BANGLADESH TECHNICAL EDUCATION BOARD

AGARGAON, SHER-E-BANGLA NAGAR

DHAKA-1207.

04-YEARS DIPLOMA IN ENGINEERING CURRICULUM

COURSE STRUCTURE & SYLLABUS

(PROBIDHAN-2022)

MECHANICAL TECHNOLOGY

TECHNOLOGY CODE: 70

FIRST SEMESTER

(Effective from 2021-2022 Academic Session)

DIPLOMA IN ENGINEERING
COURSE STRUCTURE
PROBIDHAN-2022

MECHANICAL TECHNOLOGY (70) FIRST SEMESTER

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	25812	Physical Education & Life Skills Development	-	3	1	-	-	-	25	25	50	50
5	25911	Mathematics -I	3	3	4	60	90	150	25	25	50	200
6	25912	Physics -I	3	3	4	60	90	150	25	25	50	200
7	27011	Basic Workshop Practice	-	3	1	-	-	-	25	25	50	50
8	27012	Machine Shop Practice I	1	6	3	20	30	50	50	50	100	150
Total			**11**	**24**	**19**	**220**	**330**	**550**	**200**	**200**	**400**	**950**

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
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	

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	

DIPLOMA IN ENGINEERING
DETAILED SYLLABUS
PROBIDHAN-2022

Subject Code	Subject Name	Period per Week		
		T	P	C
25912	PHYSICS-I	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 principle and processes for the understanding and application of various technology. It will help the students to study in technical subject of diploma engineering students and it is also pre-requisite of physics- 2. This subject will cover quantities, Motion, mass, weight, force, pressure, wave, sound, velocity of sound, work, power and energy, elasticity of matter, behavior of fluids, and gas.
Learning Outcome (Theoretical)	**After undergoing the subject, students will be able to:** ➢ Describe Various types of quantities ➢ Enumerate Motion, mass, weight, force, pressure, wave, sound, velocity of sound, work, power and energy, elasticity of matter, behavior of fluids, and gas. ➢ Describe measurement of various quantities. ➢ Explain different techniques for improving the knowledge of matter.
Learning Outcome (Practical)	**After undergoing the subject, students will be able to:** • Determine the diameter and area of cross section of wire. • Measure thickness of glass plate. • Verify the law of parallelogram of forces • Determine the value of "g'' and student will can draw $L - T^2$ graph. • Calculate the Young's modulus of a steel wire. • Determine the specific gravity of solid. • Calculate the moment of inertia. • Determine unknown frequency of tuning fork.

Detailed Syllabus (Practical)

Unit	Topics with Contents	Class (1 Period)	Final Marks
1	**PHYSICAL WORLD AND MEASUREMENT** 1.1 Mention the Scope and excitement of physics. 1.2 Describe relation between Physics and other knowledge of technological world. 1.3 Describe Principle of measurement. 1.4 Relate units of Fundamental and derived quantities. 1.5 Describe the errors of measuring instrument. 1.6 Describe Slide calipers, Screw gauge and Spherometer.	**2**	**2**
2	**VECTOR QUANTITIES** 2.1 Describe vector and scalar quantities. 2.2 Prove the various representations of the vector quantities; and representation of a vector by unit vector. 2.3 Explain the resultant of two vectors in different directions. 2.4 Resolve a vector into horizontal and vertical component. 2.5 Explain the dot and cross product of two vectors. 2.6 Define laws of triangle and parallelogram of Vector. 2.7 Solve the problems related with vector.	**3**	**8**
3	**MOTION AND EQUATIONS OF MOTION** 3.1 Define rest and motion. 3.2 Mention the Classification of motion. 3.3 Explain different motion. 3.4 Deduce equations of motion. 3.5 Explain the laws of falling bodies and mention the equation of motion of a body when it is projected vertically upwards or downwards. 3.6 Solve the problems related with Motion.	**3**	**5**
4	**CIRCULAR MOTION** 4.1 Define circular motion and projectile motion. 4.2 Deduce Equation of motion of a freely moving body thrown obliquely vertically upward or motion of a projectile. 4.3 Define angular velocity and linear velocity with their units. 4.4 Deduce the relation between angular velocity and linear velocity. 4.5 Define centripetal and centrifugal force with examples.	**5**	**8**

	4.6 Prove that centrifugal force $F = \frac{mv^2}{r}$. 4.7 Define moment of inertia, torque and angular momentum. 4.8 Deduce the relation between moment of inertia, angular momentum and angular velocity. 4.9 Deduce the relation between torque and angular acceleration. 4.10 Explain the law of conservation of angular momentum. 4.11 Solve the problems related with Circular Motion.		
5	**FORCE AND FRICTION** 5.1 Define force, constant force, Variable force, conservative and non-conservative force. 5.2 State Newton's law of motion and Prove that F=ma; from Newton's second law of motion. 5.3 Describe different units of force, unit correlation and dimension of force. 5.4 Derive the resultant of parallel forces. 5.5 State and prove the principles of conservation of momentum. 5.6 Describe friction. 5.7 Define the co-efficient of static friction. 5.8 Prove that the co-efficient of static friction is equal to the tangent of angle of repose. 5.9 Mention the merits and demerits of friction. 5.10 Solve the problems related with Force and Friction.	**3**	**8**
6	**GRAVITY AND GRAVITATION** 6.1 Explain the Kepler's law. 6.2 Define gravity and gravitation. 6.3 Explain Newton's law of gravitation. 6.4 Find out the relation between acceleration due to gravity (g) and gravitational constant(G). 6.5 State acceleration due to gravity 'g' with units and dimension. 6.6 Discuss the variation of 'g' at different places. 6.7 Define mass and weight. 6.8 Mention the units and dimension of mass and weight. 6.9 Describe escape velocity. 6.10 Solve the problems related with Force and Friction.	**3**	**8**
7	**SIMPLE HARMONIC MOTION** 7.1 Describe periodic and simple harmonic motion (SHM). 7.2 Mention the characteristics of SHM. 7.3 Describe a simple pendulum.	**3**	**5**

	7.4 Define effective length, amplitude, phase, complete oscillation, period of oscillation and frequency. 7.5 State the laws of simple pendulum. 7.6 Describe Motion of simple pendulum. 7.7 Deduce the differential equation of SHM. 7.8 Solve the problems related with SHM.		
8	**WORK, POWER AND ENERGY** 8.1 Define work, power, and energy. 8.2 State the units and dimensions of work, power and energy. 8.3 Prove the principle of conservation of energy for freely falling body. 8.4 Explain potential energy (PE) and kinetic energy (KE). 8.5 Derive work energy theorem. 8.6 Deduce the equation of potential and kinetic energy. 8.7 Recognize that the useful work can be found from: Efficiency= $\frac{\text{output work}}{\text{input work}} \times 100\%$ 8.8 Solve the problems related with work, power and energy.	**5**	**8**
9	**ELASTICITY** 9.1 Define Elasticity and elastic limit. 9.2 Define perfectly elastic body and perfectly rigid body. 9.3 Explain stress and strain. 9.4 Explain the hook's law. 9.5 Describe various kinds of modulus of elasticity. 9.6 Define and explain Poisson's ratio. 9.7 Prove that the potential energy per unit volume is equal to $\frac{1}{2}$ ×stress×strain. 9.8 Solve the problems related with elasticity.	**3**	**5**
10	**SURFACE TENSION AND VISCOSITY** 10.1 Describe cohesive and adhesive force. 10.2 Discuss the molecular theory of surface tension. 10.3 Define surface tension, surface energy and angle of contact. 10.4 Explain theory of capillarity. 10.5 Define viscosity and co-efficient of viscosity. 10.6 Mention necessity of viscosity. Solve the problems related with surface tension and viscosity.	**3**	**5**
11	**PRESSURE AND CHARACTERISTICS OF PRESSURE** 11.1 Discuss density and pressure as force per unit area and state that it is measured in $\mathrm{N/m^2}$ or pascal. 11.2 Mention characteristics of liquid pressure.	**2**	**3**

	11.3 Establish the pressure at a point in a fluid depend upon the density of the fluid, the depth in the fluid and acceleration due to gravity. 11.4 Solve the problems related with pressure.		
12	**WAVE** 12.1 Explain wave and wave motion. 12.2 Mention some definition of relating waves. 12.3 Describe the principle of super position. 12.4 Mention characteristics of progressive and stationary waves. 12.5 Derive the equation of progressive wave. 12.6 Define beats. 12.7 Describe the mathematical analysis of beats. 12.8 Solve the problems related with wave.	**3**	**8**
13	**SOUND AND VELOCITY OF SOUND** 13.1 Explain sound and production of sound. 13.2 Describe that sound can be produced of different frequencies and that the human ear has an audible frequency range covering approximately 20Hz to 20KHz. 13.3 State the approximately frequency for Infrasonic sound and Ultrasonic sound. 13.4 Describe the practical uses of echo sounding devices. 13.5 Explain resonance, free vibration and forced vibration. 13.6 Derive the equation for velocity of sound, $v = f\lambda$. 13.7 Explain intensity and intensity level of sound. 13.8 Mention the effects of pressure, temperature, and humidity on the velocity of sound in air. 13.9 Solve the problems related with sound.	**4**	**6**
14	**IDEAL GAS AND KINETIC THEORY OF GASES** 14.1 Define Ideal gas. 14.2 Describe the laws of gas. 14.3 Define absolute zero temperature 14.4 Define STP or NTP. 14.5 Describe fundamental postulates of gas molecules. 14.6 Explain the kinetic theory of gas molecules. 14.7 Prove that the ideal gas equation is $PV = nRT$ 14.8 Solve the problems related with theory of gases.	**3**	**8**
15	**HUMIDITY** 15.1 Explain Humidity, Absolute Humidity, Relative Humidity and Dew point. 15.2 Derive relation between vapor pressure and air pressure. 15.3 Determine humidity by wet and dry Bulb Hygrometer. 15.4 Explain few phenomena related to hygrometry. 15.5 Solve the problems related with humidity.	**3**	**3**
	Total	**48**	**90**

Detailed Syllabus (Practical)

Unit	Topics with Contents	Class (3 Period)	Marks (Continuous)
1	**Determine accurate diameter of an object using slide calipers.** 1.1 Collect sample of an object and slide calipers. 1.2 Check and set the slide calipers. 1.3 Measure small length of any object. 1.4 Measure diameter of any small cylinder. 1.5 Calculate the volume of any spherical body. 1.6 Maintain the record of performed Job.	1	3
2	**Measure the area of cross section of a wire by using screw gauge.** 2.1 Collect sample of a wire and screw gauge. 2.2 Check and set screw gauge. 2.3 Measure diameter of any narrow wire. 2.4 Calculate cross section of any object. 2.5 Maintain the record of performed Job.	1	2
3	**Determine the thickness of a glass plate by Spherometer.** 3.1 Collect sample of a glass plate and spherometer. 3.2 Check and set screw gauge. 3.3 Level the spherometer by adjusting screw. 3.4 Measure narrow thickness of any object. 3.5 Calculate radius of curvature of lens. 3.6 Maintain the record of performed Job.	1	3
4	**Verify the law of parallelogram of forces by a force board.** 4.1 Collect a force board. 4.2 Check and set a force board. 4.3 Observe and record the direction of resultant force. 4.4 Maintain the record of performed Job.	1	2
5	**Determine the co-efficient of static friction.** 5.1 Collect necessary tools and materials. 5.2 Check and set the equipment. 5.3 Select two experimental objects. 5.4 Set the object and weight each object by using horizontal table 5.5 Prevent excessive sliding of any things on a sloped surface. 5.6 Calculate the static friction by using formula 5.7 Maintain the record of performed Job.	1	3
6	**Determine the value of "g'' by using a simple pendulum and draw $L - T^2$ graph.**	3	2

	6.1 Collect necessary tools and materials. 6.2 Check and set a simple pendulum. 6.3 Measure the acceleration of gravity different places. 6.4 Measure the weight of any bodies by knowing the value of "g''. 6.5 Calculate the Time period of any oscillated body by knowing the value of "g''. 6.6 Maintain the record of performed Job.		
7	**Determine the Young's modulus of a steel wire by Searle's apparatus or by using Vernier method.** 7.1 Collect necessary tools and materials. 7.2 Check and set Searle's apparatus using Vernier method. 7.3 Measure length of a steel wire. 7.4 Set the test specimen of a steel wire into the Searle's apparatus. 7.5 Verify elastic properties of any body. 7.6 Maintain the record of performed Job.	**2**	**3**
8	**Determine the specific gravity of solid heavier than insoluble in water by Hydrostatic balance.** 8.1 Collect necessary tools and materials 8.2 Check and set Hydrostatic balance. 8.3 Set the test specimen in hydrostatic balance. 8.4 Measure the weight of a solid particle. 8.5 Measure the weight of a solid particle keeping under water. 8.6 Measure the temperature of water by thermometer. 8.7 Calculate specific gravity of solid. 8.8 Calculate specific gravity of solid repeatedly and calculate average value. 8.9 Check and justify the accuracy various type of solid by knowing value of specific gravity. 8.10 Maintain the record of performed Job.	**2**	**2**
9	**Determine the specific gravity of liquid by specific gravity bottle.** 9.1 Collect necessary tools and materials. 9.2 Measure the weight of empty bottle. 9.3 Measure the weight of bottle with water. 9.4 5Measure the weight of bottle with specimen liquid as same amount of water 9.5 Repeat the task of 8.6 three time. 9.6 Record the data in the table of above task. 9.7 Calculate the specific gravity of liquid 9.8 Maintain the record of performed Job.	**2**	**3**
10	**Determine Velocity of sound resonance method.** Collect necessary tools and materials. 10.1 Check and set resonance air column. Fill up pipe of resonance pipe of column by water.	**2**	**2**

	10.2 Strike the resonance device on a pad. 10.3 Measure the wave length of sound. 10.4 Repeat the task of 9.5 three time. 10.5 Record the data in the table of above task. 10.6 Calculate the frequency and velocity of sound 10.7 Maintain the record of performed Job.		
	Total	**16**	**25**

Necessary Resources (Tools, equipment's):

Sl	Item Name	Quantity
1	Slide calipers	15
2	Screw gauge	15
3	Spherometer	15
4	Simple pendulum	10
5	Searle, s apparatus	5
6	Hydrostatic balance	5
7	Fly wheel	5
8	Tuning fork	10

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
1.	Higher secondary physics (First part)	Dr. Shahjahan Tapan Ishak Nurunnabi Prof. Golam Hossain Pramanik	
2.	A Text Book of properties of matter	N Subrahmanyam and Brijlal	
3.	A Text Book of Sound	N Subrahmanyam and Brijlal	

Website References:

Sl	Web Link:	Remarks
1	www.Youtube.com	Search here

Subject Code	Subject Name	Period per Week		Credit
27011	Basic Workshop Practice	T	P	C
		0	3	1

Rationale	Diploma in engineering Student performs the manufacture of machine parts and other mechanical engineering product following the drawing & design in industry/ factory. The subject covers only such topics which will enable the diploma engineers to identify and classify the different types of machine operation, tools selection and proper use in the field for various types of mechanical engineering product. The emphasis will be more on teaching practical aspect rather than theory.
Learning Outcome (Practical)	**At the end of the course the students will be able to:** • Apply occupational safety and health practices in the work place. • Use hand tools, equipment and machines used simple fitting and welding works. • Cut and size metals and sheets. • Perform simple fitting work. • Develop sheet metal. • Perform shielded metal arc welding (SMAW). • Perform gas welding. • Perform soldering. • Perform Resistance Welding.

Detailed Syllabus (Practical)

Unit	Experiment name with procedure	Class (3 Period)	Marks (Continuous)
1	**APPLY OCCUPATIONAL SAFETY AND HEALTH IN THE WORK PLACE.** 1.1. Identify Personal Protective equipment (PPE) as per requirement. 1.2. Select and collect PPE. 1.3. Apply safety and health procedure related to fitting and welding works. 1.4. State the importance of good housekeeping/Tidy up 1.5. Maintain Record of performed task.	1	2
02	**SHAPE METALS & SHEET METALS** 2.1. Select and collect tools and equipment.	2	3

	2.2. Select and collect metals as per Job requirement (metals limited to: MS rod, MS Flat bar, Angle bar and pipes). 2.3. Perform Lay out as per drawing. 2.4. Cut metals as per lay out using hand tools and machines (cutting tools may include-hacksaw, power saw, metal cutting disk and hand shares.). 2.5. Select and collect sheet metals as per Job requirement (Sheet metal limited to: MS sheet, GI Sheet and SS sheets and pipes). 2.6. Cut Sheet metals as per lay out using hand tools and machines (cutting tools may include-hacksaw, Snips, metal cutting disk, hand shares, Sharing machine). 2.7. Clean work place and store tools and equipment's. 2.8. Maintain Record of performed task.		
03	**PERFORM FITTING WORK FOR INTERNAL & EXTERNAL THREAD.** 3.1. Hold and clamp work piece as per job requirement. 3.2. Chip and file metals as per lay out. 3.3. Perform drilling and reaming as per job requirement using hand/bench drill machine. 3.4. Cut internal thread as per instruction. 3.5. Cut external thread as per instruction. 3.6. Check the part as per instruction. 3.7. Assemble internal & external thread. 3.8. Clean work place and store tools and equipment. 3.9. Maintain Record of performed task.	**2**	**2**
04	**DEVELOP SHEET METAL AND MAKE PRODUCTS.** 4.1. Select and collect tools and equipment as per job requirement. 4.2. Perform layout as per job requirement. 4.3. Cut sheets as per lay-out. 4.4. Bend, fold and roll sheets as per job. 4.5. Seam and hem sheets as per job requirement. 4.6. Perform riveting as per job requirement. 4.7. Solder the joints as per job requirement. 4.8. Rectangular tray, Belcha, Funnel etc. 4.9. Clean work place and store tools and equipment. 4.10 Maintain Record of performed task.	**2**	**2**
05	**PERFORM SHIELDED METAL ARC WELDING (SMAW) BEAD** 5.1. Select and collect tools and equipment as per job requirement. 5.2. Prepare work piece for welding. 5.3. Select and collect appropriate electrode.	**1**	**3**

	5.4. Set welding machine (set current, electrode in the holder and connect neutral line/earthing). 5.5. Make single and multiple straight beads. 5.6. Inspect welded joint quality. 5.7. Clean work place and store tools and equipment. 5.8. Maintain Record of performed task.		
06	**PERFORM SHIELDED METAL ARC WELDING (SMAW) 1F (LAP JOINT & BUTT JOINT)** 6.1. Select and collect tools and equipment as per job requirement. 6.2. Prepare work piece for welding. 6.3. Select and collect appropriate electrode. 6.4. Set welding machine (set current, electrode in the holder and connect neutral line/earthing). 6.5. Perform 1F (lap joint) welding lap joint. 6.6. Perform 1F(Butt joint) welding. 6.7. Inspect welded joint quality. 6.8. Clean work place and store tools and equipment. 6.9. Maintain Record of performed task.	**2**	**3**
07	**PERFORM SHIELDED METAL ARC WELDING (SMAW)1F(CORNER & T- JOINT)** 7.1. Select and collect tools and equipment as per job requirement. 7.2. Prepare work piece for welding. 7.3. Select and collect appropriate electrode. 7.4. Set welding machine (set current, electrode in the holder and connect neutral line/earthing). 7.5. Perform 1F (corner joint) welding. 7.6. Perform 1F (T- joint) welding. 7.7. Inspect welded joint quality. 7.8. Clean work place and store tools and equipment. 7.9 Maintain Record of performed task.	**2**	**3**
08	**PERFORM SHIELDED METAL ARC WELDING (SMAW) 1G (BUTT JOINT).** 8.1. Select and collect tools and equipment as per job requirement. 8.2. Prepare work piece for welding. 8.3. Select and collect appropriate electrode. 8.4. Set welding machine (set current, electrode in the holder and connect neutral line/earthing). 8.5. Perform 1G welding	**1**	**2**

	8.6. Inspect welded joint quality. 8.7. Clean work place and store tools and equipment. 8.8. Maintain Record of performed task.		
09	**PERFORM GAS WELDING AND BRAZING STRAIGHT BEAD & (1F LAP JOINT).** 9.1. Select and collect tools and equipment. 9.2. Prepare work piece for welding 9.3. Select and collect appropriate filler rod. 9.4. Select and collect appropriate flux as required. 9.5. Make different flames (carburizing, neutral and oxidizing). 9.6. Make straight bead with filler metal. 9.7. Perform 1F welding (Lap joint). 9.8. Inspect welded joint quality. 9.9. Clean work place and store tools and equipment's. 9.10. Maintain Record of performed task.	**2**	**3**
10	**PERFORM RESISTANCE WELDING.** 10.1 Demonstration of resistance welding machines. 10.2 Demonstration of accessories and tools for resistance welding. 10.3 Make spot welding joints. 10.4 Inspect welded joint quality. 10.5 Follow safe working procedures during working with spot welding machine. 10.6 Clean work place and store tools and equipment's. 10.7 Maintain Record of performed task.	**1**	**2**
	Total	**16**	**25**

Necessary Resources (Machinery):

Sl	ITEM NAME	QUANTITY
01	Arc Welding Machine	10 no
02	Gas Welding Set (Oxy-Acetylene Cylinder)	04 Set
03	Resistance Welding Machine	02 no
04	Pillar / Gaze Drill Machine	02 no
05	Hand Drill Machine	04 no
06	Hand Grinding Machine	10 no
07	Pillar/ Bench Grinding Machine	04 no
08	Power Saw Machine	01 no
09	Shearing Machine	02 no
10	Bending Machine	02 no

Necessary Resources (Tools and equipment's):

Sl	ITEM NAME	QUANTITY
1	Soldering Iron	05 nos
2	Table Vise	20 nos
3	Pipe Vise	04 nos
4	Anvil	05 nos
5	Hand shield	30 nos
6	Hand gloves	40 pairs
7	Chipping hammer	20 nos
8	Ballpin hammer (0.5, 01, 1.5 lb.)	Each 05 nos
9	Ball pin hammer 2 lb.	02 nos
10	Slage hammer 5lb	02nos
11	Mallet (Soft hammer) Various size	20nos
12	Tongs	20nos
13	Wire brash	20nos
14	Flat file (smooth, rough) 8",10",12"	Each group 12nos
15	Round file (smooth, rough) 6",8",10"	Each group 4nos
16	Half round file (smooth, rough) 8",10",12"	Each group 12nos
17	Triangle file (smooth, rough) 6",8",10"	Each group 6nos
18	Steel rule, Measuring Tap	Each 1dozon
19	Wire gauge	4nos
20	Virnear calipers	04nos
21	Micrometer (0-25mm)	02nos
22	Combination Players	10nos
23	Players(nose,cutting)	Each 05nos

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
1	Basic Sheet Metal Practice	J. W. Giachino	
2	Prathomic Fitting Sikkha	Hemanta Kumar Bhattacharia	
3	Workshop Practice Manual	K. Venkata Reddy	B.S Publications.
4	Mechaniacal Workshop Practice	K.C. John	PHI.
5	Welding Principles for Engineers	Morris	
6	Metal Fabrication	Robert L. O'con	
7	Workshop Technology-1	W.A.J. Chapman	Taylor & Francis

Website References:

Sl	WEB LINK	REMARKS
01	www.youtube	

Subject Code	Subject Name	Period/Week		Credit
27023	Machine Shop Practice-I	T	P	C
		1	6	3

Rationale	Diploma in Engineering Level students are required to acquire the knowledge and skill on concept of machine tools, Coolant & lubricants, basic lathe machine, Drilling machine, grinding machine, basic maintenance and lubrication system. By the completion of this course student will be able to perform different machine tools operation such as lathe machine operation, drilling machine operation, grinding machine operation. As such the knowledge of machine shop practice-1 the pre-requisite for these fields for effective discharge of their duties. These necessities the introduction of Mechanical Engineering subject in the curriculum of Diploma in Engineering level. The subject covers only such topics which will enable the diploma engineers to operate lathe machine, drilling machine, grinding machine and maintenance work and lubricating process of machine tools. Have been given more emphasis on practical aspect rather than theory in teaching learning approach.
Learning Outcome (Theoretical)	**At the end of the course the students will be able to:** ▪ Recognize commonly used machine tools. ▪ Carry out the OSH practice of different machine tools. ▪ Describe the functions of commonly used machine tools. ▪ State setting and operating procedure of the machine tools and accessories.
Learning Outcome (Practical)	**At the end of the course the students will be able to** ▪ Perform setup and operation on lathe machine. ▪ Perform facing, plain turning, step turning, taper turning, knurling, parting off operation on lathe machine. ▪ Perform drilling, boring, reaming, screw threading operation on lathe machine. ▪ Perform center punch, leather punch on lathe machine. ▪ Perform setup and operation on drilling machine. ▪ Perform single point cutting tool & sharpen twist drill on pedestal grinder. ▪ Carry out wheel dressing exercise on both pedestal grinder and surface grinder. ▪ Assemble grinding wheel on machine spindle. ▪ Carry out simple maintenance procedures, including lubrication.

Detailed Syllabus (Theory)

Unit	Topics with contents	Class (1 Period)	Final Marks
1.	**SAFETY PRACTICE OF MACHINE SHOP** 1.1 State Occupational Safety & Health (OSH). 1.2 Explain principle of starting and stopping machine tools. 1.3 State general safety precautions for man. 1.4 Explain general safety precautions for machine. 1.5 State safety precaution during lathe operation. 1.6 State safety precaution during drilling machine operation. 1.7 State safety precaution during grinding machine operation.	2	4
2	**MACHINE TOOLS, CUTTING FLUID & LUBRICANT** 2.1 State machine tools. 2.2 Classify commonly used machine tools. 2.3 List essential features of commonly used machine tools 2.4 Define cutting fluid. 2.5 Explain the necessity of cutting fluid. 2.6 Mention different types of cutting fluid. 2.7 Mention the cutting fluid used in different metals. 2.8 Define the lubricant. 2.9 Classify commonly used lubricants.	4	6
3	**BASIC OF LATHE MACHINE.** 3.1 State lathe machine 3.2 Classify different types of lathe machines. 3.3 Mention major components of lathe machine. 3.4 Explain the function of different parts of lathe machine. 3.5 Mention the accessories and attachments of lathe machine. 3.6 List the specification of Lathe machine. 3.7 Explain express basic calculations for speed, feed & depth of cut for lathe works & taper calculation. 3.8 State Taper turning and its method. 3.9 Describe single point cutting tools, and tool materials.	5	10

	3.10 Explain the single point cutting angles and their relevant functions.		
4	**DRILLING MACHINE.** 4.1 State drilling machine. 4.2 Classify different types of drilling machine. 4.3 Explain the function of different drilling machines. 4.4 Mention major components of drilling machine. 4.5 Explain work holding methods. 4.6 Explain express basic calculations for speed and feed. 4.7 Mention different types of twist drill and tool materials.	3	5
5	**GRINDING MACHINE.** 5.1 Define grinding machine. 5.2 Explain different types of grinding machines. 5.3 Distinguish among surface grinder, cylindrical grinder and pedestal/bench grinder. 5.4 Mention operations for the pedestal and surface grinder. 5.5 Describe different types of grinding wheels and bond uses.	2	5
		16	30

Detailed Syllabus (Practical)

Sl.	Experiment name with procedure	Class (3 Period)	Marks (Continuous)
1	**SETUP AND OPERATE ON LATHE MACHINE.** 1.1 Follow Occupational Safety & Health (OSH) practices. 1.2 Perform simple setup of machine, work piece, tool bit and set machine speed and feed. 1.3 Clean & store tools & equipment. 1.4 Maintain the record of perform task.	1	4
2	**PERFORM FACING OPERATION ON LATHE MACHINE** 2.1 Follow Occupational Safety & Health (OSH) practices. 2.2 Interpret drawing as per specification. 2.3 Select & Collect tools and equipment as per job requirements. 2.4 Setup job on machine 2.5 Perform facing operation.	2	4

	2.6 Clean & store tools & equipment. 2.7 Maintain the record of perform task.		
3	**PERFORM PLAIN TURNING OPERATION ON LATHE MACHINE.** 3.1 Follow Occupational Safety & Health (OSH) practices. 3.2 Interpret drawing as per specification. 3.3 Select & Collect tools and equipment as per job requirements. 3.4 Setup work piece. 3.5 Perform plain turning operation. 3.6 Clean & store tools & equipment. 3.7 Maintain the record of perform task.	2	3
4	**PERFORM STEP TURNING OPERATION ON LATHE MACHINE** 4.1 Follow Occupational Safety & Health (OSH) practices 4.2 Interpret drawing as per specification. 4.3 Select & Collect tools and equipment as per job requirements. 4.4 Setup work piece. 4.5 Perform step turning operation. 4.6 Clean & store tools & equipment. 4.7 Maintain the record of perform task.	2	3
5	**PERFORM TAPER TURNING OPERATION ON LATHE MACHINE** 5.1 Follow Occupational Safety & Health (OSH) practices. 5.2 Interpret drawing as per specification. 5.3 Select & Collect tools and equipment as per job requirements. 5.4 Setup work piece. 5.5 Perform taper turning operation. 5.6 Clean & store tools & equipment. 5.7 Maintain the record of perform task.	2	2
6	**PERFORM KNURLING OPERATION ON LATHE MACHINE** 6.1 Follow Occupational Safety & Health (OSH) practices. 6.2 Interpret drawing as per specification. 6.3 Select & Collect tools and equipment as per job requirements. 6.4 Setup work piece. 6.5 Perform knurling operation. 6.6 Clean & store tools & equipment. 6.7 Maintain the record of perform task.	1	2
7	**PERFORM PARTING OFF OPERATION ON LATHE MACHINE** 7.1 Follow Occupational Safety & Health (OSH) practices. 7.2 Interpret drawing as per specification.	1	2

	7.3 Select & Collect tools and equipment as per job requirements. 7.4 Setup work piece. 7.5 Perform parting off operation. 7.6 Clean & store tools & equipment. 7.7 Maintain the record of perform task.		
8	**PERFORM DRILLING OPERATION ON LATHE MACHINE** 8.1 Follow Occupational Safety & Health (OSH) practices. 8.2 Interpret drawing as per specification. 8.3 Select & Collect tools and equipment as per job requirements. 8.4 Setup work piece. 8.5 Perform drilling operation. 8.6 Clean & store tools & equipment. 8.7 Maintain the record of perform task.	1	2
9	**PERFORM BORING OPERATION ON LATHE MACHINE** 9.1 Follow Occupational Safety & Health (OSH) practices. 9.2 Interpret drawing as per specification. 9.3 Select & Collect tools and equipment as per job requirements. 9.4 Setup work piece. 9.5 Perform boring operation. 9.6 Clean & store tools & equipment. 9.7 Maintain the record of perform task.	1	2
10	**PERFORM REAMING OPERATION ON LATHE MACHINE** 10.1 Follow Occupational Safety & Health (OSH) practices. 10.2 Interpret drawing as per specification. 10.3 Select & Collect tools and equipment as per job requirements. 10.4 Setup work piece. 10.5 Perform reaming operation. 10.6 Clean & store tools & equipment. 10.7 Maintain the record of perform task.	1	2
11	**PERFORM SIMPLE SCREW THREAD OPERATION ON LATHE MACHINE** 11.1 Follow Occupational Safety & Health (OSH) practices. 11.2 Interpret drawing as per specification. 11.3 Select & Collect tools and equipment as per job requirements. 11.4 Setup work piece. 10.5 Perform simple screw thread operation. 10.6 Clean & store tools & equipment. 10.7 Maintain the record of perform task.	2	3

12	**PERFORM CENTER PUNCH ON LATHE MACHINE** 12.1 Follow Occupational Safety & Health (OSH) practices. 12.2 Interpret drawing as per specification. 12.3 Select & Collect tools and equipment as per job requirements. 12.4 Setup work piece. 12.5 Perform center punch operation. 12.6 Clean & store tools & equipment. 12.7 Maintain the record of perform task.	2	3
13	**PERFORM LEATHER PUNCH ON LATHE MACHINE** 13.1 Follow Occupational Safety & Health (OSH) practices. 13.2 Interpret drawing as per specification. 13.3 Select & Collect tools and equipment as per job 3requirements. 13.4 Setup work piece. 13.5 Perform leather punch operation. 13.6 Clean & store tools & equipment. 13.7 Maintain the record of perform task.	2	3
14	**PERFORM SINGLE POINT CUTTING TOOL ON PEDESTAL GRINDER.** 14.1 Follow Occupational Safety & Health (OSH) practices. 14.2 Interpret drawing as per specification. 14.3 Select & Collect tools and equipment as per job requirements. 14.4 Setup work piece. 14.5 Perform single point cutting tool. 14.6 Clean & store tools & equipment. 14.7 Maintain the record of perform task.	2	3
15	**PERFORM SETUP AND OPERATION ON DRILLING MACHINE.** 15.1 Follow Occupational Safety & Health (OSH) practices. 15.2 Perform simple setup of machine, work piece, tool bit and set machine speed and feed. 15.3 Clean & store tools & equipment. 15.4 Maintain the record of perform task.	1	2
16	**SHARPEN A TWIST DRILL ON THE PEDESTAL GRINDER.** 16.1 Follow Occupational Safety & Health (OSH) practices. 16.2 Interpret drawing as per specification. 16.3 Select & Collect tools and equipment as per job requirements. 16.4 Perform sharpen a twist drill. 16.5 Clean & store tools & equipment. 16.6 Maintain the record of perform task.	2	2

17	**DRILL A NUMBER OF HOLES WITH APPROPRIATE DRILL BIT.** 17.1 Follow Occupational Safety & Health (OSH) practices. 17.2 Interpret drawing as per specification. 17.3 Select & Collect tools and equipment as per job requirements. 17.4 Setup work piece. 17.5 Perform drill a number of holes. 17.6 Clean & store tools & equipment. 17.7 Maintain the record of perform task.	2	2
18	**CARRY OUT WHEEL DRESSING EXERCISE ON BOTH PEDESTAL GRINDER AND SURFACE GRINDER.** 18.1 Follow Occupational Safety & Health (OSH) practices. 18.2 Select & Collect tools and equipment as per job requirements. 18.3 Perform wheel dressing. 18.4 Clean & store tools & equipment. 18.5 Maintain the record of perform task.	2	2
19	**MOUNT GRINDING WHEEL ON MACHINE SPINDLE.** 19.1 Follow Occupational Safety & Health (OSH) practices. 19.2 Select & Collect tools and equipment as per job requirements. 19.3 Mount grinding wheel on machine spindle with balancing. 19.4 Clean & store tools & equipment. 19.5 Maintain the record of perform task.	1	2
20	**CARRY OUT SIMPLE MAINTENANCE PROCEDURES, INCLUDING LUBRICATION.** 20.1 Follow Occupational Safety & Health (OSH) practices. 20.2 Produce a maintenance schedule common used in machine shop. 20.3 Carry out simple maintenance procedures, including lubrication.	2	2
	Total	**32**	**50**

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

Sl	Item Name	Quantity
01	Lathe with related accessories	25 no's
02	Drilling with related accessories	25 no's
03	Grinding with related accessories	2 5no's

Recommended Software:

Sl	Name	Quantity
01	www.virtuallathe.co.nz	As Necessary

Recommended Books:

Sl	Book Name	Writer Name	Publisher Name & Edition
01	MACHINE SHOP PRACTICE	SOMENATH DE	
02	BASIC MACHINE SHOP PRACTICE I & II	V. K. Tejwani	
03	MACHINE TOOLS (WORKSHOP TECHNOLOGY)	R.N. DATTA	New Central Book Agency(P) Ltd.
04	WORKSHOP TECHNOLOGY I, II & III	W. A. J Chapman	
04	SHOP THEORY	James Anderson, Earl E, Tatro	Mc Graw Hill Book Company Fifth Edition
05	TECHNOLOGY OF MACHINE TOOLS	By Steve Krar and Arthur Gill and Peter Smid and Robert J. Gerritsen	Mc Graw Hill Book 8th edition

Website References:

Sl	Web Link	Remarks
01	https://blogpuneet.files.wordpress.com/2013/07/introduction-to-basic-manufacturing-processes-and-workshop-technology.pdf	
02	https://reddragonsoftware.co.nz/virtual-lathe-software/	

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