tape. 3.2 Lay each chain and tape on a flat ground side by side. 3.3 Compare among the measurements of chains and tape in different intervals. 3.4 Measure and record the length of each chain. 3.5 Discuss among your group members.	**2×3**	
4	4**. Set perpendicular with the help of chain, tape and optical square**. 4.1 Collect chain, tape and optical square. 4.2 Use a chain and form a right-angle triangle maintaining side ratio 3:4:5 (e.g.: 15: 20:25 link and base is 15 link) such that base is either 3 or 4. 4.3 Use a tape and form a right-angle triangle maintaining side measurement 3m, 4m and 5m, such that base is either 3m or 4m. 4.4 Mark points on the field by ranging rod. 4.5 Use an Optical Square to verify the perpendicular formed.	**2×3**	
5	**5. Set parallel lines with chain & tape**. 5.1 Collect chain and tape. 5.2 Select a base line on a flat ground. 5.3 Choose two suitable points on the base line and mark it. 5.4 Measure perpendicular equal-distance from those points. 5.5 Set parallel line using chain or tape.	**1×3**	
6	**6. Measure distance across obstacles.** 6.1 List necessary tools and accessories. 6.2 Collect the listed tools and accessories. 6.3 Follow the instructions sheet. 6.4 Measure distance across obstacles. 6.5 Book the reading on field book.	**2×3**	
7	**7. Identify the different instruments and accessories used in plane table survey.** 7.1 Observe the different instruments and accessories used in plane table survey. 7.2 Recognize each of the instruments and accessories. 7.3 Make a list of instruments and accessories. 7.4 Discuss among your group members. 7.5 Ask question (if any) to your Teacher.	**2×3**	

8	**8. Conduct plane table survey in an area**. 8.1 Collect necessary tools and equipment. 8.2 Mark suitable stations of the area to be surveyed. 8.3 Select a suitable plan table survey method (e.g.: Radiation method). 8.4 Setup the plane table at the middle of the land and mark north line on the sheet. 8.5 Draw radiation lines on the sheet and measure along those lines. According to scale mark points on sheet. Join the points to make the area.	**2×3**	
9	**9. Measure magnetic bearing by prismatic compass.** 9.1 Collect prismatic compass and accessories. 9.2 Setup the compass on tripod. 9.3 Adjust bubble at the centre. 9.4 Take magnetic bearing both forward and backward. 9.5 Book the measurement in a field book.	**2×3**	
	Total	**15×3**	**50**

Recommended Books:

Sl	Book Name	Writer Name
1.	Surveying and Leveling	T. P. Kanatker.
2.	Surveying	Dr**.** B. C.Punmia.
3.	Surveying	Norman Thomas.
4.	Surveying	Aziz & Shahjahan.
5.	Plane & Geodetic Survey	D.Clark.
6.	Text Book of Surveying	S.K.Husain. M.S.Nagraj.
7.	Surveying & Levelling	N.N.Basak
8.	Surveying & leveling	S.S.Bhavikatti.
9.	Introduction to Surveying	Md.Hamidul Islam (KUET)
10.	Surveying (Volume I & II)	S.K.Duggal.
11.	Surveying & Levelling	S.V.Kulkarni.

Website References:

Sl	Web Link
1.	https://en.wikipedia.org/wiki/Surveying