

COURSE/MODULE TEMPLATE

SEMESTER: 1

COURSE NAME: ENGINEERING DRAWING-1

COURSE CODE: MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Use the fundamentals of drawing and understand the importance of Scale, lines and lettering.
✓ Understanding how to read a drawing.
✓ Understand different types of line geometric construction.
✓ Understand different methods of orthographic projection and its importance in drawing.
✓ Application of orthographic projection and isometric projection.

THEORY HOURS: 60hrs PRACTICAL HOURS: 100hrs THEORY MARKS: 100 PRACTICAL MARKS:50

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH & practical hours	Marks
1	Introduction	<ul style="list-style-type: none">✓ Understand the scientific facts, concepts, principle and procedure of engineering drawing used in tool design, process planning, estimation, inspection and QC including supervisory management to express the ideas, conveying instructions for carrying out jobs in tool and die technology.✓ Understand the media used for engineering drawing.	<ul style="list-style-type: none">• Introduction and observation of engineering drawing practice in the tool room environment and manufacturing industry.• Definition of sketch, mechanical and computer generated drawing.• Classification of drawing set and related information.• Industrial drafting process from product conception to production.	(10+10)	30

			<ul style="list-style-type: none"> • Red link diagram and subject objective. • Integrate the flow of engineering drawing tool room. • Select reference material and ISO norms. • Sketch flow chart of engineering drawing process of Tool Room. • Introduction to drawing instruments accessories and aids, concept of standard drawing sheet. 		
2	Unit II: Basics of drawing- Scale, lines and lettering	<ul style="list-style-type: none"> ✓ At the end of this unit ,student should be able to understand how to represent the drawing using the rules followed with the help of geometric dimensions and tolerances. ✓ To scale, line and lettering drawing and practical in different lines and lettering. Drawing of different line and letters in drawing book. ✓ Procedure for drawing, straight line, angles, polygons, circle, all drawing drawn in sketch book. ✓ Drawing of object as per 1st & 3rd angle projection method, Procedure for drawing different view in 1st & 3rd angle. ✓ Procedure of indication of dimension 	<ul style="list-style-type: none"> • Introduction to scale, line and lettering its classification. • Choice and use of BIS norms for scale, line and lettering. • Selecting of Various scales, line and lettering. • Introduction & Advance geometrical Construction • Definition: Straight line angles, polygons, circle areas. • Conic Sections: Ellipse, Parabola, Hyperbola. • Other Curves: helix, cycloid, involutes. • Introduction to orthographic, • Different view and plane-identification. • Definition of plots, lines, planes, solids. • Principal of quadrants and panes. • Drawing of difference view of paints in 1st and 3rd angle projection • Introduction to dimension , • Definition: functional dimension, Non –functional dimension auxiliary dimension. • Rules of dimensioning. method of dimensioning, indication of dimension 	(30+60)	70

3	Unit III: Isometric view	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand how to project a drawing using the following projections: ✓ Drawing projection of plane and point, ✓ Drawing of isometric view of different object. ✓ Conversion of Isometric view to orthographic projection. 	<ul style="list-style-type: none"> • Introduction to Isometrics drawing definition of Isometric using the coordinate system. • Isometric projection of planes, prisms, pyramids, cylinders, cones, irregular object. • Dimensioning of Isometric drawing chain dimension parallel dimension Oblique dimension Align dimension, Drafting of object. • Isometric part drawing drafted in orthographic view as per 1st & 3rd angle projection method. 	(10+30)	50
			<ul style="list-style-type: none"> • Review & class test 	10 hrs	

COURSE WISE DETAILS CONTENTS

Program Name	:DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: I
Course Title	: ENGINEERING DRAWING-1
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
02	--	06	04	70	--	30	50	150

Rationale:

Understand the scientific facts, concepts, principles and procedures of engineering drawing used in tool design, manufacturing, process planning, estimation, inspection and QC including supervisory management to express the ideas, conveying instructions for carrying out jobs in Tool & Die Technology. It is also useful in understanding technology subject such as tool design, workshop practice, production planning & estimation, supervisory management, CAD by achieving basic drawing skills, utilization and interpreting drawings. It also describes the concepts, principles and procedures of drawing of machine elements to understand machine maintenance and service manuals and related technical catalogue.

Outcomes:

- Understand the concepts, principle and procedure of engineering drawing used in tool design.
- Able to read and draw the drawing carefully by following the GD&T
- Understand different methods of geometric construction orthographic projection, and isometric projection and its importance in engineering drawing.
- Understand the elements of assembly and drawing process to draw assembly drawing, detail drawing and bill of material.

Theory:

Topic and Contents	Hours	Marks
<p>Topic 1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none">✓ Understand the scientific facts, concepts, principle and procedure of engineering drawing used in tool design, process planning, estimation, inspection and QC including supervisory management to express the ideas, conveying instructions for carrying out jobs in tool and die technology.✓ Understand the media used for engineering drawing. <p>Contents:</p> <p>1.1 Use and importance of engineering drawing environment and manufacturing industry.</p> <ul style="list-style-type: none">• Definition of sketch, mechanical and computer generated drawing.• Classification of drawing set and related information.• Industrial drafting process from product conception to production.• Red link diagram and subject objective.• Integrate the flow of engineering drawing tool room.• Select reference material and ISO norms.• Sketch flow chart of engineering drawing process of Tool Room.• Introduction to drawing instruments accessories and aids, concept of standard drawing sheet.	10+10	30
<p>Topic 2: Basics of drawing</p> <p>Objectives:</p> <ul style="list-style-type: none">✓ At the end of this unit Student should be able to understand the importance of scale, line and lettering in engineering drawing. Practice exercise of scale, lines and lettering in drawing books. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none">• Introduction to scale, line and lettering its classification.• Choice and use of BIS norms for scale, line and lettering.• Selecting of Various scales, line and lettering.• Introduction & Advance geometrical Construction• <u>Definition</u>: Straight line angles, polygons, circle areas.• <u>Conic Sections</u>: Ellipse, Parabola, Hyperbola.• <u>Other Curves</u>: helix, cycloid, involutes.• Introduction to orthographic,• Different view and plane-identification.• Definition of plots, lines, planes, solids.• Principal of quadrants and panes.• Drawing of difference view of paints in 1st and 3rd angle projection• Introduction to dimension ,• <u>Definition</u>: functional dimension, Non –functional dimension auxiliary dimension.	30+60	70

<ul style="list-style-type: none"> Rules of dimensioning. method of dimensioning, indication of dimension 		
Topic 3: Isometric view Objectives: <ul style="list-style-type: none"> ✓ At the end of this unit student should be able To understand how to project a drawing using the following projections: ✓ Drawing projection of plane and point, and isometric view of different object. ✓ Conversion of Isometric view to orthographic projection. Contents: 3.1 Introduction and to example of simple and advanced geometrical construction. <ul style="list-style-type: none"> Introductionto Isometrics drawing definition of Isometric using the coordinate system. Isometric projection of planes, prisms, pyramids, cylinders, cones, irregular object. Dimensioning of Isometric drawing chain dimension parallel dimension, Oblique dimension Align dimension, Drafting of object. Isometric part drawing drafted in orthographic view as per 1st & 3rd angle projection method. 	10+30	50
Review and class test	10	
Total	160	150

Intellectual Skills:

- 1) Note down the sequence related to the design aspect to understand the drawing.
- 2) Draw basic level geometrical/mechanical drawings and charts.
- 3) Read and interpret technical customer drawings

Motor Skills:

- 1) Follow instructions and work on areas to design a drawing
- 2) complete the assigned tasks with minimum supervision

Learning Resources:

1. Books:

AUTHOR	TITLE	PUBLISHER
Bhatt N. D.	Elementary Engineering Drawing	Charotar book stall, Anand.
Bhatt N. D.	Geometrical & Machine Drawing	Charotar book stall, Anand.
Gupta, Mahajan& Sharma	A First Year Engineering Drawing	SatyaPrakashan, New Delhi.
Gupta, Mahajan& Sharma	A Second Year Engineering Drawing	SatyaPrakashan, New Delhi.
A C Parkinson	Engineering Workshop Drawing	Pitman Publisher
PS Gill	Engineering Drawing	SK Kataria& Sons, New Delhi.
RK Dhawan	Engineering Drawing	S Chand & Co., New Delhi.
NS Kumar	Engineering Drawing	Tata Publication, New Delhi.
D.N. Arora	Fundamentals of Engineering Drawing	India Publishing House, Delhi.
Cecil Jensen, Jay Helsel	Engineering Drawing & Design	McGraw Hill Book Co.
BIS	SP-46: 1998	Bureau of Indian Standards, New Delhi.

COURSE/MODULE TEMPLATE

COURSE/MODULE TEMPLATE

SEMESTER: 1

COURSE NAME:ENGINEERING METROLOGY-1

COURSE CODE: MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understand about the use and application of engineering metrology.
✓ Understand need of metrology in mechanical industry.
✓ Describe and explain the use of measurement, its unit and unit system.
✓ Get knowledge about different measuring instruments, and know how to use it.
✓ Explain and calculate the least count of various measuring instruments like vernier calliper, micrometre, bevel protector etc.
✓ Get knowledge about accuracy and errors in measuring.
✓ Explain the use and application of different advance measuring instruments like tool maker microscope, profile projector, linear height master and CMM.
✓ Understand different types of gears and different types of comparators.

THEORY HOURS: 60hrs

PRACTICAL HOURS:NA

THEORY MARKS: 100

PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit 1: Introduction	✓ After completion of course Student should be able to understand importance of metrology in engineering branch.	To understand about the scope and need of metrology, objective of metrology. To learn about definition and concept of	5	10

		<ul style="list-style-type: none"> ✓ Understand about measuring method, measuring instruments. ✓ Get knowledge about accuracy of work, limits and tolerances use in engineering. 	<p>(measuring range, international system and units, readability, sensitivity, repeatability, accuracy, precision, uncertainty of Measurement).</p>		
2	Unit 2: Measurement	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand about the measuring instrument and measuring method. ✓ Get knowledge about how to measure with different measuring instruments. ✓ Know about what parameter use for measuring with different instrument and what its least count. ✓ What is accuracy we can get and how to take care of measuring instrument? ✓ Get knowledge about other supporting instrument like surface plate, different blocks. ✓ Use of different gauges and measurement. 	<p>To understand basic measuring instrument its classification its use and application like steel rule, calliper, surface plate, angle plate, try square, straightedge, feeler gauge, etc.</p> <p>Classification of linear measuring instrument</p> <p>To understand basic measuring instrument surface plate i.e., introduction, concepts, material of surface plate, size, accuracy, care and application.</p> <p>To understand basic measuring instrument angle plate i.e., introduction, concepts, size, accuracy, care and application.</p> <p>To understand basic measuring instrument 'V' block i.e., introduction, concepts, and application.</p> <p>To understand basic measuring instrument try square/ engineering square i.e., introduction, concepts, care and application.</p> <p>To understand basic measuring instrument straight edge i.e., introduction, concepts, classification, use and application.</p>	25	30

			<p>To understand basic measuring instrument radius gauge i.e., introduction, concepts, classification and application.</p> <p>To understand basic measuring instrument feeler gauge i.e., introduction, concepts, and application.</p> <p>To understand basic measuring instrument pitch screw gauge i.e., introduction, concepts, Use and application.</p> <p>To understand basic measuring instrument venire calliper i.e., introduction, concepts, reading the venire scale, types of venire calliper, least count calculation, errors observed in venire calliper, precautions in use of venire calliper, and application.</p> <p>To understand basic measuring instrument venire height gauge i.e., introduction, concepts, reading, least count calculation, errors observed in venire height gauge, precautions in use of venire height gauge, and application.</p> <p><u>Angular measurement</u></p> <p>To understand basic measuring instrument bevel protector i.e., introduction, concepts, classification, description of various part, and application.</p>		
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			To understand basic measuring instrument combination set i.e., introduction, concepts, and application.		
3	Unit 3: Errors	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand different types of errors in measuring of component with different instrument. ✓ Understand how the error will generate and how to know about it. ✓ How to remove it or how to decrease it. ✓ Calibration of measuring instruments. 	To understand the source of error for measuring equipment i.e., types of error, static error, controllable error, random error, concept of precision and accuracy.	5	25
4	Unit 4: Limits, fits & gauges	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to ✓ Know what is limits, fits, and tolerances. ✓ What are the types of limits, fits and tolerances. ✓ Concept of allowances and interchangeability. ✓ Getting the knowledge about the gauges, its types and how to design it. ✓ Selection of different material for different gauges. ✓ 	<p>Introduction and overview of gauges, Need, Concept, Features of Limit, Fit, and Tolerances, Inspection of Gauges, Usage and Application of Gauges, Classification of gauges, Inspection Gauge, Reference Gauge, Conceptual Design of Gauges.</p> <p>Design Parameters</p> <p>Introduction and Principles, Overview of Design Parameters, Tolerances, Wear Allowances, Supportive Elements, Surface Roughness, Wear Resistance, Manufacturing methods of gauges and Practically use of TAYLOR's Principle.</p> <p>Design of Gauges</p> <p>Introduction, Design Concept and overview of gauges, Material selection method, Calculations of Gauge Manufacturing, Assembly of Gauge.</p>	10	25
5	Unit 5: Screw thread & gear metrology	<ul style="list-style-type: none"> ✓ At the end of this unit Student can able to understand the concept of Screw thread metrology, identify and apply different methods for checking procedure for measurement of thread by different methods. 	<p>Screw thread terminology and testing</p> <p>Concept of screw thread, thread parameter, errors of pitch, various types of thread, e.g. metric and B.S.W. Concept of measurement.</p> <p>Gear thread terminology and testing</p> <p>Concept of gear terminology , optical instrument, master profile , gear tooth vernier,</p>	10	10

		✓ Terminology of gears , checking parameters of spur gear, compare actual size with drawing or master template	gear parameters measurement Spur gear terminology Comparing actual size with master templates.		
Review &class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: I
Course Title	: ENGINEERING METROLOGY-1
Course Code	:MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
3	--	---	03	70	--	30	--	100

Rationale:

In The Subject is intended to teach concepts, principles and procedures of engineering metrology to acquire skills in handling and maintaining the measuring instruments for effective use, maintaining standards of inspection and quality control. These skills are used in core technology subjects like workshop practice, manufacturing tools & dies, tool design practice and cost estimation.

Outcomes:

- Understand about the use and application of engineering metrology.
- Understand need of metrology in mechanical industry.
- Describe and explain the use of measurement, its unit and unit system.
- Get knowledge about different measuring instruments, and know how to use it .
- Explain and calculate the least count of various measuring instruments like vernier calliper, micrometre, bevel protector etc
- Get knowledge about accuracy and errors in measuring.
- Explain the use and application of different advance measuring instruments like tool maker microscope, profile projector, linear height master and CMM.
- Understand different types of gears and different types of comparators.

Topic and Contents	Hours	Marks
<p>Topic 1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand importance of metrology in engineering branch. ✓ Understand about measuring method, measuring instruments. ✓ Get knowledge about accuracy of work, limits and tolerances use in engineering. <p>Contents:</p> <p>1.1 To understand about the scope and need of metrology</p> <ul style="list-style-type: none"> • Objective of metrology. • To learn about definition and concept of (measuring range, international system and units, readability, sensitivity, repeatability, accuracy, precision, uncertainty of Measurement). 	5	10
<p>Topic 2: Measurement</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand about the measuring instrument and measuring method. ✓ Get knowledge about how to measure with different measuring instruments. ✓ Know about what parameter use for measuring with different instrument and what its least count . ✓ What is accuracy we can get and how to take care of measuring instrument? ✓ Get knowledge about other supporting instrument like surface plate, different blocks. ✓ Use of different gauges and measurement <p>Contents:</p> <p>1.1 To understand basic measuring instrument its classification its use and application like steel rule, calliper, surface plate, angle plate, try square, straightedge, feeler gauge, etc. Classification of linear measuring instrument</p>	20	30

<ul style="list-style-type: none"> • To understand basic measuring instrument surface plate i.e., introduction, concepts, material of surface plate, size, accuracy, care and application. • To understand basic measuring instrument angle plate i.e., introduction, concepts, size, accuracy, care and application. • To understand basic measuring instrument 'V' block i.e., introduction, concepts, and application. • To understand basic measuring instrument try square/ engineering square i.e., introduction, concepts, care and application. • To understand basic measuring instrument straight edge i.e., introduction, concepts, classification, use and application. • To understand basic measuring instrument radius gauge i.e., introduction, concepts, classification and application. • To understand basic measuring instrument feeler gauge i.e., introduction, concepts, and application. • To understand basic measuring instrument pitch screw gauge i.e., introduction, concepts, Use and application. • To understand basic measuring instrument vernier calliper i.e., introduction, concepts, reading the vernier scale, types of vernier calliper, least count calculation, errors observed in vernier calliper, precautions taken while using vernier calliper, and application. • To understand basic measuring instrument vernier height gauge i.e., introduction, concepts, reading, least count calculation, errors observed in vernier height gauge, precautions in use of vernier height gauge, and application. <p>2.2 Angular measurement</p> <ul style="list-style-type: none"> • To understand basic measuring instrument bevel protector i.e., introduction, concepts, classification, description of various part, and application. • To understand basic measuring instrument combination set i.e., introduction, concepts, and application. 		
<p>Topic 3: Errors</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand different types of errors in measuring of component with different instrument. ✓ Understand how the error will generate and how to know about it. ✓ How to remove it or how to decrease it. ✓ Calibration of measuring instruments. 	5	25

<p>Contents:</p> <p>3.1To understand the source of error for measuring equipment.</p> <ul style="list-style-type: none"> • i.e., types of error, static error, controllable error, random error, concept of precision and accuracy. 		
<p>Topic 4:Limits, fits & gauges</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to ✓ Know what is limits, fits, and tolerances. ✓ What are the types of limits, fits and tolerances. ✓ Concept of allowances and interchangeability. ✓ Getting the knowledge about thegauges, its types and how to design it. ✓ Selection of different material for different gauges. <p>Contents:</p> <p>4.1To understand about introduction</p> <ul style="list-style-type: none"> • Introduction and overview of gauges, Need, Concept, Features of Limit, Fit, and Tolerances, Inspection of Gauges, Usage and Application of Gauges, Classification of gauges, Inspection Gauge, Reference Gauge, Conceptual Design of Gauges. <p><u>Design Parameters</u></p> <ul style="list-style-type: none"> • Introduction and Principles, Overview of Design Parameters, Tolerances, Wear Allowances, Supportive Elements, Surface Roughness, Wear Resistance, Manufacturing methods of gauges and Practically use of TAYLOR’s Principle. <p><u>Design of Gauges</u></p> <ul style="list-style-type: none"> • Introduction, Design Concept and overview of gauges, Material selection method, Calculations of Gauge Manufacturing, Assembly of Gauge. 	15	25
<p>Unit 5:Screw thread & gear metrology</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student can able to understand the concept of Screw thread metrology, identify and apply different methods for checking procedure for measurement of thread by different methods. ✓ Terminology of gears , checking parameters of spur gear, compare actual size 	10	10

with drawing or master template		
<p>Contents:</p> <p>5.1 <u>Screw thread terminology and testing</u></p> <ul style="list-style-type: none"> • Concept of screw thread, thread parameter, errors of pitch, various types of thread, e.g. metric and B.S.W. Concept of measurement. <p><u>Gear thread terminology and testing</u></p> <ul style="list-style-type: none"> • Concept of gear terminology , optical instrument, master profile , gear tooth vernier, gear parameters measurement • Spur gear terminology • Comparing actual size with master templates. 		
Review and class test	5	
Total	60	100

Intellectual Skills:

- 1) work as an effective team members ensuring smooth execution of the inspection of the product in an efficient and timely manner with the help of measuring instruments
- 2) Note down observations (if any) related to the design aspect

Motor Skills:

- 1) Can measure any type of components with the applications of measuring devices..
- 2) Carefully do the inspection of assembly parts to gain its accuracy.

Learning Resources:

5. Books:

AUTHOR	TITLE	PUBLISHER
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R.K. Jain	Engineering Metrology	Khanna Publishers
William Winchel	Inspection & Measurement in Manufacturing	--
ASM International	ASM Hand Book Vol.17	ASM International
S.N. Mahayana S.C. Sibilant N.M. Ambedkar	Metrology and Quality Control	NiraliPrakashan BudwarPeth, Pune.
Sunder K. B.G. Rao MadhukarPuri	Engineering Measurement	SatyaPrakashan New Delhi.
M. Mahajan	Statistical Quality Control	--
	<p>Models</p> <ul style="list-style-type: none"> ➤ Mouser Practice Test Piece-‘A’, ‘B’, ‘C’, ‘D’, ‘E’, (For Engg. Measurement) ➤ Acrylic Test Models (Ruler (Sinus Lineal) 100mm, VernierCaliper, Micrometer 0 – 25mm, Inside Micrometer With Inside Ring, Universal Bevel Protector, Angle Protector, Dial Gauge) ➤ Teachware Complete Part – 1 	<p>Herbert ME GMBH</p> <p>TechnischeLehrnitte and Mebsgerc MIT Reparaturdier Sandbuhl 10 78736 Epefenderf A.M. Meckar</p>

COURSE/MODULE TEMPLATE

SEMESTER: 1

COURSE NAME: COMMUNICATION SKILLS-I

COURSE CODE: MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understanding facts, concept, principles and procedures of general communication.
✓ Acquiring proficiency in the language for effective communication.
✓ To develop communication skills among students.
✓ Learning how to communicate with others regarding their personal career growth.

THEORY HOURS : 60hrs

PRACTICAL HOURS :N.A. THEORY MARKS: 100 PRACTICAL MARKS:N.A

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Passages for comprehension	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to learn and use the vocabulary items of general use besides words from the register of physical and social sciences. ✓ 	Language of science My thousandth goal Rip Van Winkle comes to tour Robotic Revolution Non- Destructive testing Designing a car The wonders of camera Desalination or Desalting process	15	20
2	Short stories	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand and develop ability of speaking in the class, to ask questions as well as to answer them. 	<ul style="list-style-type: none"> • Selfish Giant-Oscar Wilde • A letter to god- Gregarious Lopex Y Fuentes • An Astrologer's Day – R.K.Narayan • The Last Leaf- O' Henry 	10	20

			The Male Factor – Anton Chekov		
3	Applied grammar	✓ After completion of course Student should be able to understand a passage, identified words and expressions in an appropriate manner.	<ul style="list-style-type: none"> • Determiners • Auxiliaries • Tenses • Conditionals 	20	40
4	Paragraph writing on topics of general interest	✓ At the end of this unit Student should be able to develop skills in writing , reading, listening and speaking of the language.	<ul style="list-style-type: none"> • As per text book of reference, • Use of perfect vocabulary and grammar. • Paragraph writing. • Unseen passages. • Essay writing • Letter writing with its types • Compositions • How to develop their CV/RESUMES as per their requirement. 	10	20
Review & class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	: Diploma in Tool and Die Engineering
Semester	: I
Course Title	: COMMUNICATION SKILLS
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
3	--	--	03	70	--	30	--	100

Rationale:

Understanding the facts, concepts, principles and procedures of general communications skills to be used by the student, professionals and citizens. English occupies a important role in the our curriculum. it is the important library language in India, as it acts as a barrier between the technical and scientific knowledge.

After the study they can able to communicate effectively which is very essential. So, emphasis is given for the development of English communication skills among the students.

Outcomes:

- Able to understand and communicate in English effectively.
- Can use appropriate words with appropriate use of English grammar.
- Develop their ability to read, write, and speak English
- Able to write any type of letters-Official, Personal and semi-official letters

Topic and Contents	Hours	Marks
<p>Topic 1: Passages for comprehension</p> <p>Objectives:</p> <p>✓ After completion of course Student should be able to learn and use the vocabulary items of general use besides words from the register of physical and social sciences</p> <p>Contents:</p> <p>1.2 Basic knowledge how to develop their vocabulary skills</p> <ul style="list-style-type: none"> • Language of science • My thousandth goal • Rip Van Winkle comes to town • Robotic Revolution • Non- Destructive testing • Designing a car • The wonders of camera • Desalination or Desalting process 	15	20
<p>Topic 2: Short stories</p> <p>Objectives:</p> <p>✓ After completion of course Student should be able to understand and develop ability of speaking in the class, to ask questions as well as to answer them.</p> <p>Contents:</p> <p>2.1 Understanding the short stories</p> <ul style="list-style-type: none"> • Selfish Giant-Oscar Wilde • A letter to god- Gregarious Lopez Y Fuentes • An Astrologer's Day – R.K.Narayan • The Last Leaf- O' Henry • The Male Factor – Anton Chekov 	10	20
<p>Topic 3: Applied grammar</p> <p>Objectives:</p> <p>✓ After completion of course Student should be able to understand a passage, identified words and expressions in an appropriate manner.</p> <p>Contents:</p> <p>3.1 Understand and use and importance of grammar</p> <ul style="list-style-type: none"> • Determiners • Auxiliaries • Tenses • Conditionals 	20	40
<p>Topic 3: Paragraph writing on topics of general interest</p> <p>Objectives:</p>	10	20

<p>✓ At the end of this unit Student should be able to develop skills in writing ,reading, listening and speaking of the language.</p> <p>Contents:</p> <p>4.1:learning how to read and write a paragraph</p> <ul style="list-style-type: none"> • Use of perfect vocabulary and grammar. • Paragraph writing. • Unseen passages. • Essay writing • Letter writing with its types • Compositions • How to develop their CV/RESUMES as per their requirement. 		
Review & class test	60	100

Intellectual Skills:

1. Able to understand and communicate in English effectively.
2. Can use appropriate words with appropriate use of English grammar.

Motor Skills:

- Develop their ability to read, write, and speak English
- Able to write any type of letters-Official, Personal and semi-official letters

Learning Resources:

6. Books:

AUTHOR	TITLE	PUBLISHER
Allen	Living english structure	--
Thomson & martinet	Practical english grammar(exercise-1)	--
Grant taylor	English conversation practice	--
Somaiya publications pvt. Ltd. Bombay	Communication skills for technical student book-1	Somaiya publications pvt. Ltd.

COURSE/MODULE TEMPLATE

SEMESTER: 1

COURSE NAME: MATHEMATICS-I

COURSE CODE: MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understanding facts, concept, of mathematical needs in technical subjects.
✓ Use of mathematical technique to solve engineering technique.
✓ To develop mathematical skills among students.

THEORY HOURS :60hrs

PRACTICAL HOURS :NA THEORY MARKS: 100

PRACTICAL MARKS: NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit 1: Algebra	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand what is sequence and series. ✓ general terms of a series, ✓ formulation of series. ✓ Factorial notation. ✓ Principle of partial fraction. ✓ Determinants and matrices ✓ Permutation and combination ✓ Exponents and its series. 	Sequence and series Arithmetic progression Geometrical progression Harmonica progression Permutation Combination Binomial theorem Partial fractions Determinants Exponential series	20	20
2	Unit 2: Trigonometry	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand the properties of triangle. ✓ Relation between sides & angle of triangle. ✓ Sums & difference formula. 	Trigonometric ratio Properties of triangle Trigonometric equations	15	40
3	Unit 3: Differential calculus	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand definition of function, constant, variable, limit & evaluation of limits ✓ Logarithm function ✓ Trigonometric functions ✓ Partial differentiations 	Successive Differentiation Tangent & normal, Curvature, Maxima & minima partial Differentiation Velocity and acceleration applications.	20	40
Review and class test				5	

COURSE WISE DETAILS CONTENTS

Program Name : DIPLOMA IN TOOL AND DIE ENGINEERING

Semester : I

Course Title : MATHEMATICS-I

Course Code : MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
3	--	--	03	70	--	30	--	100

Rationale:

Mathematics forms the backbone of all technologies and hence occupies an important place in the curriculum of technical education. This is very important for the future self-development of students.

In designing the curriculum for foundation course the admission level of this course has been considered as 10th board examination and mathematical needs of technical subjects has been given due consideration.

Outcomes:

- Get knowledge about need of mathematics.
- Understanding the algebra, trigonometry and differential calculus and their use.

Topic and Contents	Hours	Marks
Topic 1: Algebra Objectives: <ul style="list-style-type: none">✓ After completion of course Student should be able to understand what is sequence and series.✓ general terms of a series,✓ formulation of series.✓ Factorial notation.✓ Principle of partial fraction.✓ Determinants and matrices	20	20

<ul style="list-style-type: none"> ✓ Permutation and combination ✓ Exponents and its series. <p>Contents:</p> <p>1.2 Introduction how to start and operate computer.</p> <ul style="list-style-type: none"> • Sequence and series • Arithmetic progression • Geometrical progression • Harmonica progression • Permutation • Combination • Binomial theorem • Partial fractions • Determinants • Exponential series 		
<p>Topic 2: Trigonometry</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand the properties of triangle. ✓ Relation between sides & angle of triangle. ✓ Sums & difference formula. <p>Contents:</p> <p>2.1 Introduction use & application of different types, properties of triangle & their representation</p> <ul style="list-style-type: none"> • Trigonometric ratio • Properties of triangle • Trigonometric equations • 	15	40
<p>Topic 3: Differential calculus</p> <p>Objectives:</p> <p>After completion of course Student should be able to understand definition of function, constant, variable, limit & evaluation of limits</p> <p>Logarithm function</p> <p>Trigonometric functions</p> <p>Partial differentiations</p> <p>Contents:</p>	20	40

4.1.Introduction to logarithms, trigonometric and differentiations		
<ul style="list-style-type: none"> • Differentiation • Successive Differentiation • Tangent & normal, Curvature, Maxima & minima • partial Differentiation • Velocity and acceleration applications. 		
Review & class test	5	
Total	60	100

Intellectual Skills:

- 1) Understanding the algebra, trigonometry and differential calculus and their use.

Motor Skills:

- 1) Get knowledge about need of mathematics.
- 2) Solving the algebra, trigonometry and differential calculus problems and their solutions.

Learning Resources:

7. Books:

AUTHOR	TITLE	PUBLISHER
--	Applied mathematics	Popular book depot bhopal
T.T.T.I.Bhopal	Mathematics for polytechnic Vol.1	T.T.T.I.Bhopal
--	Applied mathematics	Deepak prakashan Gwalior
Hall & Knight	Algebra	--
S.L.Loney	trigonometry	S.Chand & Company, New Delhi.
G.Prasad	Calculus	Khanna publishers – New Delhi

COURSE/MODULE TEMPLATE

SEMESTER: 1

COURSE NAME: APPLIED PHYSICS -I

COURSE CODE: MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understanding facts, concept, of physics to develop new technology.
✓ Use of physics technique to solve engineering technique.
✓ Knowledge of science which helps the students to develop by applications of newer technologies.

THEORY HOURS :50hrs

PRACTICAL HOURS :NA

THEORY MARKS: 100

PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Physics and its importance in technical education.	<ul style="list-style-type: none">✓ After completion of course Student should be able to understand importance of fundamental science✓ Purpose of learning physics✓ Applications in daily life	<ul style="list-style-type: none">• Introduction to physics• Purpose of learning physics Applications in daily life	1	2
2	S.I unit	After completion of course Student should be able to understand types of unit and its importance	<ul style="list-style-type: none">• S.I units , base and supplementary units, derived units.• Units and dimensions with symbols , abbreviation &precaution.	2	4

3	Force and motion	✓ After completion of course Student should be able to understand distinction between rotary and circular motion, velocity , time and distance graph	<ul style="list-style-type: none"> • Classification of motion • Concept of particle in mechanism • Characteristic of different type of motion, Newton's law of motion	3	5
4	Circular motion	After completion of course Student should be able to understand centripetal and centrifugal forces , banking of roads and bending of cyclist	<ul style="list-style-type: none"> • Circular motion and related physical quantities Relation between linear and angular velocity.	3	4
5	Periodic motion	After completion of course Student should be able to understand examples of periodic motion necessary conditions for the appearance and pursuance of periodic motion	<ul style="list-style-type: none"> • Classification of periodic motion based on forces acting on the source • Condition for the motion Characteristics of SHM	4	5
6	Waves and wave motion	After completion of course Student should be able to understand wave equation	<ul style="list-style-type: none"> • Wave propagation • Wave equations • Transverse waves Longitudinal waves.	4	5
7	Ultrasonic	✓ After completion of course Student should be able to understand what is sound, its types ✓ Frequencies of sound ✓ application of ultrasonic, ✓ Flawless detection, cold welding and cleaning, etc	<ul style="list-style-type: none"> • Audible frequencies, • infrasonic, ultrasonic, production of ultrasonic, • pizo electric, pizo electric detectors thermal detector	3	5
8	Gravitation	✓ After completion of course Student should be able to understand what is gravity ✓ Newton's principle principle and technique of launching of artificial	<ul style="list-style-type: none"> • Newton's law of gravitation, • gravitation field, 	4	5

		satellite ,natural and man-made satellite	<ul style="list-style-type: none"> relation between 'G' and 'g'. factors influencing 'g'. <p>Conditions for overloading and weightlessness in space</p>		
9	Molecular phenomena in solid liquid and gases	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand what is matter ,its classifications and properties ✓ Kinetic theory of matter <p>relation of internal energy with quantity of heat and temperature.</p>	<ul style="list-style-type: none"> Order of mass, size, and speed of motion of a molecules in matter, Molecular theory brownian motion and diffusion of gases, liquid and solid. Random motion of mole kinetic and potential energy of moles, internal energy. 	4	10
10	Kinetic theory of gases	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand kinetic interpretation of temperature, absolute zero ✓ Gas law's ✓ concept of kinetic theory. 	<ul style="list-style-type: none"> Perfect gas equation, postulates of kinetic theory of gases, pressure exerted by a perfect gas 	4	10
11	Surface tension	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand the effect of temperature on ST of liquids and gases. ✓ Experimental determination of ST of liquid 	<ul style="list-style-type: none"> Molecular forces, cohesive and adhesive forces. Free still surface of a liquid tries to contract and its behaviour as a 	3	4

		by capillary rise	<p>stretched membrane.</p> <ul style="list-style-type: none"> • Definition of surface tension. • Capillarity phenomena in science and engineering, 		
12	Viscosity	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand by experimental determination by Poiseuille's method, ✓ dependence of viscosity of liquids on temperature, application 	<ul style="list-style-type: none"> • Concept of viscosity of fluids. • steady streamline flow and turbulent flow, • viscous flow, • Critical velocity. • Newton's law of viscous flow. 	3	5
13	Heat & work	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand first law of thermodynamics ✓ mechanical equivalent of heat, ✓ concept of latent heat of fusion of ice & vaporization of water 	<ul style="list-style-type: none"> • Nature of heat energy, • Relation of temperature of a substance with K.E of the motion of the molecules. • Relation of internal energy of a body with quantity of heat 	3	10
14	Hygrometry	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand determination of RH ✓ Dew point hygrometer ✓ wet and dry bulb hygrometer and hair's 	<ul style="list-style-type: none"> • Importance of knowledge of wetness of the atmosphere air in the industry & metrological observation • concept of absolute and relative humidity and dew point 	3	5

		hygrometer			
15	Heat transfer	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand natural and forced convection ✓ ventilation of buildings ✓ radiation ✓ good and bad radiations ✓ absorbers ✓ Prevost's theory ✓ Stefan-Boltzman law 	<ul style="list-style-type: none"> • Modes of heat transfer • concept of conduction, convection, radiation and evaporation transfer of heat. • variable and steady state of heat conduction thermal conductivity 	3	8
16	D.C circuit	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand potentiometer and its uses to compare EMF's of 2 ✓ Determine internal resistance of a cell 	<ul style="list-style-type: none"> • Electric current , free electron theory of metallic conduction, Ohm's law, current voltage relation resistance wheat -stone bridge 	10	13
Review & class test				3	

COURSE WISE DETAILS CONTENTS

Program Name	: Diploma in Tool and Die Engineering
Semester	: I
Course Title	: APPLIED PHYSICS-1
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme					Examination Scheme			
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
3	--	--	03	70	--	30	--	100

Rationale:

This Subject is intended to teach basic materials classification, structure, physical and mechanical properties. The students are required to understand different material for various application. It is necessary for students to know basics of metal structure, properties, usage and testing of metals. This Knowledge will be used in heat treatment and core technology subject.

Outcomes:

- 1) Understanding facts, concept, of physics to develop new technology.
- 2) Use of physics technique to solve engineering technique.
- 3) Knowledge of science which helps the students to develop by applications of newer technologies.

Topic and Contents	Hours	Marks
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<p>Topic 1: Physics and its importance in technical education.</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand importance of fundamental science ✓ Purpose of learning physics ✓ Applications in daily life <p>Contents:</p> <p>1.1 Understanding about</p> <ul style="list-style-type: none"> • Introduction to physics • Purpose of learning physics • Applications in daily life 	1	2
<p>Topic 2: S.I unit</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand types of unit and its importance <p>Contents:</p> <p>2.1 Understanding the measuring units and its conversions</p> <ul style="list-style-type: none"> • S.I units , base and supplementary units, derived units. • Units and dimensions with symbols , abbreviation & precaution. • 	2	4
<p>Topic 3: Force and motion</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand distinction between rotary and circular motion, velocity , time and distance graph <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Classification of motion • Concept of particle in mechanism • Characteristic of different type of motion, • Newton's law of motion 	3	5

<p>Topic 4: Circular motion</p> <p>Objectives:</p> <p>✓ After completion of course Student should be able to understand centripetal and centrifugal forces , banking of roads and bending of cyclist</p> <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Circular motion and related physical quantities <p>Relation between linear and angular velocity.</p>	3	4
<p>Topic 5: Periodic motion</p> <p>Objectives:</p> <p>✓ After completion of course Student should be able to understand examples of periodic motion necessary conditions for the appearance and pursuance of periodic motion</p> <p>Contents:</p> <p>5.1 Learn principle of Periodic motion.</p> <ul style="list-style-type: none"> • Classification of periodic motion based on forces acting on the source • Condition for the motion • Characteristics of SHM 	4	5
<p>Topic 6 : Waves and wave motion</p> <p>Objectives:</p> <p>✓ After completion of course Student should be able to understand wave equation</p> <p>Contents:</p> <p>3.1 Learn basic of wave and its propagation.</p> <ul style="list-style-type: none"> • Wave propagation • Wave equations • Transverse waves • Longitudinal waves. 	4	5

<p>Topic 7 :Ultrasonic</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand what is sound, its types ✓ Frequencies of sound ✓ application of ultrasonic, ✓ Flawless detection, cold welding and cleaning, etc <p>Contents:</p> <p>3.1Basic knowledge of ultrasound</p> <ul style="list-style-type: none"> • After completion of course Student should be able to understand what is sound, its types • Frequencies of sound • application of ultrasonic, • Flawless detection, • cold welding and cleaning, etc 	3	5
<p>Topic 8 : Gravitation</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand what is gravity ✓ Newton's principle ✓ Principle and technique of launching of artificial satellite ,natural and man-made satellite. <p>Contents:</p> <p>3.1Introduction and basic knowledge of gravity.</p> <ul style="list-style-type: none"> • Newton's law of gravitation, • gravitation field, • relation between 'G' and 'g'. factors influencing 'g'. • Conditions for overloading and weightlessness in space 	4	5

<p>Topic 9 :Molecular phenomena in solid liquid and gases</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand what is matter ,its classifications and properties • Kinetic theory of matter relation of internal energy with quantity of heat and temperature. <p>Contents:</p> <p>9.1Introduction and basic knowledge of molecular structure of matter.</p> <ul style="list-style-type: none"> • Order of mass, size, and speed of motion of a molecules in matter, • Molecular theory • brownian motion and diffusion of gases, liquid and solid. • Random motion of mole • kinetic and potential energy of moles, internal energy. 	4	10
<p>Topic 10 :Kinetic theory of gases</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand kinetic interpretation of temperature, absolute zero ✓ Gas law's ✓ concept of kinetic theory. <p>Contents:</p> <p>10.1 Learning about kinetic theory of gases</p> <ul style="list-style-type: none"> • Perfect gas equation, • postulates of kinetic theory of gases, • pressure exerted by a perfect gas 	4	10
<p>Topic 11 :Surface tension</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand the effect of temperature on ST of liquids and gases. ✓ Experimental determination of ST of liquid by capillary rise <p>Contents:</p>	3	4

<p>11.1 Learning about surface tension35</p> <ul style="list-style-type: none"> • Molecular forces, cohesive and adhesive forces. • Free still surface of a liquid tries to contract and its behaviour as a stretched membrane.3 • Definition of surface tension. • Capillarity phenomena in science and engineering, 		
<p>Topic 12 :Viscosity</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand by experimental determination by Poiseuille's method, dependence of viscosity of liquids on temperature, application <p>Contents:</p> <p>12.1</p> <ul style="list-style-type: none"> • Concept of viscosity of fluids. • steady streamline flow and turbulent flow, • viscous flow, • Critical velocity. <p>Newton's law of viscous flow.</p>	3	5
<p>Topic 13 :Heat & work</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand first law of thermodynamics ✓ mechanical equivalent of heat, <p>concept of latent heat of fusion of ice & vaporization of water</p> <p>Contents:</p> <p>13.1</p> <ul style="list-style-type: none"> • Nature of heat energy, • Relation of temperature of a substance with K.E of the motion of the molecules. <p>Relation of internal energy of a body with quantity of heat</p>	3	10
<p>Topic 14 :Hygrometry</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand determination of RH ✓ Dew point hygrometer <p>wet and dry bulb hygrometer and hair's hygrometer</p> <p>Contents:</p>	3	5

<p>14.1</p> <ul style="list-style-type: none"> • Importance of knowledge of wetness of the atmosphere air in the industry & metrological observation <p>concept of absolute and relative humidity and dew point</p>		
<p>Topic 15 :Heat transfer</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand natural and forced convection ✓ ventilation of buildings ✓ radiation ✓ good and bad radiations ✓ absorbers ✓ Prevost's theory ✓ Stefan-Boltzman law <p>Contents:</p> <p>15.1</p> <ul style="list-style-type: none"> • Modes of heat transfer • concept of conduction, convection, radiation and evaporation transfer of heat. • variable and steady state of heat conduction thermal conductivity 	3	8
<p>Topic 16 :D.C circuit</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand potentiometer and its uses to compare EMF's of 2 <p>Determine internal resistance of a cell</p> <p>Contents:</p> <p>16.1</p> <ul style="list-style-type: none"> • Electric current , free electron theory of metallic conduction, Ohm's law, current voltage relation resistance wheat -stone bridge 	10	13
<p>Review & class test</p>	3	100

Intellectual Skills:

- 1) Understanding facts, concept, of physics to develop new technology.
- 2) Use of physics technique to solve engineering technique.
- 3) Knowledge of science which helps the students to develop by applications of newer technologies.

Motor Skills:

- 1) This Subject is intended to teach basic materials classification, structure, physical and mechanical properties.
- 2) The students are required to understand different material for various application. It is necessary for students to know basics of metal structure, properties, usage and testing of metals.
- 3) Getting Knowledge that can be helpful in heat treatment and core technology subject.

Learning Resources:

8. Books:

AUTHOR	TITLE	PUBLISHER
T.T.T.I.Bhopal	Principles of physics	--
Brijlal&Subrahmaniam	Principles of physics	--
Mehta Banwat,Suri S. Kaushik	A text book of applied physics	--
R.K.Gour	Basic applied physics	--
L.S. Zednor	Physics for technical education	--

COURSE/MODULE TEMPLATE

SEMESTER: 1

COURSE NAME: APPLIED CHEMISTRY -I

COURSE CODE: MSME/DTE/

COURSE OUTCOMES:

✓ Understanding facts, concept, of chemistry to develop new structure and properties of matter.
✓ Learning about changes in structure and properties in all engineering process changes.
✓ Use of chemistry to solve engineering activities and processes.

THEORY HOURS : 60hrs PRACTICAL HOURS : NA THEORYMARKS: 100 PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Atomic structure & nuclear chemistry	<ul style="list-style-type: none">✓ After completion of course Student should be able to understand importance of fundamental chemistry✓ Radioactivity, Alfa gamma & beta rays	<ul style="list-style-type: none">• Discovery of electron, nucleus, proton & electron, atomic number, atomic mass• Bohr's burry scheme• Sub shells, electro-valency & co-valency• Theory of radioactivity group displacement law• Half life period• atomic fusion and fission	6	8

2	Colligative properties and chemical energies	After completion of course Student should be able to understand effect of temperature catalysis.	<ul style="list-style-type: none"> • Osmosis & osmotic pressure • Relative vapour pressure & Routl's law • Internal energy, entropy and enthalpy 	5	8
3	Chemical equilibrium	<p>✓ After completion of course Student should be able to understand Le- chateliers principle</p> <p>Effect of temperature, pressure & concentration in NH₃</p>	<ul style="list-style-type: none"> • Rate of reaction • factors effecting rate of reaction, • reversible reaction • law of mass action & its application to reversible reaction. 	5	8
4	Periodic classification of elements	<p>✓ After completion of course Student should be able to understand classification on basis of s, p, d, f model</p> <p>Actinide and lanthanide series.</p>	<ul style="list-style-type: none"> • Dobernior,newland, luther-mayer, mendeleef laws of classification • Advantages and disadvantages and limitation , periodicity, electron affinity • Modern periodic table 	5	10
5	Redoximetry	<p>✓ After completion of course Student should be able to understand Redox reactions</p> <p>✓ Calculation of chemical equivalents on its basis.</p>	<ul style="list-style-type: none"> • Explanation of oxidation & reduction, oxidation number & its calculation. 	3	6
6	Electrochemistry	<p>✓ After completion of course Student should be able to understand electroplating of Cu and Ni.</p>	<ul style="list-style-type: none"> • Explanation of electrolysis • Faraday's laws of electrolysis 	5	10

7	Thermo-chemistry	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand Hisses law, simple numerical. 	<ul style="list-style-type: none"> • Heat of formation, • heat neutralization, • heat of reaction, • heat of combustion 	4	10
8	Surface chemistry	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand properties of colloids 	<ul style="list-style-type: none"> • True solution, • colloidal solution & suspension, classification of colloids • Explanation of gels & emulsion. 	4	10
9	Chemical process technology	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand their sheet diagram for manufacture of sodium bicarbonates and ammonia 	<ul style="list-style-type: none"> • Explanation of unit process in the manufacture of sodium carbonate & ammonia. 	5	10
10	Metals & alloy	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand composition & uses of steel, brass, bronze and duralumin alloy. 	<ul style="list-style-type: none"> • General principles and terms used in metallurgy • purification and extraction of Cu, Fe & Al 	8	10
11	Corrosion of material and its prevention	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand modification of environmental properties of metal ✓ Use of protective coatings anodic & cathodic protection ✓ modification in design and choice of material. 	<ul style="list-style-type: none"> • Oxidation - reduction process, definition of corrosion • Atmospheric corrosion, pitting corrosion, water line corrosion, corrosion due to temperature - moisture 	5	10

Review & class test	5	
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COURSE WISE DETAILS CONTENTS

Program Name	: Diploma in Tool and Die Engineering
Semester	: I
Course Title	: CHEMISTRY-1
Course Code	: MSME/ DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
3	--	--	03	70	--	30	--	100

Rationale:

It develops the ability to investigate the cause and effect to predict the result under given conditions.

It is essential for technicians and engineers because it is concerned with the changes in structure and properties of matter in all engineering activities and processes which involving the changes required.

The topics to be discussed are:-

- 1) The common requirement of chemistry for all engineering courses.
- 2) The attainment level in chemistry for students entering into polytechnics.

Outcomes:

- 1) Understanding facts, concept, of chemistry to develop new structure and properties of matter.
- 2) Learning about changes in structure and properties in all engineering process changes.
- 3) Use of chemistry to solve engineering activities and processes.

Topic and Contents	Hours	Marks
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<p>Topic 1: Atomic structure & nuclear chemistry</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand importance of fundamental chemistry ✓ Radioactivity, Alfa gamma & beta rays <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Discovery of electron, nucleus, proton & electron, atomic number, atomic mass • Bohr's burry scheme • Sub shells, electrovalency&covalency • Theory of radioactivity group displacement law • Half life period • atomic fusion and fission 	6	8
<p>Topic 2: Colligative properties and chemical energies</p> <p>Objectives:</p> <p>After completion of course Student should be able to understand effect of temperature catalysis.</p> <p>Contents:</p> <p>2.1Able to understand</p> <ul style="list-style-type: none"> • Osmosis & osmotic pressure • Relative vapour pressure & Rout's law • Internal energy, entropy and enthalpy • 	5	8
<p>Topic 3: Chemical equilibrium</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand Le- chateliers principle <p>Effect of temperature, pressure & concentration in NH₃</p> <p>Contents:</p> <ul style="list-style-type: none"> • Rate of reaction • factors effecting rate of reaction, • reversible reaction • law of mass action & its application to reversible reaction. 	5	8

<p>Topic 4: Periodic classification of elements</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand classification on basis of s, p, d, f model Actinide and lanthanide series. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Dobernior, newland, luther-mayer, mendeleef laws of classification • Advantages and disadvantages and limitation, periodicity, electron affinity • Modern periodic table 	5	10
<p>Topic 5: Redoximetry</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand Redox reactions <p>Calculation of chemical equivalents on its basis.</p> <p>Contents:</p> <p>3.1.</p> <ul style="list-style-type: none"> • Explanation of oxidation & reduction, oxidation number & its calculation. 	3	6
<p>Topic 6 : Electrochemistry</p> <p>Objectives:</p> <p>After completion of course Student should be able to understand electroplating of Cu and Ni.</p> <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Explanation of electrolysis • Faraday's laws of electrolysis • 	5	10
<p>Topic 7 :Thermo-chemistry</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand Hisses law, simple numerical. <p>Contents:</p>	4	10

<p>3.1</p> <ul style="list-style-type: none"> • Heat of formation, • heat neutralization, • heat of reaction, • heat of combustion 		
<p>Topic 8 : Surface chemistry</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand properties of colloids <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • True solution, • colloidal solution & suspension, classification of colloids • Explanation of gels & emulsion. 	4	10
<p>Topic 9 :Chemical process technology</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand their sheet diagram for manufacture of sodium bicarbonates and ammonia <p>Contents:</p> <p>9.1 Understand in detail about the</p> <ul style="list-style-type: none"> • Explanation of unit process in the manufacture of sodium carbonate & ammonia. 	5	10
<p>Topic 10 :Metals & alloy</p> <p>Objectives:</p> <p>After completion of course Student should be able to understand composition & uses of steel, brass, bronze and duralumin alloy.</p> <p>Contents:</p> <p>10.1</p> <ul style="list-style-type: none"> • General principles and terms used in metallurgy purification and extraction of Cu, Fe & Al 	8	10

Topic 11 :Corrosion of material and its prevention	5	10
Objectives: <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand modification of environmental properties of metal ✓ Use of protective coatings anodic &cathodic protection ✓ modification in design and choice of material. 		
Contents: <p>11.1</p> <ul style="list-style-type: none"> • Oxidation - reduction process, definition of corrosion Atmospheric corrosion, pitting corrosion, water line corrosion, corrosion due to temperature - moisture		
Review & class test	5	
Total	60	100

Intellectual Skills:

1. It is essential for technicians and engineers because it is concerned with the changes in structure and properties of matter in all engineering activities and processes which involving the changes required.
2. The common requirement of chemistry for all engineering courses.
3. The attainment level in chemistry for students entering into polytechnics.

Motor Skills:

1. Understanding facts, concept, of chemistry to develop new structure and properties of matter.
2. Learning about changes in structure and properties in all engineering process changes.
3. Use of chemistry to solve engineering activities and processes.

Learning Resources:

9. Books:

AUTHOR	TITLE	PUBLISHER
Bhal&Tuli	Physical Chemistry	--
Mitra	Advance inorganic chemistry	--

Shrivastava&Singhal	Applied chemistry	PBS Pub.Bhopal
Shrivastava&Shrivastava	Objective Chemistry	Chandra Publications Bhopal

COURSE/MODULE TEMPLATE

SEMESTER: 1

COURSE NAME:WORKSHOP TECHNOLOGY-I

COURSE CODE: MSME/DTE/

COURSE OUTCOMES:

✓ Use and application of different machine as per requirement
✓ Understanding different types of machine and their operation and use of cutting fluid
✓ Customize the use of different machine as per manufacturing of part
✓ Calculation of speed, feed and depth of cut and its importance
✓ Plan to design the tool and die parts
✓ Understand the technology and apply them in the field of engineering.

THEORY HOURS :80hrs PRACTICAL HOURS : NA THEORY MARKS: 100 PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Introduction to workshop technology and Safety precautions	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand tools and materials required and their use in industry ✓ Type of material ✓ Ferrous & non-ferrous ✓ Safety ✓ Application, safety rules, Precaution of 	<ul style="list-style-type: none"> • Introduction about • Classification of industrial material • Processing Method • Industrial material • Major processing methods • Material processing Technique 	12	25

		<p>accidents</p> <p>✓ Safety Precaution and safety rule</p>	<ul style="list-style-type: none"> • Efficiency • Effectiveness • Use of Safety Precaution <p>Concept of accidents and Classification source of accident</p>		
2	Basic metal working techniques	<p>✓ At the end of this unit Student should be able to</p> <p>✓ Types of hand tools</p> <p>✓ Use & Application of hand tools ,</p> <p>✓ Use & Application & use of Filling methods</p> <p>✓ Use & Application & use of chisel</p> <p>✓ Use & application of marking tool</p> <p>✓ Working principle of welding, soldering and brazing</p>	<ul style="list-style-type: none"> • Understand various form selection of hand tool • Use of hand tool • Design of hand tool • Construction of hand tool • Description of hand tool • Types of files • Types of Chisel • Types of Marking tool <p>Classification of welding, soldering and brazing</p>	33	35
3	Drilling and Lathe machines and their	<p>✓ At the end of this unit Student should be able to Select & use of drilling machine</p>	<ul style="list-style-type: none"> • Understand different types of drilling machine classification Of drilling machine drilling operation 	30	40

	<p>operations</p>	<ul style="list-style-type: none"> ✓ Use of drilling operation & methods of drilling ✓ Function of drilling machine ✓ Use of work holding devices , ✓ Vice, angle plate, 'V' block, 'C' clamp ✓ Application & use of drills ✓ Centre drill counter base, counter sink ✓ Application & use of drill chuck, sleeves, drifts, tapping, attachment ✓ Use & application of drilling, tapping, counter sink, counter boring, and their ✓ Calculation of speed, feed, depth of cut ✓ Selection & use of lathe machine ✓ Parts of lathe machine ✓ Types of work holding device & it's material ✓ Types of cutting tool 	<ul style="list-style-type: none"> • Parts of drilling machine • Type of work holding devices • Vice, angle plate, 'V' block, 'C' clamp • Design, types & construction of drills, centre drills, counter bark, counter sink • Design, types & construction of drill chuck, sleeves, tapping attachment • Speed, feed, depth of cut, cutting fluid • Drilling, counter sink, counter boring, reaming, tapping • Understand in detail about types of lathe machine and classification • Function of lathe machine & it's part • Use & application of 3-jaw chuck,4-jaw chuck, read centre, revolving centre, face plate • Use & application of single point cutting tool, rough cutting tool, finishing tools, growing tool • Use & application of drill chuck ,tool post, indexing tool post, quick change tool holder 		
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	<ul style="list-style-type: none"> ✓ Types of cutting tool/holder & it's classification ✓ What is speed feed de pin of cut ✓ Types of operation Construction ✓ Types of cutting fluid ✓ Selecting & use of milling machine ✓ function of milling machine & it's part ✓ Type of work holding devices ✓ Design & types of cutting tools construction ✓ Cutting tool holder <p>Tool geometry speed feed & depth of cut</p>	<ul style="list-style-type: none"> • Calculation of speed, feed & depth of cut. • Time calculation • Use of cutting fluid • Application & use of plan turning, shoulder turning, grooving , facing, knurling, eccentric turning, chamfering • Understand in detail about • Type of milling machine • Application of milling machine & it's part <p>Use & application of universal vice, sine vice, rotary table</p>		
Review and class test			5	

COURSE WISE DETAILS CONTENTS

Program Name	: Diploma in Tool and Die Engineering
Semester	: I
Course Title	: WORKSHOP TECHNOLOGY-I
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
4	--	--	03	70	--	30	--	100

Rationale:

This Subject describes the facts, concepts, principles and procedures of using hand tools, machine tools and related techniques efficiently, effectively to plan the manufacturing of Tool & Die Parts to the specification considering safety and environment. It is also useful in Understanding technology and apply them in the areas such as workshop practice, tool design, production plan, estimation and supervisory management.

It also describes the concept, principle and procedures to identify and report the maintenance requirement for corrective action. It also describes the procedures to derive the specification I.e. hand tools, machine tools for tool and die making.

Outcomes:

- Safety rules to be taken at workshop while working
- Understand the different machining process used in workshop.
- Use and application of different machine as per requirement
- Able to operate different types of machine ,construction, operation and use of cutting fluid
- Maintaining different machine as per manufacturing of part
- Able to Calculate the speed, feed and depth of cut and its importance

- Use and application of cutting tools

Topic and Contents	Hours	Marks
<p>Topic 1: Introduction to workshop technology and Safety precautions</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand tools and materials required and their use in industry ✓ Type of material ✓ Ferrous & non-ferrous ✓ Safety ✓ Application, safety rules, Precaution of accidents ✓ Safety Precaution and safety rule <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Introduction about • Classification of industrial material • Processing Method • Industrial material • Major processing methods • Material processing Technique • Efficiency • Effectiveness • Use of Safety Precaution • Concept of accidents and Classification source of accident 	12	25
<p>Topic 2: Basic metal working techniques</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to ✓ Types of hand tools ✓ Use & Application of hand tools , ✓ Use & Application & use of Filing methods ✓ Use & Application & use of chisel ✓ Use & application of marking tool ✓ Working principle of welding, soldering and brazing 	33	35

<p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Understand various form selection of hand tool • Use of hand tool • Design of hand tool • Construction of hand tool • Description of hand tool • Types of files • Types of Chisel • Types of Marking tool • Classification of welding, soldering and brazing 		
<p>Topic 3: Drilling and Lathe machines and their operations</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able toSelect& use of drilling machine ✓ Use of drilling operation & methods of drilling ✓ Function of drilling machine ✓ Use of work holding devices , ✓ Vice, angle plate, 'V' block, 'C' clamp ✓ Application & use of drills ✓ Centre drill counter base, counter sink ✓ Application & use of drill chuck, sleeves, drifts, tapping, attachment ✓ Use & application of drilling, tapping, counter sink, counter boring, and their ✓ Calculation of speed, feed, depth of cut ✓ Selection & use of lathe machine ✓ Parts of lathe machine ✓ Types of work holding device & it's material 	30	40

- ✓ Types of cutting tool
- ✓ Types of cutting tool/holder & it's classification
- ✓ What is speed feed de pin of cut
- ✓ Types of operation Construction
- ✓ Types of cutting fluid
- ✓ Selecting & use of milling machine
- ✓ function of milling machine & it's part
- ✓ Type of work holding devices
- ✓ Design & types of cutting tools construction
- ✓ Cutting tool holder

Tool geometry speed feed & depth of cut

Contents:

3.1

- Understand different types of drilling machine classification Of drilling machine drilling operation
- Parts of drilling machine
- Type of work holding devices
- Vice, angle plate, 'V' block, 'C' clamp
- Design, types & construction of drills, centre drills, counter bark, counter sink
- Design, types & construction of drill chuck, sleeves, tapping attachment
- Speed, feed, depth of cut, cutting fluid
- Drilling, counter sink, counter boring, reaming, tapping
- Understand in detail about types of lathe machine and classification
- Function of lathe machine & it's part
- Use & application of 3-jaw chuck,4-jaw chuck, read centre, revolving centre, face plate
- Use & application of single point cutting tool, rough cutting tool, finishing tools, growing tool
- Use & application of drill chuck ,tool post, indexing tool post, quick change tool holder

<ul style="list-style-type: none"> • Calculation of speed, feed & depth of cut. • Time calculation • Use of cutting fluid • Application & use of plan turning, shoulder turning, grooving , facing, knurling, eccentric turning, chamfering • Understand in detail about • Type of milling machine • Application of milling machine & it's part • Use & application of universal vice, sine vice, rotary table 		
Review & class test	5	
Total	80	100

Intellectual Skills:

- 1) Understand the proper selection of the machine for different machining process.
- 2) Maintenance of the machine

Motor Skills:

- 1)selection of tool and its maintenance
- 2)understanding the working and importance of the different machines used for manufacturing.

Learning Resources:**10. Books:**

AUTHOR	TITLE	PUBLISHER
Chapman A.J.	Workshop Technology (Vol. I,II & III)	New Delhi: Amol Publication
Hazra S.K. &Chaoudhary S.K.	Elements of Workshop Technology	Metropolitan Publishers, Bombay.
Raghuwanshi B.S. & Others	Workshop Technology	New Heights, New Delhi.
Gupta K.N. &Kaushish J.P.	Workshop Technology Vol. I to II.	New Heights, New Delhi.
Atherton W.H.	Workshop Practice Vol. I to V	New Era Publishers, London.
Gerling	All about Machine tools	WILSEY EASTERN, Delhi.
B. Kishore	Tool & Die Maker	Saurabh& Co.
Hermann Jutz Edward Scharkus	Westermann Tables	WILSEY EASTERN, Delhi.

COURSE/MODULE TEMPLATE

SEMESTER: 1

COURSE NAME:WORKSHOP PRACTICE-I

COURSE CODE :MSME/DTE/

COURSE OUTCOMES:

✓ Get knowledge about practical work in workshop.
✓ Acquiring practical knowledge and hand skill in operating the types of machines used in workshop
✓ Get knowledge about different machine used in workshop like milling, turning, grinding, etc.
✓ Find out different problems during manufacturing of different parts and using different machine.

THEORY HOURS :NA PRACTICAL HOURS :660 HRS THEORY MARKS:NA PRACTICAL MARKS:150

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH & PR hours	Practical marks
1	Workshop practice	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of machining process. ✓ Turning ✓ Milling ✓ Surface grinding ✓ Maintenance of machine tools 	<ul style="list-style-type: none"> • To make the exercise jobs and the part of press tools such as bushes, pillars • Utilities items like centre punch, studs, nuts • Operation likes turning, facing, step turning, parting, recessing, undercutting, thread cutting • Making V block , • Face milling, step milling, profile milling, face milling, slot milling, step milling, groove milling. • Grinding exercise • Surface grinding, external grinding, 	40+600	400

			cylindrical grinding, internal cylindrical grinding		
Review & class test				20	

COURSE WISE DETAILS CONTENTS

Program Name	:Diploma in Tool and Die Engineering
Semester	: I
Course Title	: WORKSHOP PRACTICE-I
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
---	--	33	08	--	200	--	200	400

Rationale:

Understand the facts, concepts, principles, procedures of tool design techniques so that this knowledge can be used in Tool Design Practice effectively and efficiently. It is also useful in understanding technology subjects and applies them in the area such as Workshop practice, CAD/CAM, CAE, Production Planning, Estimation, Industrial Management and Quality Assurance.

At the end of semester the trainees will be able to produce useful items by acquiring hand skill and selected machining skill in basic metal working and machine tool operations and by combining them with both knowledge of IGTR-Ahmedabad training organization and safety regulations .The trainees also manufacture machine accessories and standard parts by integrating hand skill and machine tool operation skill.

Outcomes:

1. Get knowledge about practical work in workshop.
2. Get knowledge about different machine used in workshop like milling, turning, grinding, etc.
3. Find out different problems during manufacturing of different parts and using different machine.

Topic and Contents	Hours	Marks
<p>Topic 1: Workshop practice</p> <p>Objectives :</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of machining process. ✓ Turning ✓ Milling ✓ Surface grinding ✓ Maintenance of machine tools <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • To make the exercise jobs and the part of press tools such as bushes, pillars • Utilities items like centre punch, studs, nuts • Operation likes turning, facing, step turning, parting, recessing, undercutting, thread cutting • Making V block , • Face milling, step milling, profile milling, face milling, slot milling, step milling, groove milling. • Grinding exercise • Surface grinding, external grinding, cylindrical grinding, internal cylindrical grinding 	40+600	400
Review & class test	20	
TOTAL	660	400

Intellectual Skills:

1. understand different types of machining process and different machines
2. problem finding & solving during production, design, assembly and trial

Motor Skills: .

- 1)Able to make assembly properly
- 2)Knowledge about the machine and tools used for manufacturing.

Learning Resources:

11. Books:

AUTHOR	TITLE	PUBLISHER
Chapman A.J.	Workshop Technology (Vol. I,II & III)	New Delhi: Amol Publication
Hazra S.K. &Chaoudhary S.K.	Elements of Workshop Technology	Metropolitan Publishers, Bombay.
Raghuwanshi B.S. & Others	Workshop Technology	New Heights, New Delhi.
Gupta K.N. &Kaushish J.P.	Workshop Technology Vol. I to II.	New Heights, New Delhi.
Atherton W.H.	Workshop Practice Vol. I to V	New Era Publishers, London.
Gerling	All about Machine tools	WILSEY EASTERN, Delhi.
B. Kishore	Tool & Die Maker	Saurabh& Co.
Hermann Jutz Edward Scharkus	Westermann Tables	WILSEY EASTERN, Delhi.

COURSE/MODULE TEMPLATE

SEMESTER:2

COURSE NAME: COMMUNICATION SKILLS-II

COURSE CODE:MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understanding facts, concept, principles and procedures of general communication.
✓ Acquiring proficiency towards greater enrichment of power of expression by acquiring words from social science.
✓ To develop communication skills among students.
✓ Learning how to communicate with others regarding their personal career growth.

THEORY HOURS :60hrs PRACTICAL HOURS :NA THEORY MARKS :100 PRACTICAL MARKS :NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Passages for comprehension	✓ After completion of course Student should be able to understand and use the vocabulary items use in officials	<ul style="list-style-type: none">• Silent features of the Indian constitution• Structure of the government• Functioning of an economic system• The public sector in India• Production and productivity• Professional ethics	10	20
2	Unit II:	<ul style="list-style-type: none">• After completion of course Student should be able to understand and develop ability of	<ul style="list-style-type: none">• Basic facts of technical writing• Features of technical styles	10	15

	Technical writing	speaking technical terms and writing technical passages	<ul style="list-style-type: none"> Types of technical writing Technical descriptions 		
3	Unit III: Business letters	<ul style="list-style-type: none"> After completion of course Student should be able to understand introduction, importance and purpose 	<ul style="list-style-type: none"> Business letter Mechanics the format of a business letter Style i) Negative ii) Neutral iii) Positive Types of business letter: <ul style="list-style-type: none"> ➤ Application for job ➤ Enquiry ➤ Order ➤ Complaint 	10	15
4	Unit IV: Direct and indirect speech	<ul style="list-style-type: none"> At the end of this unit Student should be able to develop communication speech 	<ul style="list-style-type: none"> Direct and indirect speech 	15	30
5	Unit V: Unseen passage	<ul style="list-style-type: none"> At the end of this unit Student should be able to develop solve unseen passage 	<ul style="list-style-type: none"> As per text book 	10	20
Review & class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: II
Course Title	:COMMUNICATION SKILLS-II
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme					Examination Scheme			
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
3	--	--	03	70	--	30	--	100

Rationale:

Understanding the facts, concepts, principles and procedures of general communications skills to be used by the student, professionals and citizens. English occupies a important role in the our curriculum.it is the important library language in India, as it acts as a barrier between the technical and scientific knowledge.

After the study they can able to communicate effectively which is very essential. So, emphasis is given for the development of English communication skills among the students.

Outcomes:

- Understanding facts, concept, principles and procedures of general communication.
- Acquiring proficiency towards greater enrichment of power of expression by acquiring words from social science.
- To develop communication skills among students.
- Learning how to communicate with others regarding their personal career growth.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Passages for comprehension</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand and use the vocabulary items use in officials <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> ● Silent features of the Indian constitution ● Structure of the government ● Functioning of an economic system ● The public sector in India ● Production and productivity ● Professional ethics 	10	20
<p>Topic 2: Technical writing</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand and develop ability of speaking technical terms and writing technical passages. <p>Contents:</p> <p>1.2</p> <ul style="list-style-type: none"> ● Basic facts of technical writing ● Features of technical styles ● Types of technical writing ● Technical descriptions 	10	15
<p>Topic 3: Business letters</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand introduction, importance and purpose <p>Contents:</p> <p>1.3</p> <ul style="list-style-type: none"> ● Business letter ● Mechanics the format of a business letter ● Style i) Negative ii) Neutral iii) Positive ● Types of business letter: <ul style="list-style-type: none"> ➤ Application for job ➤ Enquiry ➤ Order ➤ Complaint 	10	15

Topic 4: Direct and indirect speech Objectives: <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to develop communication speech Contents: 1.4 <ul style="list-style-type: none"> • Direct and indirect speech 	15	30
Topic 5: Unseen passage Objectives: <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to develop solve unseen passage Contents: 1.5 <ul style="list-style-type: none"> • As per text book 	10	20
Review and class test	5	
Total	60	100

Intellectual Skills:

- 1) Able to understand and communicate in English effectively.
- 2) Can use appropriate words with appropriate use of English grammar.

Motor Skills:

- 1) Develop their ability to read, write, and speak English
- 2) Able to write any type of letters-Official, Personal and semi-official letters

Learning Resources:

12. Books:

AUTHOR	TITLE	PUBLISHER
--	passage in general studies	Vikaspublications,Bhopal
--	A course in technical english book-II	Somaiya publications Pvt. Ltd

COURSE/MODULE TEMPLATE

SEMESTER:2

COURSE NAME:MATHEMATICS-II

COURSE CODE:MSME/DTE/

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Understanding facts, concept, of mathematical needs in technical subjects.
✓ Use of mathematical technique to solve engineering technique.
✓ To develop mathematical skills among students.

THEORY HOURS :60hrs PRACTICAL HOURS :NA THEORY MARKS :100 PRACTICAL MARKS :NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Co-ordinate Geometry	✓ After completion of course Student should be able to understand definition of different systems ✓ Transformation of co-ordinates ✓ Standards form, general equations	<ul style="list-style-type: none"> • Co-ordinate system • Distance, division and area • Standard forms of the equations of a straight line • Intersection of straight line • Change of axes • Pair of straight line 	21	30

			<ul style="list-style-type: none"> • General equation of second degree • Circle, Conic section, Parabola • Ellipse • Hyperbola 		
2	Unit II: Vector algebra	<ul style="list-style-type: none"> • After completion of course Student should be able to understand concept of vectors • Scalar and vector product of two vectors. 	<ul style="list-style-type: none"> • Introduction of vectors • Addition of vectors • Multiplication of vectors • Application of product of vector 	12	20
3	Unit III: Integral calculus	<ul style="list-style-type: none"> • After completion of course Student should be able to understand definition, fundamental and properties of integration 	<ul style="list-style-type: none"> • Integration • Methods of integration • Application 	14	25
4	Unit IV: Matrix	<ul style="list-style-type: none"> • After completion of course Student should be able to understand definition of matrix, different types of matrix • Reversal laws, inverse laws 	<ul style="list-style-type: none"> • Matrix • Special matrices • Operation and different laws. 	10	25
Review & class test				3	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: II
Course Title	: MATHEMATICS-II
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
3	--	--	03	70	--	30	--	100

Rationale:

Mathematics forms the backbone of all technologies and hence occupies an important place in the curriculum of technical education. This is very important for the future self-development of students.

In designing the curriculum for foundation course the admission level of this course has been considered as 10th board examination and mathematical needs of technical subjects has been given due consideration.

Outcomes:

- Understanding facts, concept, of mathematical needs in technical subjects.
- Use of mathematical technique to solve engineering technique.
- To develop mathematical skills among students.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1 : Co-ordinate Geometry</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand definition of different systems ✓ Transformation of co-ordinates ✓ Standards form, general equations <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Co-ordinate system • Distance, division and area • Standard forms of the equations of a straight line • Intersection of straight line • Change of axes • Pair of straight line • General equation of second degree • Circle, Conic section, Parabola • Ellipse • Hyperbola 	21	30
<p>Topic 2 : Vector algebra</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand concept of vectors ✓ Scalar and vector product of two vectors. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Introduction of vectors • Addition of vectors • Multiplication of vectors • Application of product of vector 	12	20
<p>Topic 3 : Integral calculus</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand definition, fundamental and properties of integration <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Integration • Methods of integration • Application 	14	25

Topic 4 : Matrix	10	25
Objectives: <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand definition of matrix, different types of matrix ✓ Reversal laws, inverse laws 		
Contents: <p>4.1</p> <ul style="list-style-type: none"> • Matrix • Special matrices • Operation and different laws. 		
Review and class test	3	
Total	60	100

Intellectual Skills:

1. Understanding the algebra, trigonometry and differential calculus and their use.

Motor Skills:

1. Get knowledge about need of mathematics.
2. Solving the algebra, trigonometry and differential calculus problems and their solutions.

Learning Resources:

16. Books:

AUTHOR	TITLE	PUBLISHER
S.L.Loney	Co-ordinate Geometry	--
T.T.T.I.Bhopal	Mathematics for polytechnic Vol.2	--
S.P Deshpandey	Mathematics for polytechnic	--
--	Applied mathematics	Popular book depot bhopal
--	Applied mathematics	Deepak prakashan Gwalior
Gorakh Pd.	Integral Calculus	--

COURSE/MODULE TEMPLATE

SEMESTER:2

COURSE NAME:APPLIED PHYSICS -II

COURSE CODE:MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understanding facts, concept, of physics to develop new technology.
✓ Use of physics technique to solve engineering technique.

THEORY HOURS :60hrs PRACTICAL HOURS :NA THEORY MARKS :100 PRACTICAL MARKS :NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: High temperature measurement	<p>✓ After completion of course Student should be able to understand arrangement for protecting the hot junction and keeping cold junction away</p> <p>✓ Recording the developed thermo - E MF, MV and potentiometer, accuracy and range.</p>	<ul style="list-style-type: none"> • Principle of resistance thermometer, construction and working of resistance thermometer, • accuracy and range of measurements, • principle of thermocouple, • Sea beck effect, neutral temperature and temperature of inversion, • construction of thermo-electric thermometer, 	4	8

			<ul style="list-style-type: none"> • Different elements forming thermocouple. 		
2	Unit II: Heating effects of electric current	✓ After completion of course Student should be able to calculate the amount of electric energy consumed.	<ul style="list-style-type: none"> • Joule's law of heating, • electric work and electric power, • Verification of joule's law. 	3	6
3	Unit III: Comparative study of cells, batteries and their maintenance	✓ After completion of course Student should be able to understand how to test and maintain the secondary cells.	<ul style="list-style-type: none"> • Comparative study of electrodes, electrolytes, depolarizes • EMF's and order of internal resistances of different cells and batteries with the aid of a chart, • Ampere – hour capacity of batteries, sulphating of plates. 	3	6
4	Unit IV: Magnetic field	✓ After completion of course Student should be able to understand the relation between strength of electro – magnet and intensity of electric current.	<ul style="list-style-type: none"> • Magnetic field due to a magnet, • magnetic fields due to a current carrying conductor, • magnetic induction, • magnetic induction due to straight conductor carrying current • magnetic induction at the centre of a circular coil carrying current, • magnetic induction of a solenoid, • electro - magnet. 	2	4

5	Unit V: Force of current carrying conductor	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand Fleming's left hand rule ✓ left hand palm rule. 	<ul style="list-style-type: none"> ● Force acting on a current carrying conductor. 	3	6
6	Unit VI: Moving charge in magnetic field	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand the path described by the charge in the magnetic field. 	<ul style="list-style-type: none"> ● Magnitude of force on a moving charge $Q, F = B.v.a \sin\theta$, ● Conditions when no force acts on charge. 	3	6
7	Unit VII: Quantum nature of light photo-electric	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand laws of photo electric emission ✓ photocells ✓ Applications. 	<ul style="list-style-type: none"> ● Plank's quantum theory, ● photo-electric effect ● characteristics of photo-electrons, ● Einstein's photo-electric equation. 	4	8
8	Unit VIII: Radio activity, mass energy, equivalent mass defect, binding energy, fissions and fusion	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand Einstein's mass energy, ✓ Nuclear fission, and nuclear fusion. 	<ul style="list-style-type: none"> ● Radioactivity ● properties of radioactivity ● radio-active substances ● half life period ● radio-active isotopes. 	8	15
9	Unit IX: Refraction of	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand combination of lenses 	<ul style="list-style-type: none"> ● Refraction of light ● laws of refraction of light, 	6	12

	light	✓ Power of a lens.	<ul style="list-style-type: none"> • speed of light in different media, • refraction through a prism • Refraction through lenses (no derivation of formulae required). 		
10	Unit X: Defects of image	✓ After completion of course Student should be able to understand the defects of images and their correction methods.	<ul style="list-style-type: none"> • Defects of images • chromatic aberration • spherical aberration • removal of chromatic aberration • Minimization of spherical aberration. 	3	6
11	Unit XI: Optical instruments	✓ After completion of course Student should be able to understand different types of telescope.	<ul style="list-style-type: none"> • Simple microscope • compound microscope • astronomical telescope • terrestrial telescope • Galilean telescope. 	5	6
12	Unit XII: Dispersion of light and scale of electromagnetic spectrum	✓ After completion of course Student should be able to understand scale of electro – magnetic spectrum range ✓ detection and properties	<ul style="list-style-type: none"> • Dispersion of light • Dispersive power • impure spectrums, pure spectrum, spectrometer • Measurement of the refractive index emission and absorption spectrum. 	5	7
13	Unit XIII:	✓ After completion of course Student should be able to understand the application of	<ul style="list-style-type: none"> • Production, properties of X-rays, laser. 	8	10

	Modern physics	X-rays, laser.			
Review & class test				3	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: II
Course Title	:APPLIED PHYSICS -II
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
3	--	--	03	70	--	30	--	100

Rationale:

Physics builds the foundation of technical course. Studies of physics require knowledge about light, electric current, and nuclear power interaction. A good foundation of fundamental sciences helps the students to develop and understand new technologies.

The different topics included in this course are:-

1. The attainment level of students in physics at the entry level in polytechnics.
2. Reference to engineering subjects.
3. Continuity of sequence necessary for logical development of subjects.

Outcomes:

- Gaining knowledge about light, electric current, and nuclear power interaction.
- Understanding about the force. Its types and its use practically.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: High temperature measurement</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand arrangement for protecting the hot junction and keeping cold junction away ✓ Recording the developed thermo - E MF, MV and potentiometer, accuracy and range. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Principle of resistance thermometer, construction and working of resistance thermometer, • accuracy and range of measurements, • principle of thermocouple, • Sea beck effect, neutral temperature and temperature of inversion, • construction of thermo-electric thermometer, • Different elements forming thermocouple. 	4	8
<p>Topic 2: Heating effects of electric current</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to calculate the amount of electric energy consumed. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Joule’s law of heating, • electric work and electric power, • Verification of joule’s law. 	3	6
<p>Topic 3: Comparative study of cells, batteries and their maintenance</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand how to test and maintain the secondary cells. <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Comparative study of electrodes, electrolytes, depolarizes • EMF’s and order of internal resistances of different cells and batteries with the aid of a chart, • Ampere – hour capacity of batteries, sulphating of plates. 	3	6

<p>Topic 4: Magnetic field</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand the relation between strength of electro – magnet and intensity of electric current <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Magnetic field due to a magnet, • magnetic fields due to a current carrying conductor, • magnetic induction, • magnetic induction due to straight conductor carrying current • magnetic induction at the centre of a circular coil carrying current, • magnetic induction of a solenoid, • electro - magnet. 	2	4
<p>Topic 5: Force of current carrying conductor</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand Fleming’s left hand rule ✓ left hand palm rule. <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Force acting on a current carrying conductor. 	3	6
<p>Topic 6: Moving charge in magnetic field</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand the path described by the charge in the magnetic field. <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Magnitude of force on a moving charge $Q, F = B.v.a \sin\theta$, • Conditions when no force acts on charge. 	3	6
<p>Topic 7: Quantum nature of light photo-electric</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand laws of photo electric emission ✓ photocells ✓ Applications. <p>Contents:</p>	4	8

<p>7.1</p> <ul style="list-style-type: none"> • Plank’s quantum theory, • photo-electric effect • characteristics of photo-electrons, • Einstein’s photo-electric equation. 		
<p>Topic 8: Radio activity, mass energy, equivalent mass defect, binding energy, fissions and fusion</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand Einstein’s mass energy, ✓ Nuclear fission, and nuclear fusion. <p>Contents:</p> <p>8.1</p> <ul style="list-style-type: none"> • Radioactivity • properties of radioactivity • radio-active substances • half life period • radio-active isotopes. 	8	15
<p>Topic 9: Refraction of light</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand combination of lenses ✓ Power of a lens. <p>Contents:</p> <p>9.1</p> <ul style="list-style-type: none"> • Refraction of light • laws of refraction of light, • speed of light in different media, • refraction through a prism • Refraction through lenses (no derivation of formulae required). 	6	12
<p>Topic 10: Defects of image</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand the defects of images and their correction methods. <p>Contents:</p> <p>10.1</p>	3	6

<ul style="list-style-type: none"> • Defects of images • chromatic aberration • spherical aberration • removal of chromatic aberration • Minimization of spherical aberration. 		
<p>Topic 11: Optical instruments</p> <p>Objectives:</p> <p>✓ After completion of course Student should be able to understand different types of telescope.</p> <p>Contents:</p> <p>11.1</p> <ul style="list-style-type: none"> • Simple microscope • compound microscope • astronomical telescope • terrestrial telescope • Galilean telescope. 	5	6
<p>Topic 12: Dispersion of light and scale of electromagnetic spectrum</p> <p>Objectives:</p> <p>✓ After completion of course Student should be able to understand scale of electro –magnetic spectrum range,detection and properties</p> <p>Contents:</p> <p>12.1</p> <ul style="list-style-type: none"> • Dispersion of light • Dispersive power • impure spectrums, pure spectrum, spectrometer • Measurement of the refractive index emission and absorption spectrum. 	5	7
<p>Topic 13: Modern physics</p> <p>Objectives:</p> <p>✓ After completion of course Student should be able to understand the application of X–rays, laser.</p> <p>Contents:</p> <p>13.1</p> <ul style="list-style-type: none"> • Production, properties of X–rays, laser 	8	10
Review and class test	3	
Total	60	100

Intellectual Skills:

- 1) The attainment level of students in physics at the entry level in polytechnics.
- 2) Reference to engineering subjects.
- 3) Continuity of sequence necessary for logical development of subjects.

Motor Skills:

- Gaining knowledge about light, electric current, and nuclear power interaction.
- Understanding about the force. Its types and its use practically.

Learning Resources:

17. Books:

AUTHOR	TITLE	PUBLISHER
T.T.T.I.Bhopal	Principles of Physics	--
Brijlal and Subramaniam	Principles of Physics	--
Mehta, Nanwatsuri and Kaushik	A text book of Applied Physics	--
R,K,Gour	Basic Applied Physics	--
L.S.Zednov	Physics for Technical Education	--

COURSE/MODULE TEMPLATE

SEMESTER:2

COURSE NAME:APPLIED CHEMISTRY -II

COURSE CODE:MSME/IGTRAHD/DTE/01

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Understanding facts, concept, of chemistry to develop new structure and properties of matter.

✓ Use of chemistry to solve engineering activities and processes.

THEORY HOURS :60hrs PRACTICAL HOURS :NA THEORY MARKS :100 PRACTICAL MARKS :NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Ionization, pH, corrosion and protection	✓ After completion of course Student should be able to understand protection against corrosion.	<ul style="list-style-type: none">● Arrhenius theory of ionization● factors effecting ionization● hydrolysis of salts, acids, bases,● pH meaning numerical.● Buffer solutions and buffer actions.● Indicator and its choice in acidi-metry and alkali-metry (pH curves)	8	15

			<ul style="list-style-type: none"> • Explanation of corrosion, • Types of corrosion control. 		
2	Unit II: Fuel nuclear fuel and fuel cells	✓ After completion of course Student should be able to understand classification and application to nuclear fuels.	<ul style="list-style-type: none"> • Introduction and classification to solid, liquid and gaseous fuels. • Proximate and ultimate analysis. • Petroleum and its various fractionation products. • Calorific value, gross and net calorific value. • Introduction to nuclear fuels. • Classification and application to nuclear fuels. • Definition, classification and application of fuel cells. 	8	12
3	Unit III: Glass and refractory	✓ After completion of course Student should be able to understand meaning, types and properties of various refractory. ✓	<ul style="list-style-type: none"> • Raw material, composition and manufacture of glass. Varieties of annealing of glass. • Meaning, types and properties of various refractory. 	4	8
4	Unit IV: Carbon Chemistry	✓ After completion of course Student should be able to understand laboratory preparation properties and uses of acetylene ✓ Laboratory preparation properties and uses of ethyl alcohol.	<ul style="list-style-type: none"> • Saturated and unsaturated hydrocarbons. • Isomerism. 	2	4
5	Unit V: Highpolymer	✓ After completion of course Student should be able to understand different types of high polymers and their application.	<ul style="list-style-type: none"> • Highpolymer, polymerization and condensation, • classification of plastics, • Preparation, properties and uses of PVC and 	4	8

			<p>polythene.</p> <ul style="list-style-type: none"> • Synthetic Fibres, nylon, rayon, Dacron, Orlon and polyesters. 		
6	Unit VI: Insulators	✓ After completion of course Student should be able to understand classification and properties of insulators.	<ul style="list-style-type: none"> • Definition, thermal insulators and their application, • Characteristics of Glass wool and thermocol. 	3	6
7	Unit VII: Galvanizing and electroplating	✓ After completion of course Student should be able to understand definition of electroplating, principles and factors influencing electroplating	<ul style="list-style-type: none"> • Definition, classification, types and factors influencing galvanizing. • Definition of electroplating, • principles and factors influencing electroplating, • Electroplating of Copper and Nickel in regular and irregular articles. 	3	7
8	Unit VIII: Paints, varnishes and lacquers	✓ After completion of course Student should be able to understand classification of paints and varnishes, Application of paints, varnishes and lacquers in engineering field.	<ul style="list-style-type: none"> • Ingredients, characteristics of paints, varnishes and lacquers. • Manufacture of paints and varnishes. 	4	8
9	Unit IX: Pollution and Control	✓ After completion of course Student should be able to understand effect of waste and waste products in the environment.	<ul style="list-style-type: none"> • Introduction and chemical toxicology, • Air and Water pollution, • Control of air and water pollution. 	4	6
10	Unit X:	✓ After completion of course Student should be able to understand determination of hardness in water	<ul style="list-style-type: none"> • Sources of water • hardness of water 	8	12

	Water	✓ EDTA and O HenriesTo remove the hardness in water.	<ul style="list-style-type: none"> • its causes, removal, • boiler feed water • Municipal water supply. 		
11	Unit XI: Biomass and waste recycling	✓ After completion of course Student should be able to understand the advantages and disadvantages of Gobar gas plants, ✓ concept of producing non-conventional energy from waste matter (Organic).	<ul style="list-style-type: none"> • Concept of biomass • chemistry of fuel gas from biomass • Production of Gobar gas from gobar gas plant. 	4	6
12	Unit XII: Soaps and detergents	✓ After completion of course Student should be able to understand characteristics of detergents, ✓ Difference between soaps and detergents.	<ul style="list-style-type: none"> • Definition, characteristics, classification of different types of soaps and their uses • soap action and soap as washing agent • industrial application of soaps • Definition, classification, preparation and uses of detergents. 	5	8
Review & class test				3	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: II
Course Title	:APPLIED CHEMISTRY -II
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
3	--	--	03	70	--	30	--	100

Rationale:

Chemistry is concerned with the changes in structure and properties of matter. The aim is to develop the students the habit of scientific enquiry , ability to investigate the cause and effect relationship, ability to predict the result under given condition.

Outcomes:

- Understanding facts, concept, of chemistry to develop new structure and properties of matter.
- Use of chemistry to solve engineering activities and processes.

Theory:

Topic and Contents	Hours	Marks
Topic 1: Ionization, pH, corrosion and protection	8	15
Objectives:		

<p>✓ After completion of course Student should be able to understand protection against corrosion.</p> <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> ● Arrhenius theory of ionization ● factors effecting ionization ● hydrolysis of salts, acids, bases, ● pH meaning numerical. ● Buffer solutions and buffer actions. ● Indicator and its choice in acidimetry and alkalimetry (pH curves) ● Explanation of corrosion, ● Types of corrosion control. 		
<p>Topic 2: Fuel nuclear fuel and fuel cells</p> <p>Objectives:</p> <p>✓ After completion of course Student should be able to understand classification and application to nuclear fuels</p> <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> ● Introduction and classification to solid, liquid and gaseous fuels. ● Proximate and ultimate analysis. ● Petroleum and its various fractionation products. ● Calorific value, gross and net calorific value. ● Introduction to nuclear fuels. ● Classification and application to nuclear fuels. ● Definition, classification and application of fuel cells. 	8	12
<p>Topic 3: Glass and refractory</p> <p>Objectives:</p> <p>✓ After completion of course Student should be able to understand meaning, types and properties of various refractory.</p> <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> ● Raw material, composition and manufacture of glass. Varieties of annealing of glass. 	4	8

<ul style="list-style-type: none"> • Meaning, types and properties of various refractory 		
<p>Topic 4: Carbon Chemistry</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand laboratory preparation properties and uses of acetylene ✓ Laboratory preparation properties and uses of ethyl alcohol. <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Saturated and unsaturated hydrocarbons. • Isomerism. 	2	4
<p>Topic 5: Highpolymer</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand different types of high polymers and their application. <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Highpolymer, polymerization and condensation, • classification of plastics, • Preparation, properties and uses of PVC and polythene. • Synthetic Fibres, nylon, rayon, Dacron, Orlon and polyesters. 	4	8
<p>Topic 6: Insulators</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand classification and properties of insulators. <p>Contents:</p> <p>6.1</p>	3	6

<ul style="list-style-type: none"> • Definition, thermal insulators and their application, • Characteristics of Glass wool and thermocole. 		
<p>Topic 7: Galvanizing and electroplating</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand definition of electroplating, principles and factors influencing electroplating <p>Contents:</p> <p>7.1</p> <ul style="list-style-type: none"> • Definition, classification, types and factors influencing galvanizing. • Definition of electroplating, • principles and factors influencing electroplating, • Electroplating of Copper and Nickel in regular and irregular articles. 	3	7
<p>Topic 8: Paints, varnishes and lacquers</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand classification of paints and varnishes, Application of paints, varnishes and lacquers in engineering field. <p>Contents:</p> <p>8.1</p> <ul style="list-style-type: none"> • Ingredients, characteristics of paints, varnished and lacquers. • Manufacture of paints and varnishes. 	4	8
<p>Topic 9: Pollution and Control</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand effect of waste and waste products in the environment. <p>Contents:</p> <p>9.1</p> <ul style="list-style-type: none"> • Introduction and chemical toxicology, 	4	6

<ul style="list-style-type: none"> • Air and Water pollution, • Control of air and water pollution. 		
<p>Topic 10: Water</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand determination of hardness in water ✓ EDTA and O HenriesTo remove the hardness in water. <p>Contents:</p> <p>10.1</p> <ul style="list-style-type: none"> • Sources of water • hardness of water • its causes, removal, • boiler feed water • Municipal water supply. 	8	12
<p>Topic 11: Biomass and waste recycling</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand the advantages and disadvantages of Gobar gas plants, ✓ concept of producing non-conventional energy from waste matter (Organic). <p>Contents:</p> <p>11.1</p> <ul style="list-style-type: none"> • Concept of biomass • chemistry of fuel gas from biomass • Production of Gobar gas from gobar gas plant. 	4	6
<p>Topic 12: Soaps and detergents</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand characteristics of 	5	8

detergents, ✓ Difference between soaps and detergents. Contents: 12.1 <ul style="list-style-type: none"> • Definition, characteristics, classification of different types of soaps and their uses • soap action and soap as washing agent • industrial application of soaps • Definition, classification, preparation and uses of detergents. 		
Review and class test	3	
Total	60	100

Intellectual Skills:

- 1) Chemistry is concerned with the changes in structure and properties of matter.
- 2) The aim is to develop the students the habit of scientific enquiry, ability to investigate the cause and effect relationship, ability to predict the result under given condition.

Motor Skills:

- 1) Understanding facts, concept, of chemistry to develop new structure and properties of matter.
- 2) Use of chemistry to solve engineering activities and processes.

Learning Resources:

21. Books:

AUTHOR	TITLE	PUBLISHER
S.S.Dara	A textbook of engineering chemistry	S,Chand Publications
M.M.Uppal	A textbook of engineering chemistry	--
P.C. Jain& Monica Jain	Basic Applied chemistry	DhanpatRai& Sons
P.C. Jain& Monica Jain	Engineering chemistry	DhanpatRai& Sons

Shrivatava&Singhal	Applied chemistry	PBS Publications Bhopal
M.Prasad	Experiment in Applied chemistry	Chandra Publications Bhopal

COURSE/MODULE TEMPLATE

SEMESTER:2

COURSE NAME:MATERIAL TECHNOLOGY-I

COURSE CODE:MSME/IGTRAHD/DTE/01

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understand different types of material and its group.
✓ Get knowledge about different material and its properties.
✓ Get knowledge about the application of materials, its effect on environment.
✓ Get knowledge about available of material and costing of material in markets.

THEORY HOURS :60hrs PRACTICAL HOURS :NA THEORY MARKS :100 PRACTICAL MARKS :NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Crystal system and imperfection	✓ At the end of this unit Student should be able to understand internal structure of material. ✓ Understand atomic structure for different material. ✓ Understand atomic bonds of materials what is important of atomic bonds, how they are connected. ✓	<ul style="list-style-type: none">• Understanding of the crystal by their atomic structure like fundamental particles of atomic structure (photon, electron, neutron).• Understanding of atomic bonds like bond energy types of bond (primary bond, secondary bond).	8	20

		<ul style="list-style-type: none"> ✓ Get deep knowledge about the crystalline material and non-crystalline material, what is the different between them. ✓ Get deep knowledge about the impurities in material and involve defects in materials. 	<ul style="list-style-type: none"> • Classification of primary bond Ionic bond, covalent bond, metallic bond • Understanding of crystalline material and non-crystalline material. • Understand the common terminology of crystal, solidification process, and classification of crystal system like cubic, tetragonal, hexagonal, orthorhombic, monoclinic, triclinic, crystal system. • Sound knowledge of crystal structure as a space lattice, unit cell, body centered cubic structure, face centered cubic structure, hexagonal closed pack. 		
2	Unit II: Mechanical properties	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different phase of iron material and its properties at different temperature. ✓ Understand different material and its properties in different conditions. ✓ Get knowledge to utilize material with different condition. 	<ul style="list-style-type: none"> • Understand the theory of stress strain and their units and also detail study of stress-strain curve for steel and cast iron. • To study of mechanical properties of strength, elasticity, plasticity, ductility, malleability, hardness, fatigue, stiffness, conductivity, toughness ,creep 	8	20
3	Unit III: Deformation	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about the deformation of material ✓ Understand different process for deformations. 	<ul style="list-style-type: none"> • Learn principle of deformation of material. • Deep knowledge of deformation processes like twinning, slip, etc. and work hardening and strain hardening • Detail knowledge of cold working and hot 	12	20

			working with their operations, advantage and disadvantage.		
4	Unit IV: Manufacturing and Application of steel and cast iron.	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about different types of steel materials and its properties. ✓ Get knowledge to utilize material at suitable place. ✓ Get knowledge about various alloy steel material. 	<ul style="list-style-type: none"> • Learn basic definition of steel. • Detail properties of steel like irons and iron ores, plain carbon steel (low carbon steel, medium carbon steel, high carbon steel) and their effect. • Understand the various alloying element and combination in steel. Use of alloy steel with their properties (silicon steel, manganese steel, nickel steel, nickel chrome steel, etc.) 	15	15
5	Unit V: Alloy steel and alloying elements	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand purpose of alloying elements and their effect on properties of steel. 	<ul style="list-style-type: none"> • Concept of alloy steel • Classification as low alloy and high alloy steel 	8	15
6	Unit VI: Destructive and non-destructive testing	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Izod and Charpy, Rockwell, Brinell, Vickers pyramid. 	<ul style="list-style-type: none"> • Concept and procedure of mechanical testing of metal such as tensile, compression, impact, hardness, fatigue and creep test. • Concept and procedure of non-destruction testing of metals such as dye penetration, magnetic particles, ultrasonic rays, laser beam. 	6	10
Review & class test				3	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: II
Course Title	: MATERIAL TECHNOLOGY-I
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
3	--	--	03	70	--	30	--	100

Rationale:

This Subject is intended to teach basic materials classification, structure, physical and mechanical properties. The students are required to understand different material for various application. It is necessary for students to know basics of metal structure, properties, usage and testing of metals. This Knowledge will be used in heat treatment and core technology subject.

Outcomes:

- Understand different types of material and its group.
- Get knowledge about different material and its properties.
- Get knowledge about the application of materials, its effect on environment.
- Get knowledge about selection and iso coding of tool steel material.
- Get knowledge about availability of material and costing of material in markets.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Crystal system and imperfection</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand internal structure of material. ✓ Understand atomic structure for different material. ✓ Understand atomic bonds of materials what is important of atomic bonds, how they are connected. ✓ Get deep knowledge about the crystalline material and non-crystalline material, what is the different between them. ✓ Get deep knowledge about the impurities in material and involve defects in materials. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Understanding of the crystal by their atomic structure like fundamental particles of atomic structure (photon, electron, neutron). • Understanding of atomic bonds like bond energy types of bond (primary bond, secondary bond). • Classification of primary bond Ionic bond, covalent bond, metallic bond • Understanding of crystalline material and non-crystalline material. • Understand the common terminology of crystal, solidification process, and classification of crystal system like cubic, tetragonal, hexagonal, orthorhombic, monoclinic, triclinic, crystal system. • Sound knowledge of crystal structure as a space lattice, unit cell, body centered cubic structure, face centered cubic structure, hexagonal closed pack. 	8	20
<p>Topic 2: Mechanical properties</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different phase of iron material and its properties at different temperature. ✓ Understand different material and its properties in different conditions. ✓ Get knowledge to utilize material with different condition <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Understand the theory of stress strain and their units and also detail study of stress-strain curve for steel and cast iron. • To study of mechanical properties of strength, elasticity, plasticity, ductility, malleability, hardness, fatigue, stiffness, conductivity, toughness ,creep 	8	20

<p>Topic 3: Deformation</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about the deformation of material. ✓ Understand different process for deformations. <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Learn principle of deformation of material. • Deep knowledge of deformation processes like twinning, slip, etc. and work hardening and strain hardening • Detail knowledge of cold working and hot working with their operations, advantage and disadvantage. 	12	20
<p>Topic 4: Manufacturing and application of steel and cast iron.</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about different types of steel materials and its properties. ✓ Get knowledge to utilize material at suitable place. ✓ Get knowledge about various alloy steel material. <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Learn basic definition of steel. • Detail properties of steel like irons and iron ores, plain carbon steel(low carbon steel, medium carbon steel, high carbon steel) and their effect. • Understand the various alloying element and combination in steel. Use of alloy steel with their properties (silicon steel, manganese steel, nickel steel, nickels chrome steel, etc.) 	15	15
<p>Topic 5: Alloy steel and alloying elements</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand purpose of alloying elements and their effect on properties of steel. <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Concept of alloy steel • Classification as low alloy and high alloy steel 	8	15

Topic 6: Destructive and non- destructive testing	6	10
Objectives: <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Izod and Charpy, Rockwell, Brinell, Vickers pyramid. Contents: 6.1 <ul style="list-style-type: none"> • Concept and procedure of mechanical testing of metal such as tensile, compression, impact, hardness, fatigue and creep test. • Concept and procedure of non-destruction testing of metals such as dye penetration, magnetic particles, ultrasonic rays, laser beam. 		
Review and class test	3	
Total	60	100

Intellectual Skills:

- 1) Able to identify and select the proper material according to the needed accuracy.
- 2) Must gain knowledge about material properties and how to use them for manufacturing

Motor Skills:

- 1) able to find the defects possible in different materials

Learning Resources:

25. **Books:**

AUTHOR	TITLE	PUBLISHER
G.B.S. Narang	Material Science	Khanna Publications, Delhi.
HazraChoudhary&HazraChoudhary	Material Science & Processes	Indian Book Distribution Co.

George's Brady	Material Hand Book	McGraw Hill Book Co.
Roy A. Lindberg	Materials & Manufacture	Prentice Hall of India
O.P. Khanna	Material Science & Metrology	DhanpatRai& Sons, New Delhi
Y. Lakhtin	Engineering Physical Metrology	Mir Publishers-Moskow
R.K. Rajput	Material Science & Engineering	Kataria& sons, New Delhi.
D.S. Nat	Materials & Metallurgy	Katson Publishing House, Delhi.
Albert G. Guy	Physical Metallurgy for Engineers	Addision Wesley Publishing Co.
Dr. D. Swarup& Ajay Rastogi	Elements of Metallurgy	Rastogi Publications, Meerut.

COURSE/MODULE TEMPLATE

SEMESTER:2

COURSE NAME:WORKSHOP TECHNOLOGY-II

COURSE CODE:MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Use and application of different machine as per requirement
✓ Understanding different types of machine and their operation and use of cutting fluid
✓ Customize the use of different machine as per manufacturing of part
✓ Calculation of speed, feed and depth of cut and its importance

THEORY HOURS :80hrs PRACTICAL HOURS :NA THEORY MARKS :100 PRACTICAL MARKS :NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Machines and operations of Drilling, Planning, Slotting, Turning, Milling and Grinding	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to Selection & use of drilling machine ✓ Use of drilling operation & methods of drilling ✓ Function of drilling machine ✓ Use of work holding devices , ✓ Vice, angle plate, 'V' block, 'C' clamp ✓ Application & use of drill chuck, sleeves, drifts, tapping, attachment ✓ Selection & use of lathe machine ✓ Parts of lathe machine 	<ul style="list-style-type: none"> • Understand different types of drilling machine Classification Of drilling machine drilling operation • Parts of drilling machine • Type of work holding devices • Vice, angle plate, 'V' block, 'C' clamp • Design, types & construction of drills, centre drills, counter bark, counter sink, drill chuck, sleeves, tapping attachment • Drilling, counter sink, counter boring, reaming, tapping • Understand in detail about types of lathe machine and 	65	80

		<ul style="list-style-type: none"> ✓ Types of work holding device & it's material ✓ Types of cutting tool ✓ Types of cutting tool/holder & it's classification ✓ Selecting & use of milling machine ✓ function of milling machine & it's part ✓ Type of work holding devices ✓ Design & types of cutting tools construction ✓ Cutting tool holder ✓ Tool geometry speed feed & depth of cut ✓ Types of milling operation Construction ✓ Use of grinding machine ✓ Application & use of vices, sine table ,angle table, 'V' block ✓ Use and selection of planing operation and planer ✓ Use and selection of slotting operation and slotting machine 	<p>classification Function of lathe machine & it's part Use & application of 3-jaw chuck,4-jaw chuck, read centre, revolving centre, face plate</p> <ul style="list-style-type: none"> • Use & application of single point cutting tool, rough cutting tool, finishing tools, growing tool • Use & application of drill chuck ,tool post, indexing tool post, quick change tool holder • Time calculation • Application & use of plan turning, shoulder turning, grooving , facing, knurling, eccentric turning, chamfering • Understand in detail about • Type of milling machine • Application of milling machine & it's part • Use & application of concave and convex form cutters, t-slot cutters, saws boring cutter solid carbide cutters, carbide inserts • Type of cutting tool holder construction • Calculation of no. of teeth, machining time speed, feed, depth of cut, selection of cutting fluid • Application & use of profile milling, key ways, sawing slits & 'T' slot • Understand in detail about the types of grinding machine • Types of vices, sine table, angle table, 'V' block construction • Factors of cutting tool, work material, machine 		
2	Unit II: Pantograph	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to ✓ Understand Pantograph machine and 	<ul style="list-style-type: none"> • Operation and principle of pantograph machine and parts, • Various steps performed on pantograph 	12	20

	and single lip grinder	<p>operations</p> <ul style="list-style-type: none"> ✓ Concept of main parts and functions of machine ✓ Work holding devices ✓ single lip grinder machine and operations ✓ Concept of main parts and functions of machine ✓ Work holding 	<ul style="list-style-type: none"> • Operation and principle of single lip grinder machine and parts, • Various steps performed on single lip grinder operation • Work holding attachment cutting tools 		
Review & class test				3	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: II
Course Title	:WORKSHOP TECHNOLOGY-II
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
4	--	--	03	70	--	30	--	100

Rationale:

This Subject describes the facts, concepts, principles and procedures of using hand tools, machine tools and related techniques efficiently, effectively to plan the manufacturing of Tool & Die Parts to the specification considering safety and environment. It is also useful in Understanding technology and apply them in the areas such as workshop practice, tool design, production plan, estimation and supervisory management.

It also describes the concept, principle and procedures to identify and report the maintenance requirement for corrective action. It also describes the procedures to derive the specification I.e. hand tools, machine tools for tool and die making.

Outcomes:

- Safety rules to be taken at workshop while working
- Understand the different machining process used in workshop.
- Use and application of different machine as per requirement
- Able to operate different types of machine ,construction, operation and use of cutting fluid
- Maintaining different machine as per manufacturing of part

- Able to Calculate the speed, feed and depth of cut and its importance
- Use and application of cutting tools

Theory:

Topic and Contents	Hours	Marks
<p>Topic 1: Machines and operations of Drilling, Planning, Slotting, Turning, Milling and Grinding</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to Selection & use of drilling machine ✓ Use of drilling operation & methods of drilling ✓ Function of drilling machine ✓ Use of work holding devices , ✓ Vice, angle plate, 'V' block, 'C' clamp ✓ Application & use of drill chuck, sleeves, drifts, tapping, attachment ✓ Selection & use of lathe machine ✓ Parts of lathe machine ✓ Types of work holding device & it's material ✓ Types of cutting tool ✓ Types of cutting tool/holder & it's classification ✓ Selecting & use of milling machine ✓ function of milling machine & it's part ✓ Type of work holding devices ✓ Design & types of cutting tools construction ✓ Cutting tool holder ✓ Tool geometry speed feed & depth of cut ✓ Types of milling operation Construction ✓ Use of grinding machine ✓ Application & use of vices, sine table ,angle table, 'V' block ✓ Use and selection of planning operation and planer ✓ Use and selection of slotting operation and slotting machine <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Understand different types of drilling machine Classification Of drilling machine drilling operation • Parts of drilling machine • Type of work holding devices • Vice, angle plate, 'V' block, 'C' clamp • Design, types & construction of drills, centre drills, counter bark, counter sink, drill chuck, sleeves, tapping attachment • Drilling, counter sink, counter boring, reaming, tapping 	65	80

<ul style="list-style-type: none"> • • Understand in detail about types of lathe machine and classification Function of lathe machine & it's part Use & application of 3-jaw chuck, 4-jaw chuck, read centre, revolving centre, face plate • Use & application of single point cutting tool, rough cutting tool, finishing tools, growing tool • Use & application of drill chuck, tool post, indexing tool post, quick change tool holder • Time calculation • Application & use of plan turning, shoulder turning, grooving, facing, knurling, eccentric turning, chamfering • Understand in detail about • Type of milling machine • Application of milling machine & it's part • Use & application of concave and convex form cutters, t-slot cutters, saws boring cutter solid carbide cutters, carbide inserts • Type of cutting tool holder construction • Calculation of no. of teeth, machining time speed, feed, depth of cut, selection of cutting fluid • Application & use of profile milling, key ways, sawing slits & 'T' slot • • Understand in detail about • Types of grinding machine • Types of vices, sine table, angle table, 'V' block construction • Factors of cutting tool, work material, machine 		
<p>Topic :</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to ✓ Understand Pantograph machine and operations ✓ Concept of main parts and functions of machine ✓ Work holding devices ✓ single lip grinder machine and operations ✓ Concept of main parts and functions of machine <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Operation and principle of pantograph machine and parts, • Various steps performed on pantograph • Operation and principle of single lip grinder machine and parts, • Various steps performed on single lip grinder operation • Work holding attachment cutting tools 	12	20
<p>Review and class test</p>	3	
Total	80	100

Intellectual Skills:

- 1) Understand the proper selection of the machine for different machining process.
- 2) Maintenance of the machine

Motor Skills:

- 1) Selection of tool and its maintenance
- 2) Understanding the working and importance of the different machines used for manufacturing.

Learning Resources:

29. Books:

AUTHOR	TITLE	PUBLISHER
Chapman A.J.	Workshop Technology (Vol. I,II & III)	New Delhi: Amol Publication
Hazra S.K. & Chaoudhary S.K.	Elements of Workshop Technology	Metropolitan Publishers, Bombay.
Raghuwanshi B.S. & Others	Workshop Technology	New Heights, New Delhi.
Gupta K.N. & Kaushish J.P.	Workshop Technology Vol. I to II.	New Heights, New Delhi.
Atherton W.H.	Workshop Practice Vol. I to V	New Era Publishers, London.
Gerling	All about Machine tools	WILSEY EASTERN, Delhi.
B. Kishore	Tool & Die Maker	Saurabh & Co.
Hermann Jutz Edward Scharkus	Westermann Tables	WILSEY EASTERN, Delhi.

COURSE/MODULE TEMPLATE

SEMESTER:2

COURSE NAME :ENGINEERING DRAWING-II

COURSE CODE :MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understand different types of development of surface and its importance in drawing.
✓ Application of elements in drawing.
✓ Understand and use Assembly drawing and detail drawing in industrial projects.

THEORY HOURS :30hrs PRACTICAL HOURS 130hrs THEORY MARKS :NA PRACTICAL MARKS :150

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Surface texture, limits, fits and tolerances, geometrical tolerance	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to ✓ Understand about Tolerances, limits, fits and Surface texture. ✓ Geometric tolerance symbols and characteristics. 	<ul style="list-style-type: none"> • Definition of single and related feature, • Classification and use of surface texture. • Type of geometrical tolerance • Rules of geometrical tolerance, procedure of drafting and symbol, tolerance and various characteristics. 	5+10	20
2	Unit II:	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to 	<ul style="list-style-type: none"> • Type of section <ul style="list-style-type: none"> a. Sectional view 	5+10	20

	Development of surface	<ul style="list-style-type: none"> ✓ Understand the Different Section view drawing and its detail view ✓ Development of different types of surfaces ✓ Interpenetration of solids 	<p>b. Assembly section</p> <ul style="list-style-type: none"> • Principal of sectioning & BIS norms. • Procedure of selecting and drawing of section views. • Parallel line development radial line development, • Triangular development, approximate development <p>Intersection of two plane surfaces, intersection of two curved surfaces, intersection of plane surface and curved surface.</p>		
3	Unit III: Drawing of assembly	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to ✓ Understand the Practical drawing in different temporary joints as per BIS standard which is used for assembly 	<ul style="list-style-type: none"> • Definition & introduction of element of assembly • definition of temporary joints • screw Thread • bolts, nuts • dowels, washers • spring • Permanent joints. • standard elements as per BIS being used for assembly • Section and representation of different elements in used in assembly. 	10+50	60
4	Unit IV: Drawing of sub assembly & Assembly	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to <p>Understand the Assembly and detail drawing any object.</p>	<ul style="list-style-type: none"> • Introduction to Assembly drawing • Introduction to detail of Assembly drawing • Title block, bill of material block modification block. • Relationship of assembly drawing. • Detail drawing and bill of material. • Procedures for Drawing of assembly draw and detail Drawing. • Detail drawing and with bill of mat. for simple job like. ➤ Jig & fixture ➤ press tools (single operation) ➤ injection mould (single cavity) 	10+50	50
Review & class test				10	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: II
Course Title	:ENGINEERING DRAWING-II
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
2	--	6	05	70	--	30	50	150

Rationale:

Understand the scientific facts, concepts, principles and procedures of engineering drawing used in tool design, manufacturing, process planning, estimation, inspection and QC including supervisory management to express the ideas, conveying instructions for carrying out jobs in Tool & Die Technology. It is also useful in understanding technology subject such as tool design, workshop practice, production planning & estimation, supervisory management, CAD by achieving basic drawing skills, utilization and interpreting drawings. It also describes the concepts, principles and procedures of drawing of machine elements to understand machine maintenance and service manuals and related technical catalogue.

Outcomes:

- Understand the concepts, principle and procedure of engineering drawing used in tool design.
- Able to read and draw the drawing carefully by following the GD&T
- Understand different methods of geometric construction orthographic projection, and isometric projection and its importance in engineering drawing.
- Understand the elements of assembly and drawing process to draw assembly drawing, detail drawing and bill of material.

Theory:

Topic and Contents	Hours	Marks
<p>Topic 1: Surface texture, limits, fits and tolerances, geometrical tolerance</p> <p>Objectives:</p> <ul style="list-style-type: none">✓ At the end of this unit Student should be able to✓ Understand about Tolerances, limits, fits and Surface texture.✓ Geometric tolerance symbols and characteristics. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none">• Definition of single and related feature,• Classification and use of surface texture.• Type of geometrical tolerance <p>Rules of geometrical tolerance, procedure of drafting and symbol, tolerance and various characteristics.</p>	5+10	20
<p>Topic 2: Development of surface</p> <p>Objectives:</p> <ul style="list-style-type: none">✓ At the end of this unit Student should be able to✓ Understand the Different Section view drawing and its detail view✓ Development of different types of surfaces✓ Interpenetration of solids <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none">• Type of sectionc. Sectional viewd. Assembly section• Principal of sectioning & BIS norms.• Procedure of selecting and drawing of section views.• Parallel line development radial line development,• Triangular development, approximate development• Intersection of two plane surfaces, intersection of two curved surfaces, intersection of plane surface and curved surface.	5+10	20
<p>Topic 3: Drawing of assembly</p> <p>Objectives:</p> <ul style="list-style-type: none">✓ At the end of this unit Student should be able to✓ Understand the Practical drawing in different temporary joints as per BIS standard which is used for assembly✓ <p>Contents:</p>	10+50	60

<p>2.1</p> <ul style="list-style-type: none"> • Definition & introduction of element of assembly • definition of temporary joints • screw Thread • bolts, nuts • dowels, washers • spring • Permanent joints. • standard elements as per BIS being used for assembly <p>Section and representation of different elements in used in assembly.</p>		
<p>Topic 4: Drawing of sub assembly & Assembly</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to ✓ Understand the Assembly and detail drawing any object. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Introduction to Assembly drawing • Introduction to detail of Assembly drawing • Title block, bill of material block modification block. • Relationship of assembly drawing. • Detail drawing and bill of material. • Procedures for Drawing of assembly draw and detail drawing. • Detail drawing and with bill of mat. for simple job like. ➤ Jig & fixture ➤ press tools (single operation) ➤ injection mould (single cavity) 	10+50	50
<p>Review and class test</p>	10	
<p>Total</p>	50	150

Intellectual Skills:

- 1) Note down the sequence related to the design aspect to understand the drawing.
- 2) Draw basic level geometrical/mechanical drawings and charts.
- 3) Read and interpret technical customer drawing

Motor Skills:

- 1) Follow instructions and work on areas to design a drawing
- 2) complete the assigned tasks with minimum supervision

Learning Resources:**33. Books:**

AUTHOR	TITLE	PUBLISHER
Bhatt N. D.	Elementary Engineering Drawing	Charotar book stall, Anand.
Bhatt N. D.	Geometrical & Machine Drawing	Charotar book stall, Anand.
Gupta, Mahajan& Sharma	A First Year Engineering Drawing	SatyaPrakashan, New Delhi.
Gupta, Mahajan& Sharma	A Second Year Engineering Drawing	SatyaPrakashan, New Delhi.
A C Parkinson	Engineering Workshop Drawing	Pitman Publisher
PS Gill	Engineering Drawing	SK Kataria& Sons, New Delhi.
RK Dhawan	Engineering Drawing	S Chand & Co., New Delhi.
NS Kumar	Engineering Drawing	Tata Publication, New Delhi.
D.N. Arora	Fundamentals of Engineering Drawing	India Publishing House, Delhi.
Cecil Jensen, Jay Helsel	Engineering Drawing & Design	McGraw Hill Book Co.
BIS	SP-46: 1998	Bureau of Indian Standards, New Delhi.

COURSE/MODULE TEMPLATE

SEMESTER:2

COURSE NAME: WORKSHOP PRACTICE-II

COURSE CODE:MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Get knowledge about practical work in workshop.
✓ Get knowledge about different machine used in workshop like milling, turning, grinding, etc.
✓ Find out different problems during manufacturing of different parts and using different machine.

THEORY HOURS :NA PRACTICAL HOURS :660hrs THEORY MARKS :NA PRACTICAL MARKS :150

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Workshop practice	At the end of this unit Student should be able to <ul style="list-style-type: none"> ✓ Understand different types of machining process. ✓ Understand different machines. ✓ Understand different parameter for use of different machines. <ul style="list-style-type: none"> ✓ Different process regarding workshop and store 	To understand about <ul style="list-style-type: none"> • Heat treatment & hardness testing • Sheet metal working • Basic cylindrical grinding • Basic tool & cutter grinding • Fundamentals of dimensional metrology Store management & material preparation.	640	400

Review and Class test	20	
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COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: II
Course Title	:WORKSHOP PRACTICE-II
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme					Examination Scheme			
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	30	8	--	200	--	200	400

Rationale:

At the end of semester the trainees will be able to produce useful items by acquiring hand skill and selected machining skill in basic metal working and machine tool operations and by combining them with both knowledge of IGTR-Ahmedabad training organization and safety regulations .The trainees also manufacture machine accessories and standard parts by integrating hand skill and machine tool operation skill.

Outcomes:

- Get knowledge about practical work in workshop.
- Get knowledge about different machine used in workshop like milling, turning, grinding, etc.
- Find out different problems during manufacturing of different parts and using different machine.

Theory:

Topic and Contents	Hours	Marks
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Topic 1:Workshop practice	40+600	400
Objectives:		
At the end of this unit Student should be able to		
<ul style="list-style-type: none"> ✓ Understand different types of machining process. ✓ Understand different machines. ✓ Understand different parameter for use of different machines. ✓ Different process regarding workshop and store 		
Contents:		
2.1		
To understand about		
<ul style="list-style-type: none"> • Heat treatment & hardness testing • Sheet metal working • Basic cylindrical grinding • Basic tool & cutter grinding • Fundamentals of dimensional metrology • Store management & material preparation. 		
Review and class test	20	
Total	660	400

Intellectual Skills:

- 1) understand different types of machining process and different machines
- 2) problem finding & solving during production, design, assembly and trial

Motor Skills:

- 1)Able to make assembly properly
- 2)Knowledge about the machine and tools used for manufacturing.

Learning Resources:

37. Books:

AUTHOR	TITLE	PUBLISHER
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Chapman A.J.	Workshop Technology (Vol. I,II & III)	New Delhi: Amol Publication
Hazra S.K. &Chaoudhary S.K.	Elements of Workshop Technology	Metropolitan Publishers, Bombay.
Raghuwanshi B.S. & Others	Workshop Technology	New Heights, New Delhi.
Gupta K.N. &Kaushish J.P.	Workshop Technology Vol. I to II.	New Heights, New Delhi.
Atherton W.H.	Workshop Practice Vol. I to V	New Era Publishers, London.
Gerling	All about Machine tools	WILSEY EASTERN, Delhi.
B. Kishore	Tool & Die Maker	Saurabh& Co.
Hermann Jutz Edward Scharkus	Westermann Tables	WILSEY EASTERN, Delhi.

COURSE/MODULE TEMPLATE

SEMESTER:3

COURSE NAME :APPLIED MECHANICS

COURSE CODE :MSME/DTE/

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Understand different principle of mechanics.
✓ Application of mechanics in general engineering and tool and die making problems.
✓ Understand and analyse problems encountered in core technological subjects.

THEORY HOURS :60hrs PRACTICAL HOURS :NA THEORY MARKS :100 PRACTICAL MARKS :NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Introduction	At the end of this unit Student should be able to understand <ul style="list-style-type: none"> ✓ Scalar and vector quantities ✓ System of units ✓ Principle of abbreviation, symbols, units of quantities. 	<ul style="list-style-type: none"> • Scalar and vector quantity and application • Concept of scalar quantity, vector quality. • Principles of system of units, scalar quantities, vector quantities. • Related Problems on scalar and vector quantities. • System of units, standard quantity and derived quantity. • Units of C.G.S. system, systems of international (S.I). • Rules for writing abbreviations, standard quantity, derived quantity. Related problems on units and standard quantities.	2	5
2	Unit II:	At the end of this unit Student should be able	<ul style="list-style-type: none"> • System of forces and its application. • Concept of force, type of forces, resultant of forces, 	8	12

	Coplanar concurrent forces	<p>to understand</p> <ul style="list-style-type: none"> ✓ Principle of statics ✓ Equilibrium of coplanar concurrent forces. ✓ Lami's theorem. ✓ Resolution and resultant, graphical methods. ✓ Newton's third law. 	<p>composition of force, resolution of force.</p> <ul style="list-style-type: none"> • Concept of Bow's notation. Principle of force, type of forces, resultant of forces, composition of force, resolution of force. • Related problems of System of forces of finding resultant force. • Concept of condition of Equilibrium, • Parallelogram law of forces, • Triangle law of forces, • Free body diagram. • Related problems on equilibrium of coplanar, concurrent forces 		
3	Unit III: Coplanar, parallel and non-concurrent forces	<p>At the end of this unit Student should be able to understand</p> <ul style="list-style-type: none"> ✓ Moments ✓ Lami's theory. ✓ Principle of parallel forces, unlike parallel forces, non-concurrent force, couple, resultant force. ✓ Condition of equilibrium. ✓ Varignon 's principle 	<ul style="list-style-type: none"> • Coplanar, parallel and non-concurrent force and application. • Concept of parallel forces, unlike parallel forces, non-concurrent force, couple, resultant force, condition of equilibrium. • Related problems on parallel and unlike parallel forces, non-concurrent force. • Concept of moment, types of moments, law of moments. • Resultant force. • Related problem and application of moment. 	8	12
4	Unit 4: Centre of gravity	<p>At the end of this unit Student should be able to understand</p> <ul style="list-style-type: none"> ✓ Concept of centre of gravity, centroid, ✓ symmetry consideration ✓ theorem of moments, ✓ Axis of symmetry. ✓ State of equilibrium and application. 	<ul style="list-style-type: none"> • Centre of gravity and centroid for basic shapes and solids. • Principle of centre of gravity, centroid, symmetry consideration, theorem of moments, axes of symmetry. • Related problems on centre of gravity or centroid of basic shapes or solids. • Concept of stability, equilibrium, types of equilibrium, magnitude of force. • Related problems in equilibrium and stability 	8	15
5	Unit 5:	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Friction in engineering 	<ul style="list-style-type: none"> • Concept of friction, limiting friction, Co – efficient of friction, angle of friction, laws of friction 	8	12

	Friction	field.	<ul style="list-style-type: none"> Study problem, identify and categories problem, select laws of friction, describe solution. 		
6	Unit 6: Rectilinear motion	<p>At the end of this unit Student should be able to understand</p> <ul style="list-style-type: none"> ✓ Terms related to motion ✓ Laws of motion ✓ Application. 	<ul style="list-style-type: none"> Motion, uniform velocity, variable velocity acceleration. Concept of motion, speed, velocity, acceleration, distance traversed. Concept of momentum, Newton's laws, forces equation from second law of motion, piles, lift, and bodies tied with string. 	5	10
7	Unit 7: Curvilinear motion	<p>At the end of this unit Student should be able to understand the application of</p> <ul style="list-style-type: none"> ✓ angular displacement ✓ velocity ✓ acceleration ✓ centrifugal forces ✓ Centripetal forces. 	<ul style="list-style-type: none"> Concept of angular displacement, angular velocity ,angular acceleration, tangential velocity, Relationship between angular acceleration & linear acceleration, Relationship between tangential and radial acceleration. Concept and principles of centripetal forces, centrifugal forces, reaction on wheels, skidding velocity, over hunting velocity, vertical running on rails. 	5	12
8	Unit 8: Engineering application of work, power, energy	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Work done by torque ✓ The application of work done, work done by torque, horse power, torque, speed relationship. ✓ The application of horse power, kinetic energy & potential energy. 	<ul style="list-style-type: none"> Concept of work done, force-displacement diagram, work done by torque, horse power, torque, speed relationship, work done by rotation. Concept and principle of horse power, kinetic energy & potential energy, work done & energy. 	5	10
9	Unit 9: Simple machine	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the mechanical advantages and velocity ratio in simple machine. 	<ul style="list-style-type: none"> Concept and principle of mechanical advantages and velocity ratio, work done by machine, simple pulleys, lever, wheel and axle, screw jack, crab winch (single and double) 	8	12
Review & class test				3	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: III
Course Title	:APPLIED MECHANICS
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
3	--	--	03	70	--	30	--	100

Rationale:

The subject is taken from engineering science group which deals with laws and principles of mechanics along with their applications in engineering. And tool and die making problems. It helps the students to analyses the problems encountered in core technology subjects like design, heat treatment, planning, work shop technology and work shop practice.

Outcomes:

- Understand different principle of mechanics.
- Application of mechanics in general engineering and tool and die making problems.
- Understand and analyse problems encountered in core technological subjects.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Introduction</p> <p>Objectives:</p> <p>At the end of this unit Student should be able to understand</p> <ul style="list-style-type: none"> ✓ Scalar and vector quantities ✓ System of units ✓ Principle of abbreviation, symbols, units of quantities. ✓ <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Scalar and vector quantity and application • Concept of scalar quantity, vector quality. • Principles of system of units, scalar quantities, vector quantities. • Related Problems on scalar and vector quantities. • System of units, standard quantity and derived quantity. • Units of C.G.S. system, systems of international (S.I). • Rules for writing abbreviations, standard quantity, derived quantity. <p>Related problems on units and standard quantities.</p>	2	5
<p>Topic 2: Coplanar concurrent forces</p> <p>Objectives:</p> <p>At the end of this unit Student should be able to understand</p> <ul style="list-style-type: none"> ✓ Principle of statics ✓ Equilibrium of coplanar concurrent forces. ✓ Lami's theorem. ✓ Resolution and resultant, graphical methods. ✓ Newton's third law. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • System of forces and its application. • Concept of force, type of forces, resultant of forces, composition of force, resolution of force. • Concept of Bow's notation. Principle of force, type of forces, resultant of forces, composition of force, resolution of force. • Related problems of System of forces of finding resultant force. • Concept of condition of Equilibrium, • Parallelogram law of forces, • Triangle law of forces, • Free body diagram. <p>Related problems on equilibrium of coplanar, concurrent forces</p>	8	12

<p>Topic 3: Coplanar, parallel and non-concurrent forces</p> <p>Objectives:</p> <p>At the end of this unit Student should be able to understand</p> <ul style="list-style-type: none"> ✓ Moments ✓ Lami's theory. ✓ Principle of parallel forces, unlike parallel forces, non-concurrent force, couple, resultant force. ✓ Condition of equilibrium. ✓ Varignon 's principle <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Coplanar, parallel and non-concurrent force and application. • Concept of parallel forces, unlike parallel forces, non-concurrent force, couple, resultant force, condition of equilibrium. • Related problems on parallel and unlike parallel forces, non-concurrent force. • Concept of moment, types of moments, law of moments. • Resultant force. • Related problem and application of moment. 	8	12
<p>Topic 4: Centre of gravity</p> <p>Objectives:</p> <p>At the end of this unit Student should be able to understand</p> <ul style="list-style-type: none"> ✓ Concept of centre of gravity, ✓ centroid, ✓ symmetry consideration ✓ theorem of moments, ✓ Axis of symmetry. ✓ State of equilibrium and application. <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Centre of gravity and centroid for basic shapes and solids. • Principle of centre of gravity, centroid, symmetry consideration, theorem of moments, axes of symmetry. • Related problems on centre of gravity or centroid of basic shapes or solids. • Concept of stability, equilibrium, types of equilibrium, magnitude of force. <p>Related problems in equilibrium and stability</p>	8	15
<p>Topic 5: Friction</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Friction in engineering field. <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Concept of friction, limiting friction, Co – efficient of friction, angle of friction, laws of friction 	8	12

Study problem, identify and categories problem, select laws of friction, describe solution.		
<p>Topic 6: Rectilinear motion</p> <p>Objectives:</p> <p>At the end of this unit Student should be able to understand</p> <ul style="list-style-type: none"> ✓ Terms related to motion ✓ Laws of motion ✓ Application. ✓ <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Motion, uniform velocity, variable velocity acceleration. • Concept of motion, speed, velocity, acceleration, distance traversed. • Concept of momentum, • Newton’s laws, forces equation from second law of motion, piles, lift, and bodies tied with string. 	5	10
<p>Topic 7: Curvilinear motion</p> <p>Objectives:</p> <p>At the end of this unit Student should be able to understand the application of</p> <ul style="list-style-type: none"> ✓ angular displacement ✓ velocity ✓ acceleration ✓ centrifugal forces ✓ Centripetal forces. <p>Contents:</p> <p>7.1</p> <ul style="list-style-type: none"> • Concept of angular displacement, angular velocity ,angular acceleration, tangential velocity, • Relationship between angular acceleration & linear acceleration, • Relationship between tangential and radial acceleration. • Concept and principles of centripetal forces, centrifugal forces, reaction on wheels, skidding velocity, over hunting velocity, vertical running on rails. 	5	12
<p>Topic 8: Engineering application of work, power, energy</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Work done by torque ✓ The application of work done, work done by torque, horse power, torque, speed relationship. ✓ The application of horse power, kinetic energy & potential energy. <p>Contents:</p> <p>8.1</p> <ul style="list-style-type: none"> • Concept of work done, force-displacement diagram, work done by torque, horse power, torque, speed relationship, work done by rotation. • Concept and principle of horse power, kinetic energy & potential energy, work done & energy. 	5	10

Topic 9: Simple machine	8	12
Objectives: <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the mechanical advantages and velocity ratio in simple machine. 		
Contents: 9.1 Concept and principle of mechanical advantages and velocity ratio, work done by machine, simple pulleys, lever, wheel and axle, screw jack, crab winch (single and double)		
Review and class test	3	
Total	60	100

Intellectual Skills:

1. Organize all process/ equipment manuals so that sorting/ accessing Information is easy.
2. It helps the students to analyses the problems encountered in core technology subjects like design, heat treatment, planning, work shop technology and work shop practice.

Motor Skills:

1. Application of mechanics in general engineering and tool and die making problems.
2. Understand and analyse problems encountered in core technological subjects.

Learning Resources:

41. Books:

AUTHOR	TITLE	PUBLISHER
R.S.Khurmi	A text book of engineering method	S.Chand and Co.Ltd.,Delhi
Ramamrutham& Narayan R.	A text book of engineering mechanics	DhanpatRai&Sons.,Delhi
Harry Parker &James Ambrose	Simple mechanics & strength of material	John Willey &Sons,Inc.
Learning resources development center	engineering mechanics	Continuing Education D.T.E.Gujrat
J.B Prasad	A text book of Applied mechanics	KhannaPublishers,Delhi
S.K.Aggarwal&P.K.Gupta	strength of material	Metropolitan book Co.,New Delhi.
Junkar	Applied mechanics	--

COURSE/MODULE TEMPLATE

SEMESTER:3

COURSE NAME :MATHEMATICS-III

COURSE CODE :MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understanding facts, concept, of mathematical needs in technical subjects.
✓ Use of mathematical technique to solve engineering technique.
✓ To develop mathematical skills among students.

THEORY HOURS :60hrs PRACTICAL HOURS :NA THEORY MARKS :100 PRACTICAL MARKS :NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit 1: Differential calculus	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand different types of differential equation. 	<ul style="list-style-type: none"> • Introduction, differential equation of first order and first degree, • differential equation of second order and first degree with constant co-efficient • Differential equation of third and fourth order and of first degree 	25	50
2	Unit 2: Integral calculus	<ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand integration, ✓ Mean value and R.M.S value of a function. 	<ul style="list-style-type: none"> • Integration of rational and irrational definite integrals, gamma functions • area of curves, volume of solids of revolution, • moment of inertia, work done 	30	50
Review & class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: III
Course Title	: MATHEMATICS-III
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
3	--	--	03	70	--	30	--	100

Rationale:

Mathematics forms the backbone of all technologies and hence occupies an important place in the curriculum of technical education. This is very important for the future self-development of students.

In designing the curriculum for foundation course the admission level of this course has been considered and mathematical needs of technical subjects has been given due consideration.

Topics included are:- Applications of differential calculus, integral calculus and differential equations.

Outcomes:

- Understanding facts, concept, of mathematical needs in technical subjects.
- Use of mathematical technique to solve engineering technique.
- To develop mathematical skills among students.

Theory:

Topic and Contents	Hours	Marks
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Topic 1: Differential calculus Objectives: <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand different types of differential equation. ✓ Contents: 1.1 <ul style="list-style-type: none"> • Introduction, differential equation of first order and first degree, • differential equation of second order and first degree with constant co-efficient • Differential equation of third and fourth order and of first degree 	25	50
Topic 2: Integral calculus Objectives: <ul style="list-style-type: none"> ✓ After completion of course Student should be able to understand integration, ✓ Mean value and R.M.S value of a function. ✓ Contents: 2.1 <ul style="list-style-type: none"> • Integration of rational and irrational definite integrals, gamma functions • area of curves, volume of solids of revolution, • moment of inertia, work done 	30	50
Review and class test	5	
Total	60	100

Intellectual Skills:

- 1) Applications of differential calculus
- 2) Integral calculus
- 3) Differential equations.

Motor Skills:

- 1) Understanding facts, concept, of mathematical needs in technical subjects.
- 2) Use of mathematical technique to solve engineering technique.
- 3) To develop mathematical skills among students.

Learning Resources:

45. **Books:**

AUTHOR	TITLE	PUBLISHER
S.S.Sabharwal& Others	Applied mathematics	Eagle Prakashan,Jalandar

T.T.T.I.Bhopal	Mathematics for polytechnic Vol.2	T.T.T.I.Bhopal
Dass H.K	Advanced Engineering Mathematics	S.Chand&Co.,New Delhi
T.T.T.I.Chandigard	Applied mathematics	T.T.T.I.Chandigard
T.T.T.I.Madras	Applied mathematics	T.T.T.I.Madras
Loney S.R	Plain Trigonometry	Loney S.R

COURSE/MODULE TEMPLATE

SEMESTER:3

COURSE NAME :WORKSHOP TECHNOLOGY-III

COURSE CODE :MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Use and application of different machine as per requirement
✓ Understanding different types of machine and their operation and use of cutting fluid
✓ Customize the use of different machine as per manufacturing of part
✓ Calculation of speed, feed and depth of cut and its importance

THEORY HOURS :80hrs PRACTICAL HOURS :NA THEORY MARKS :100 PRACTICAL MARKS :NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Milling, Grinding and Gear cutting techniques	At the end of this unit Student should be able to understand <ul style="list-style-type: none"> ✓ Tool geometry speed feed & depth of cut ✓ Types of milling operation Construction ✓ Use of grinding machine ✓ Application & use of vices, sine table ,angle table, 'V' block ✓ Use of grinding wheel , grinding wheel dressing ✓ speed, feed ,depth of cut ✓ gear cutting technique 	<ul style="list-style-type: none"> • Calculation of no. of teeth, machining time speed, feed, depth of cut, selection of cutting fluid • Application & use of profile milling, key ways, sawing slits & 'T' slot • Types of grinding machine • Types of vices, sine table, angle table, 'V' block construction • Grinding wheel nomenclature, common grinding wheel • Calculation of speed feed, depth of cut • concept of gear manufacturing technique • principle of cutters and setting up machine and accessories 	32	40

2	Unit II: Jig boring, Profile grinding, and EDM process	At the end of this unit Student should be able to understand <ul style="list-style-type: none"> ✓ Operation in copy milling machine ✓ Jig boring operation ✓ Function of machine setting up machine for operation ✓ EDM process ✓ Function of EDM cutting parameter operation 	<ul style="list-style-type: none"> • Steps performed in copy milling and milling machine operation • Type of machine & types of machining method • Main part of machine work holding devices cutting tool's type • Steps performed in copy milling and milling machine operation • Concept of EDM, wire cut processes • Main part work holding device, tool holding devices, cutting tools, and material 	15	15
3	Unit III: Types of non conventional machines	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand types and application of non conventional machines ✓ Its importance in industry ✓ Main parts of these process and their machine 	<ul style="list-style-type: none"> • Concept and function of electro chemical machining • Concept and function of ultrasonic machining • Concept and function of abrasive jet machining • Concept and function of electronic beam machining • Concept and function of chemical machining • Concept and function of electro chemical grinding • Concept and function of ion beam machining • Concept and function of laser beam machining • Concept and function of plasma arc machining • Rapid prototyping • Various steps to performed these process 	12	15
4	Unit IV: Polishing, Lapping and Honing	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand types and application of polishing, lapping, honing ✓ Its importance in industry 	<ul style="list-style-type: none"> • Concept and function of polishing , lapping, honing materials and polishing, lapping , honing machine • Selection of polishing , lapping, honing materials and polishing, • Different technique of polishing , lapping, honing 	8	15
5	Unit V: Electroplating, Blasting and	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand working principles of process Functions and features of these process 	<ul style="list-style-type: none"> • Concept and function of electroplating • Concept and function of blackening • Concept and function of shot blasting • Concept and function of galvanizing • Various steps to performed these process 	8	15

	Galvanizing				
Review & class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: III
Course Title	:WORKSHOP TECHNOLOGY-III
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
04	--	03	03	70	--	30	--	100

Rationale:

This Subject describes the facts, concepts, principles and procedures of using hand tools, machine tools and related techniques efficiently, effectively to plan the manufacturing of Tool & Die Parts to the specification considering safety and environment. It is also useful in Understanding technology and apply them in the areas such as workshop practice, tool design, production plan, estimation and supervisory management.

It also describes the concept, principle and procedures to identify and report the maintenance requirement for corrective action. It also describes the procedures to derive the specification I.e. hand tools, machine tools for tool and die making.

Outcomes:

- Safety rules to be taken at workshop while working
- Understand the different machining process used in workshop.
- Use and application of different machine as per requirement
- Able to operate different types of machine ,construction, operation and use of cutting fluid
- Maintaining different machine as per manufacturing of part

- Able to Calculate the speed, feed and depth of cut and its importance
- Use and application of cutting tools

Theory:

Topic and Contents	Hours	Marks
<p>Topic 1: Milling, Grinding and Gear cutting techniques</p> <p>Objectives:</p> <p>At the end of this unit Student should be able to understand</p> <ul style="list-style-type: none"> ✓ Tool geometry speed feed & depth of cut ✓ Types of milling operation Construction ✓ Use of grinding machine ✓ Application & use of vices, sine table ,angle table, 'V' block ✓ Use of grinding wheel , grinding wheel dressing ✓ speed, feed ,depth of cut ✓ gear cutting technique <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Calculation of no. of teeth, machining time speed, feed, depth of cut, selection of cutting fluid • Application & use of profile milling, key ways, sawing slits & 'T' slot • Types of grinding machine • Types of vices, sine table, angle table, 'V' block construction • Grinding wheel nomenclature, common grinding wheel • Calculation of speed feed, depth of cut • concept of gear manufacturing technique • principle of cutters and setting up machine and accessories 	32	40
<p>Topic 2: Jig boring, Profile grinding, and EDM process</p> <p>Objectives:</p> <p>At the end of this unit Student should be able to understand</p> <ul style="list-style-type: none"> ✓ Operation in copy milling machine ✓ Jig boring operation ✓ Function of machine setting up machine for operation ✓ EDM process ✓ Function of EDM cutting parameter operation ✓ <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Steps performed in copy milling and milling machine operation • Type of machine & types of machining method • Main part of machine work holding devices cutting tool's type 	15	15

<ul style="list-style-type: none"> • Steps performed in copy milling and milling machine operation • Concept of EDM, wire cut processes <p>Main part work holding device, tool holding devices, cutting tools, and material</p>		
<p>Topic 3: Types of non conventional machines</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand types and application of non conventional machines ✓ Its importance in industry ✓ Main parts of these process and their machine <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Concept and function of electro chemical machining • Concept and function of ultrasonic machining • Concept and function of abrasive jet machining • Concept and function of electronic beam machining • Concept and function of chemical machining • Concept and function of electro chemical grinding • Concept and function of ion beam machining • Concept and function of laser beam machining • Concept and function of plasma arc machining • Rapid prototyping <p>Various steps to performed these process</p>	12	15
<p>Topic 4: Polishing, Lapping and Honing</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand types and application of polishing, lapping, honing ✓ Its importance in industry <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Concept and function of polishing , lapping, honing materials and polishing, lapping , honing machine • Selection of polishing , lapping, honing materials and polishing, 	8	15

Different technique of polishing , lapping, honing		
Topic 5: Electroplating, Blasting and Galvanizing Objectives: ✓ At the end of this unit Student should be able to understand working principles of process Functions and features of these process Contents: 5.1 <ul style="list-style-type: none"> • Concept and function of electroplating • Concept and function of blackening • Concept and function of shot blasting • Concept and function of galvanizing • Various steps to performed these process 	8	15
Review and class test	5	
Total	80	100

Intellectual Skills:

1. Understand the proper selection of the machine for different machining process.
2. Maintenance of the machine

Motor Skills:

- 1) Selection of tool and its maintenance
- 2) Understanding the working and importance of the different machines used for manufacturing.

Learning Resources:

49. **Books:**

AUTHOR	TITLE	PUBLISHER
Chapman A.J.	Workshop Technology (Vol. I,II & III)	New Delhi: Amol Publication
Hazra S.K. &Chaoudhary S.K.	Elements of Workshop Technology	Metropolitan Publishers, Bombay.
Raghuwanshi B.S. & Others	Workshop Technology	New Heights, New Delhi.
Gupta K.N. &Kaushish J.P.	Workshop Technology Vol. I to II.	New Heights, New Delhi.
Atherton W.H.	Workshop Practice Vol. I to V	New Era Publishers, London.
Gerling	All about Machine tools	WILSEY EASTERN, Delhi.
B. Kishore	Tool & Die Maker	Saurabh& Co.
Hermann Jutz Edward Scharkus	Westermann Tables	WILSEY EASTERN, Delhi.

COURSE/MODULE TEMPLATE

SEMESTER:3

COURSE NAME :MATERIAL TECHNOLOGY-II

COURSE CODE: MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understand different types of material and its group.
✓ Get knowledge about different material and its properties.
✓ Get knowledge about the application of materials, its effect on environment.
✓ Get knowledge about available of material and costing of material in markets.

THEORY HOURS : 60hrs PRACTICAL HOURS :NA THEORY MARKS :100 PRACTICAL MARKS :NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Non-ferrous metals and alloys	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about different types of non-ferrous materials and its properties. ✓ Get knowledge to utilize non-ferrous material at suitable place. ✓ Get knowledge about various alloy non-ferrous material and its properties. 	<ul style="list-style-type: none"> • Basic knowledge of ferrous and non-ferrous metal. • Define and application ferrous and non-ferrous metal. • Detail study of ferrous metal and their alloy like steel, wrought iron, cast iron, stainless steel high speed steel, tool steel etc. in non-ferrous material study of aluminium, copper, zinc, tin, lead and their alloy. 	12	24

2	Unit II: Ceramics and refractories	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about different types of ceramic, refractories and polymer materials and its properties. ✓ Get knowledge to utilize material at suitable place. ✓ Get knowledge about various alloy and ceramic material and its properties. 	<ul style="list-style-type: none"> • Introduction and basic knowledge of ceramics. • Classification of ceramics based on • Application, based on structure, • Detail study of ceramic like ceramic phase, melting temperature, bond of ceramic compound, crystal structure of ceramic, application of ceramics • Study of refractory, application classification. • Identification of polymer, 	10	20
3	Unit III: Polymers	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to get knowledge to utilize material at suitable place. ✓ Get knowledge about various polymer material and its properties. ✓ Get knowledge about plastic material, polarization, polymer additives. 	<ul style="list-style-type: none"> • Classification of polymer base on composition, behaviour, structure, characteristic • Detail study of polymerization, classification of polymerization (additional polymerization, co-polymerization, condensation polymerization). • Polymer additives and application of polymerization process • Principle and application of thermo plastics and thermo setting 	10	20
4	UnitIV: Composite material	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about different types of composite materials and its properties. ✓ Get knowledge to utilize material at suitable place. ✓ Get knowledge about various composite material and its properties. 	<ul style="list-style-type: none"> • Introduction to composite materials and its application • Concept of reinforced fibre glass, protective coatings, anodizing, galvanizing cladding, cermets • Principle and application of glass reinforced plastics, copper lead stainless steel, titanium carbide tungsten's carbide. 	6	10
5	Unit V: Corrosion and oxidation	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand effect of different environment and medium on the different material. ✓ Utilize perfect material to work with suitable medium ✓ Understand oxidation and corrosion of 	<ul style="list-style-type: none"> • To understand briefly concept of oxidation and the principle of corrosion. • The method of controlling the corrosion. and how to prevent the material from corrosion. 	6	10

		material and how to prevent it.			
6	Unit VI: Powder metallurgy	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the concept of powder metallurgy ✓ Process of powder making 	<ul style="list-style-type: none"> • Common metals and non-metals used in powder metallurgy • Procedure for making parts and components in powder metallurgy • Specific application of making carbide and ceramic cutting tools or bits 	6	8
7	Unit VII: Disposal and recycling of materials	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand concept of pollution ✓ Procedure for recycling of waste material 	<ul style="list-style-type: none"> • Definition of pollution • Pollution related to industrial environment and tool room situation • Procedure for disposal of material and waste causing pollution. 	6	8
Review & class test				4	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: III
Course Title	: MATERIAL TECHNOLOGY-II
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
03	--	--	03	70	--	30	--	100

Rationale:

This Subject is intended to teach basic materials classification, structure, physical and mechanical properties. The students are required to understand different material for various application. It is necessary for students to know basics of metal structure, properties, usage and testing of metals. This Knowledge will be used in heat treatment and core technology subject.

Outcomes:

- Understand different types of material and its group.
- Get knowledge about different material and its properties.
- Get knowledge about the application of materials, its effect on environment.
- Get knowledge about selection and iso coding of tool steel material.
- Get knowledge about availability of material and costing of material in markets.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Non-ferrous metals and alloys</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about different types of non-ferrous materials and its properties. ✓ Get knowledge to utilize non-ferrous material at suitable place. ✓ Get knowledge about various alloy non-ferrous material and its properties. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Basic knowledge of ferrous and non-ferrous metal. • Define and application ferrous and non-ferrous metal. <p>Detail study of ferrous metal and their alloy like steel, wrought iron, cast iron, stainless steel high speed steel, tool steel etc. in non-ferrous material study of aluminium, copper, zinc, tin, lead and their alloy.</p>	12	24
<p>Topic 2: Ceramics and refractories</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about different types of ceramic, refractories and polymer materials and its properties. ✓ Get knowledge to utilize material at suitable place. ✓ Get knowledge about various alloy and ceramic material and its properties. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Introduction and basic knowledge of ceramics. • Classification of ceramics based on • Application, based on structure, • Detail study of ceramic like ceramic phase, melting temperature, bond of ceramic compound, crystal structure of ceramic, application of ceramics • Study of refractory, application classification. • Identification of polymer, • 	10	20

<p>Topic 3: Polymers</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to get knowledge to utilize material at suitable place. ✓ Get knowledge about various polymer material and its properties. ✓ Get knowledge about plastic material, polarization, polymer additives. <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Classification of polymer base on composition, behaviour, structure, characteristic • Detail study of polymerization, classification of polymerization (additional polymerization, co-polymerization, condensation polymerization). • Polymer additives and application of polymerization process <p>Principle and application of thermo plastics and thermo setting</p>	10	20
<p>Topic 4: Composite material</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about different types of composite materials and its properties. ✓ Get knowledge to utilize material at suitable place. ✓ Get knowledge about various composite material and its properties. <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Introduction to composite materials and its application • Concept of reinforced fibre glass, protective coatings, anodizing, galvanizing cladding, cermets <p>Principle and application of glass reinforced plastics, copper lead stainless steel, titanium carbide tungsten's carbide.</p>	6	10
<p>Topic 5: Corrosion and oxidation</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand effect of different environment and medium on the different material. ✓ Utilize perfect material to work with suitable medium ✓ Understand oxidation and corrosion of material and how to prevent it. <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • To understand briefly concept of oxidation and the principle of corrosion. • The method of controlling the corrosion. and how to prevent the material from corrosion. 	6	10

<p>Topic 6: Powder metallurgy</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the concept of powder metallurgy ✓ Process of powder making <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Common metals and non-metals used in powder metallurgy • Procedure for making parts and components in powder metallurgy <p>Specific application of making carbide and ceramic cutting tools or bits</p>	6	8
<p>Topic 7: Disposal and recycling of materials</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand concept of pollution ✓ Procedure for recycling of waste material ✓ <p>Contents:</p> <p>7.1</p> <ul style="list-style-type: none"> • Definition of pollution • Pollution related to industrial environment and tool room situation <p>Procedure for disposal of material and waste causing pollution.</p>	6	8
Review and class test	4	
Total	60	100

Intellectual Skills:

- 1) Able to identify and select the proper material

- according to the needed accuracy.
- 2) Must gain knowledge about material properties and how to use them for manufacturing

Motor Skills:

- 1) able to find the defects possible in different materials
- 2) select the proper material according to the need

Learning Resources:

53. Books:

AUTHOR	TITLE	PUBLISHER
G.B.S. Narang	Material Science	Khanna Publications, Delhi.
HazraChoudhary&HazraChoudhary	Material Science & Processes	Indian Book Distribution Co.
George's Brady	Material Hand Book	McGraw Hill Book Co.
Roy A. Lindberg	Materials & Manufacture	Prentice Hall of India
O.P. Khanna	Material Science & Metrology	DhanpatRai& Sons, New Delhi
Y. Lakhtin	Engineering Physical Metrology	Mir Publishers-Moskow
R.K. Rajput	`Material Science & Engineering	Kataria& sons, New Delhi.
D.S. Nat	Materials & Metallurgy	Katson Publishing House, Delhi.
Albert G. Guy	Physical Metallurgy for Engineers	Addision Wesley Publishing Co.
Dr. D. Swarup& Ajay Rastogi	Elements of Metallurgy	Rastogi Publications, Meerut.

COURSE/MODULE TEMPLATE

SEMESTER:3

COURSE NAME :TOOL DESIGN THEORY (PRESS TOOLS-I)

COURSE CODE :MSME/DTE/

COURSE OUTCOMES:After completion of course Student should be able to:

<ul style="list-style-type: none"> • Understand different types of tool.
<ul style="list-style-type: none"> • Understand press tool, types of press tool, operation of press tools.
<ul style="list-style-type: none"> • Selection of proper tool as per the component given
<ul style="list-style-type: none"> • Get knowledge about design of press tool and its parameter.
<ul style="list-style-type: none"> • Understand different application of press tool and its need in industry.
<ul style="list-style-type: none"> • Understanding the technological subjects and applying in the workshop practice.

THEORY HOURS :80hrs PRACTICAL HOURS :NA THEORY MARKS :100 PRACTICAL MARKS :NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Introduction	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about different types of tools used in industries. ✓ Get knowledge about concept of press tool. ✓ To know about the sheet metal and strip layout ✓ Understand design fundamental of presses 	<ul style="list-style-type: none"> • Overview of mass production of sheet metal component for use of press tool, • Types of presses • To produce sheet metal component and application by use of press tool for mass production • Principles of press tool for sheet metal • Studying the use of sheet material components. 	5	10

		<p>and advantages and disadvantages of press tool</p> <ul style="list-style-type: none"> ✓ Get knowledge about use of press tool. ✓ Selection of proper tool parts as required. <ul style="list-style-type: none"> ✓ Understand different operation done on press tool. 			
2	<p>Unit II:</p> <p>Press tool operation</p>	<p>At the end of this unit one should be able to</p> <ul style="list-style-type: none"> ✓ Understand requirement of press tool operation. ✓ Understand different operations on press tools. ✓ Understand different parameter for cutting and non cutting operations. ✓ Get knowledge about strip layout, principles about operations, different sheet metals, and require parameter to band or cut it. 	<ul style="list-style-type: none"> ➤ <u>Press tool cutting operation</u> <ul style="list-style-type: none"> • Understand use and application of cutting operation with press tool and classification of it • Learning about the principle of shearing and clearance with strip layout. Study about relation between punch and die. • Types of cutting operation piercing, blanking cut off. ➤ <u>Press tool non cutting operation</u> <ul style="list-style-type: none"> • The basic information of press tool noncutting operation • plastic deformation and spring back , strip layout, principle of plastic deformation ,principle of spring back • Types of noncutting operation. • Steps followed for the operations. ➤ <u>Press tool integrated operation</u> <ul style="list-style-type: none"> • Getting knowledge about integrated operation of press tool • Principles and application of integrated operation • Relation between difference operations. 	15	10

3	Unit III: Basic element of press tool	<p>At the end of this unit Student should be able to</p> <ul style="list-style-type: none"> ✓ Understand the different component of press tools like cutting die , non cutting die, top plate , bottom plate, guide pillar , guide bush, stripper plate etc. ✓ Understanding about the different component used in design of press tool. 	<ul style="list-style-type: none"> • Understand application of different element in press tool. • Brief knowledge of press tool and their parts. • Principle of alignment and guidance, clearance, stripping and ejection, mounting 	15	15
4	Unit IV: Classification of press tools	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to get knowledge about different material their uses for manufacturing of elements of press tool. ✓ Get knowledge for manufacturing different process to produce elements. ✓ Get knowledge about design of element and its requirement. 	<ul style="list-style-type: none"> • Understanding about the applications of different element in press tool. • Brief knowledge of press tool and their parts. ➤ <u>Cutting dies</u> <ul style="list-style-type: none"> • Brief knowledge about types of cutting and classification like blanking die , piercing dies , and compound die • notching, turning, and shearing. • Principle of construction of cutting dies like integrated and section dies. ➤ <u>Non cutting dies</u> <ul style="list-style-type: none"> • Understand types of noncutting dies like bending dies, forming dies, drawing dies with principle of die cushion. • Steps followed for the manufacture of non cutting dies. 	20	30

5	Unit V: Design parameter	At the end of this unit Student should be able to <ul style="list-style-type: none"> ✓ Get knowledge about the design of press tool. ✓ Get knowledge of different parameters required during design. ✓ Selection of strip layout ✓ Conceptual designing the model and other components of press tool. ✓ Selection of different material for different element. ✓ Selection of bending parameters and bending operation. 	<ul style="list-style-type: none"> • Brief knowledge about various parameter of design like shearing, • strip layout, • elements of press tool for cutting operation understanding of shearing angle , stripping force ,effect of shear angle, principle of shearing and stripping force, economy factor material utilization , classification of die set, shaft height, concept of material selection , bending force, spring back, guiding, locating , ejection, functional element etc. 	15	25
6	Unit VI: Classification of press	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to Understand different types of presses. ✓ Get knowledge about parameter to use different press for different press tool operation. ✓ Understand selection of press for operation. ✓ Get knowledge for selection of press by its height, power etc. 	<ul style="list-style-type: none"> • Understand concept of shut height, die cushion and presses • Principles of presses • Construction of press • Selection of shut height and selection of presses. 	5	10
Review & class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: III
Course Title	:TOOL DESIGN THEORY (PRESS TOOLS-I)
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
04	--	--	03	70	--	30	--	100

Rationale:

Understand the facts, concepts, principles, procedures of tool design techniques so that this knowledge can be used in Tool Design effectively and efficiently. It is also useful in understanding technology subjects and applies them in the area such as Workshop, CAD/CAM, CAE, Production Planning, Estimation, Industrial Management and Quality Assurance.

Outcomes:

- Understand different types of tool.
- Understand press tool, types of press tool, operation of press tools.
- Get knowledge about design of press tool and its parameter.
- Understand different application of press tool and its need in industry
- Understand use and application of press and its classification

Theory:

Topic and Contents	Hours	Marks
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<p>Topic1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about different types of tools used in industries. ✓ Get knowledge about concept of press tool. ✓ To know about the sheet metal and strip layout ✓ Understand design fundamental of presses and advantages and disadvantages of press tool ✓ Get knowledge about use of press tool. ✓ Selection of proper tool parts as required. ✓ Understand different operation done on press tool. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Overview of mass production of sheet metal component for use of press tool, • Types of presses • To produce sheet metal component and application by use of press tool for mass production • Principles of press tool for sheet metal • Studying the use of sheet material components. 	5	10
<p>Topic 2: Press tool operation</p> <p>Objectives:</p> <p>At the end of this unit one should be able to</p> <ul style="list-style-type: none"> ✓ Understand requirement of press tool operation. ✓ Understand different operations on press tools. ✓ Understand different parameter for cutting and non cutting operations. ✓ Get knowledge about strip layout, principles about operations, different sheet metals, and require parameter to band or cut it. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> ➤ <u>Press tool cutting operation</u> • Understand use and application of cutting operation with press tool and classification of it • Learning about the principle of shearing and clearance with strip layout. Study about 	15	10

<ul style="list-style-type: none"> relation between punch and die. • Types of cutting operation piercing, blanking cut off. ➤ <u>Press tool non cutting operation</u> <ul style="list-style-type: none"> • The basic information of press tool noncutting operation • plastic deformation and spring back , strip layout, principle of plastic deformation ,principle of spring back • Types of noncutting operation. • Steps followed for the operations. ➤ <u>Press tool integrated operation</u> <ul style="list-style-type: none"> • Getting knowledge about integrated operation of press tool • Principles and application of integrated operation • Relation between difference operations. 		
<p>Topic 3: Basic element of press tool</p> <p>Objectives:</p> <p>At the end of this unit Student should be able to</p> <ul style="list-style-type: none"> ✓ Understand the different component of press tools like cutting die , non cutting die, top plate , bottom plate, guide pillar , guide bush, stripper plate etc. ✓ Understanding about the different component used in design of press tool. ✓ <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Understand application of different element in press tool. • Brief knowledge of press tool and their parts. <p>Principle of alignment and guidance, clearance, stripping and ejection, mounting</p>	15	15
<p>Topic 4: Classification of press tools</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to get knowledge about different material their uses for manufacturing of elements of press tool. ✓ Get knowledge for manufacturing different process to produce elements. ✓ Get knowledge about design of element and its requirement. <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Understanding about the applications of different element in press tool. • Brief knowledge of press tool and their parts. <p>➤ <u>Cutting dies</u></p>	20	30

<ul style="list-style-type: none"> • Brief knowledge about types of cutting and classification like blanking die , piercing dies , and compound die • notching, turning, and shearing. • Principle of construction of cutting dies like integrated and section dies. <p>➤ <u>Non cutting dies</u></p> <ul style="list-style-type: none"> • Understand types of noncutting dies like bending dies, forming dies, drawing dies with principle of die cushion. • Steps followed for the manufacture of non cutting dies. 		
<p>Topic 5: Design parameter</p> <p>Objectives:</p> <p>At the end of this unit Student should be able to</p> <ul style="list-style-type: none"> ✓ Get knowledge about the design of press tool. ✓ Get knowledge of different parameters required during design. ✓ Selection of strip layout ✓ Conceptual designing the model and other components of press tool. ✓ Selection of different material for different element. ✓ Selection of bending parameters and bending operation. <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Brief knowledge about various parameter of design like shearing, • strip layout, • elements of press tool for cutting operation bending, drawing and integrated operation with understanding of shearing angle , stripping force ,effect of shear angle, principle of shearing and stripping force, economy factor material utilization , classification of die set, shaft height, • concept of material selection , bending force, spring back, guiding, locating , ejection, functional element etc. 	15	25
<p>Topic 6: Classification of press</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to Understand different types of presses. ✓ Get knowledge about parameter to use different press for different press tool operation. ✓ Understand selection of press for operation. ✓ Get knowledge for selection of press by its height, power etc. <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Understand concept of shut height, die cushion and presses • Principles of presses • Construction of press 	5	10

<ul style="list-style-type: none"> • Selection of shut height and selection of presses. 		
Review and class test	5	
Total	80	100

Intellectual Skills:

- 1) Plan and organize the work order and jobs received from the Operator for mass production by using press tools

Motor Skills:

- 1) Can able to calculate the strip/sheet required for any type of component
- 2) Can able to design type of press tool required by studying the shape, size of the component.

Learning Resources:

57. Books:

AUTHOR	TITLE	PUBLISHER
D. Eugene Osterguard	Basic Die Making ISBN-07-046090-6	McGraw Hill Book CO.
Prakash H. Joshi	Press Tools Design & Construction ISBN-81-85814-46-5	Wheeler Publishing
American Society of Tool & Manufacturing Engineering(F.W. Wilson)	Fundamentals of Tool Design ISBN-0-87692-058-10	Prentice Hall of India Pvt. Ltd. New Delhi.

C. Donaldson, George H. Lecain V.C. Gold	Tool Design ISBN-0-07-099274-6	Tata McGraw Hill
NTTF	Theoretical Training Manual	NTTF – Bangalore
NTTF	Practical Training Manual	NTTF – Bangalore
CITD(ISTE)	Tool Engineering Parameters	CITD(ISTE) – Hyderabad
TETCOS	Transparencies	Education & Training Consultants, Bangalore
FIBRO	Standard Catalogues	--
Surrender Kumar & Umesh Chandra	Production Engineering Design	SatyaPrakashan New Delhi.
Donaldson	Fundamentals of Tool Design	Tata McGraw Hill

COURSE/MODULE TEMPLATE

SEMESTER:3

COURSE NAME:TOOL DESIGN THEORY (JIGS, FIXTURES& GAUGES)

COURSE CODE:MSME/IGTRAHD/DTE/01

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Understand different type's tool.
✓ Get knowledge about jig, fixture and gauges. Understand different parameter and principle for design of jig and fixture.
✓ Understand how to design jig and fixture for require given parts.
✓ Get knowledge for material require for jig and fixture and costing for manufacturing it.
✓ Understand different types of gauges , its material, tolerances, fits, etc.

THEORY HOURS :50hrs PRACTICAL HOURS :NA THEORY MARKS :100 PRACTICAL MARKS :NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Introduction	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about different types of tool. ✓ Gaining the knowledge about the concept of jig and fixture. ✓ Understanding the design fundamentals of jig and fixture. ✓ Advantages and disadvantages of jig and fixture ✓ How to handle jig and fixtures. 	<ul style="list-style-type: none"> • Definition, Types of productions, • Jig, Fixtures, Gauges, Moulds, Press tool, • Concept of Jigs & Fixtures, • Working Principles of J&F • Design Fundamentals • Advantages & Disadvantages of Jigs & Fixtures. 	2	3

2	Unit II: Basic elements of Jigs & Fixtures	<ul style="list-style-type: none"> ✓ At the end of this unit Student can understand the different components used in design of jig and fixture. ✓ Understanding the different materials used for manufacturing of elements of jig and fixture. ✓ Gaining knowledge about design of elements of J&F and its requirement. 	<ul style="list-style-type: none"> • Elements used in Jig & Fixtures • Classification of jig & Fixtures, • Typical Jig & Fixtures, • Overview Of manufacturing Process of Jigs & Fixtures, • Sketching of Jigs & Fixtures. 	2	4
3	Unit III: Locating Elements	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand what are locators. ✓ Types of Locators ✓ Locating methods, 	<ul style="list-style-type: none"> • Introduction and Definitions, Concept & Classification of Locators, • Degree of Freedom, • Tool positioning, • Geometrical Dimensioning and tolerances, • Plane Locators, Concentric Locators, Profile Locators, • Sketching of Locating Elements. 	6	8
4	Unit IV: Clamping Elements	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about the types of clamping elements with their clamping methods, 	<ul style="list-style-type: none"> • Introduction to clamping Elements, • Concept & classification of Standard Clamping Elements, • Principles of Clamping, • Types of Clamping, • Material used in Clamping Units, Sketching of Clamping Elements. • Non-standard clamping Elements, Concept & Classification of Non-standard clamping elements, • External & Internal equalizers & Concept, Sketching of Clamping Elements. 	5	8
5	Unit V: Guiding Elements	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about the types of Guiding elements with their clamping methods, ✓ Calculations for the guiding elements. 	<ul style="list-style-type: none"> • Introduction to guiding elements in Jigs & Fixtures. • Overview of guiding elements, • Working Principle of guiding elements, • Classification of guiding elements, • Proper Guiding Elements Selection & Material 	5	5

			Selection Method, Sketching of Guiding Elements.		
6	Unit VI: Supporting Elements	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about the types of supporting elements with their clamping methods, ✓ Types of supports used. 	<ul style="list-style-type: none"> • Introduction, Overview of Supporting Elements, • Concept and classification of Rigidity and supporting elements, • Principle of Rigidity-supporting elements and material selection, • All types of screw-Plunger-equalizer & Floating elements, Sketching of Supporting Elements. 	2	5
7	Unit VII: Classification of jigs	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Principle and classification of jig 	<ul style="list-style-type: none"> • Overview of the types of jigs • Principles of classification of jigs • Selection of types of jigs 	2	12
8	Unit VIII: Design of jigs	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Principle of Rigid Body Design, its body construction 	<ul style="list-style-type: none"> • Overview of body features • Concept & Classification of Jig body design • Selection Method of Body Features, • Sketching of Body Design Features and conceptual drawings. 	2	8
9	Unit IX: Tool Setting Elements	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Selection Method of tool setting elements, Conceptual design of Tool setting elements 	<ul style="list-style-type: none"> • Introduction to Setting elements, • Machining Operation • SetBlocks, Feeler Gauges, Slip Gauges • Sketching overview of Tool With tool setting elements. 	1	2
10	Unit X: Classification of fixtures	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Preparation of Conceptual design using standard parts ✓ Material selection methods ✓ Alternative selection and selection of kind of particular fixture. 	<ul style="list-style-type: none"> • Overview of Fixtures • Classification of fixtures • Elements used in Fixtures 	2	7
11	Unit XI:	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Sketching of fixture Models 	<ul style="list-style-type: none"> • Conceptual Design • Flow chart Safety Factor, • Maintenance Requirements, 	2	8

	Design of fixtures		<ul style="list-style-type: none"> • Product Requirement, • Production Rate Alternative selection and selection of kind of particular fixture, • Sketching of fixture Models. 		
12	Unit XII: Estimation	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand how to Observe the component drawing ✓ Preparing process sheets, bill of material & detail drawing ✓ Calculate the machine hours 	<ul style="list-style-type: none"> • Concept of estimation, • tool material • machining hours, • principle of weight, volume, • Estimation of machine hours through process planning, process estimation. 	1	5
13	Unit XIII: Maintenance, safety and storage	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Principle of jig/fixture safety , machine safety and personal safety ✓ Standard check list for maintenance of machine and jig/fixture 	<ul style="list-style-type: none"> • Concept of safety, maintenance, storage • Study & observe jigs/fixture safety, machine safety & personal safety 	1	5
14	Unit XIV: Introduction to Gauges	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Application of Gauges, ✓ Classification of gauges 	<ul style="list-style-type: none"> • Introduction and overview of gauges, • Need, Concept, Features, Limit, Fit, and Tolerances, • Inspection of Gauges, Uses of Inspection Gauge, Reference Gauge, • Conceptual Design of Gauges. 	1	2
15	Unit XV: Classification of gauges	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Classification of gauges based on accuracy based on use 	<ul style="list-style-type: none"> • Overview of classification of gauges • Shop gauges, inspection gauges, reference gauges, Fixed gauges, indicating gauges, combination gauges • Principle of classification of gauges. 	2	4
16	Unit XVI: Design Parameters	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understanding the Manufacturing methods of gauges ✓ Practically applications of TAYLOR's Principle. 	<ul style="list-style-type: none"> • Introduction and Principles and Overview of Design Parameters • Tolerances, Wear Allowances • Supportive Elements, Surface Roughness, Wear Resistance 	5	8

17	Unit XVII: Design of Gauges	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Assembly of Gauge. ✓ Calculation of design parameters 	<ul style="list-style-type: none"> • Introduction, Design Concept and overview of gauges • Material selection method • Calculations of Gauge Manufacturing, 	5	4
18	Unit XVIII: Maintenance, safety and storage	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Principle of gauges. ✓ safety and personal safetyStandard check list for maintenance of gauges 	<ul style="list-style-type: none"> • Concept of safety, maintenance, storage • Study & observe gauges safety, machine safety & personal safety 	1	2
Review & class test				3	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: III
Course Title	:TOOL DESIGN THEORY (JIGS , FIXTURES& GUAGES)
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
2.5	--	--	03	70	--	30	--	100

Rationale:

This Subject describes the facts, concepts, principles, procedures of tool design techniques so that this knowledge can be used in Tool Design Practice effectively and efficiently. It is also useful in understanding technology and apply them in the area such as Workshop practice, Production Planning, Estimation and industrial Management.

Outcomes:

- Understand different type's mass production tools.
- Get knowledge about jig, fixture and gauges. Understand different parameter and principle for design of jig and fixture.
- Understand how to design jig and fixture for require given parts.
- Get knowledge for material require for jig and fixture and costing for manufacturing it.
- Understand different types of gauges , its material, tolerances, fits, etc.

Theory:

Topic and Contents	Hours	Marks
<p>Topic 1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none">✓ At the end of this unit Student should be able to understand about different types of tool.✓ Gaining the knowledge about the concept of jig and fixture.✓ Understanding the design fundamentals of jig and fixture.✓ Advantages and disadvantages of jig and fixture✓ How to handle jig and fixtures. <p>✓</p> <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none">• Definition, Types of productions,• Jig, Fixtures, Gauges, Moulds, Press tool,• Concept of Jigs & Fixtures,• Working Principles of J&F• Design Fundamentals• Advantages & Disadvantages of Jigs & Fixtures.	2	3
<p>Topic 2: Basic elements of Jigs & Fixtures</p> <p>Objectives:</p> <ul style="list-style-type: none">✓ At the end of this unit Student can understand the different components used in design of jig and fixture.✓ Understanding the different materials used for manufacturing of elements of jig and fixture.✓ Gaining knowledge about design of elements of J&F and its requirement. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none">• Elements used in Jig & Fixtures• Classification of jig & Fixtures,• Typical Jig& Fixtures,• Overview Of manufacturing Process of Jigs & Fixtures,• Sketching of Jigs & Fixtures.	2	4
<p>Topic 3: Locating Elements</p> <p>Objectives:</p> <ul style="list-style-type: none">✓ At the end of this unit Student should be able to understand what are locators.	6	8

<ul style="list-style-type: none"> ✓ Types of Locators ✓ Locating methods, <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Introduction and Definitions, Concept & Classification of Locators, • Degree of Freedom, • Tool positioning, • Geometrical Dimensioning and tolerances, • Plane Locators, Concentric Locators, Profile Locators, <p>Sketching of Locating Elements.</p>		
<p>Topic 4: Clamping Elements</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about the types of clamping elements with their clamping methods, <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Introduction to clamping Elements, • Concept &classification of Standard Clamping Elements, • Principles of Clamping, • Types of Clamping, • Material used in Clamping Units, Sketching of Clamping Elements. • Non-standard clamping Elements, Concept &Classification of Non-standard clamping elements, <p>External & Internal equalizers & Concept, Sketching of Clamping Elements.</p>	5	8
<p>Topic 5: Guiding Elements</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about the types of Guiding elements with their clamping methods, ✓ Calculations for the guiding elements. <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Introduction to guiding elements in Jigs & Fixtures. • Overview of guiding elements, • Working Principle of guiding elements, • Classification of guiding elements, 	5	5

Proper Guiding Elements Selection & Material Selection Method, Sketching of Guiding Elements.		
<p>Topic 6: Supporting Elements</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about the types of supporting elements with their clamping methods, ✓ Types of supports used. <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Introduction, Overview of Supporting Elements, • Concept and classification of Rigidity and supporting elements, • Principle of Rigidity-supporting elements and material selection, <p>All types of screw-Plunger-equalizer & Floating elements, Sketching of Supporting Elements.</p>	2	5
<p>Topic 7: Classification of jigs</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Principle and classification of jig <p>Contents:</p> <p>7.1</p> <ul style="list-style-type: none"> • Overview of the types of jigs • Principles of classification of jigs • Selection of types of jigs 	2	12
<p>Topic 8: Design of jigs</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Principle of Rigid Body Design, its body construction <p>Contents:</p> <p>8.1</p> <ul style="list-style-type: none"> • Overview of body features 	2	8

<ul style="list-style-type: none"> • Concept & Classification of Jig body design • Selection Method of Body Features, <p>Sketching of Body Design Features and conceptual drawings.</p>		
<p>Topic 9: Tool Setting Elements</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Selection Method of tool setting elements, Conceptual design of Tool setting elements <p>Contents:</p> <p>9.1</p> <ul style="list-style-type: none"> • Introduction to Setting elements, • Machining Operation • SetBlocks, Feeler Gauges, Slip Gauges • Sketching overview of Tool With tool setting elements. 	1	2
<p>Topic 10: Classification of fixtures</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Preparation of Conceptual design using standard parts ✓ Material selection methods ✓ Alternative selection and selection of kind of particular fixture. <p>Contents:</p> <p>10.1</p> <ul style="list-style-type: none"> • Overview of Fixtures • Classification of fixtures <p>Elements used in Fixtures</p>	2	7
<p>Topic 11: Design of fixtures</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Sketching of fixture Models <p>Contents:</p> <p>11.1</p> <ul style="list-style-type: none"> • Conceptual Design 	2	8

<ul style="list-style-type: none"> • Flow chart Safety Factor, • Maintenance Requirements, • Product Requirement, • Production Rate Alternative selection and selection of kind of particular fixture, Sketching of fixture Models. 		
<p>Topic 12: Estimation</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand how to Observe the component drawing ✓ Preparing process sheets, bill of material & detail drawing ✓ Calculate the machine hours <p>Contents:</p> <p>12.1</p> <ul style="list-style-type: none"> • Concept of estimation, • tool material • machining hours, • principle of weight, volume, <p>Estimation of machine hours through process planning, process estimation.</p>	1	5
<p>Topic 13: Maintenance, safety and storage</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Principle of jig/fixture safety , machine safety and personal safety ✓ Standard check list for maintenance of machine and jig/fixture <p>Contents:</p> <p>13.1</p> <ul style="list-style-type: none"> • Concept of safety, maintenance, storage <p>Study & observe jigs/fixture safety, machine safety & personal safety</p>	1	5
<p>Topic 14: Introduction to Gauges</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Application of Gauges, ✓ Classification of gauges <p>Contents:</p> <p>14.1</p>	1	2

<ul style="list-style-type: none"> • Introduction and overview of gauges, • Need, Concept, Features, Limit, Fit, and Tolerances, • Inspection of Gauges, Uses of Inspection Gauge, Reference Gauge, Conceptual Design of Gauges. 		
<p>Topic 15: Classification of gauges</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Classification of gauges based on accuracy based on use ✓ <p>Contents:</p> <p>15.1</p> <ul style="list-style-type: none"> • Overview of classification of gauges • Shop gauges, inspection gauges, reference gauges, Fixed gauges, indicating gauges, combination gauges <p>Principle of classification of gauges.</p>	2	4
<p>Topic 16: Design Parameters</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understanding the Manufacturing methods of gauges ✓ Practically applications of TAYLOR’s Principle. <p>Contents:</p> <p>16.1</p> <ul style="list-style-type: none"> • Introduction and Principles and Overview of Design Parameters • Tolerances, Wear Allowances <p>Supportive Elements, Surface Roughness, Wear Resistance</p>	5	8

<p>Topic 17: Design of Gauges</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Assembly of Gauge. ✓ Calculation of design parameters <p>Contents:</p> <p>17.1</p> <ul style="list-style-type: none"> • Introduction, Design Concept and overview of gauges • Material selection method <p>Calculations of Gauge Manufacturing,</p>	5	4
<p>Topic 18: Maintenance, safety and storage</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Principle of gauges. ✓ safety and personal safetyStandard check list for maintenance of gauges <p>Contents:</p> <p>18.1</p> <ul style="list-style-type: none"> • Concept of safety, maintenance, storage <p>Study & observe gauges safety, machine safety & personal safety</p>	1	2
<p>Review and class test</p>	3	
Total	50	100

Intellectual Skills:

1. Can able to locate& clamp any type of component without facing any problem.
2. Can able to design type of jigs, fixtures &gauges by studying the shape, size &operation to be carried out

Motor Skills:

- 1)Plan and organize the work order and jobs received from the Operator for mass production by using jigs, fixtures &gauges.

Learning Resources:

61. Books:

AUTHOR	TITLE	PUBLISHER
D. Eugene Osterguard	Basic Die Making ISBN-07-046090-6	McGraw Hill Book CO.
Prakash H. Joshi	Press Tools Design & Construction ISBN-81-85814-46-5	Wheeler Publishing
American Society of Tool & Manufacturing Engineering(F.W. Wilson)	Fundamentals of Tool Design ISBN-0-87692-058-10	Prentice Hall of India Pvt. Ltd. New Delhi.
C. Donaldson, George H. Lecain V.C. Gold	Tool Design ISBN-0-07-099274-6	Tata McGraw Hill
NTTF	Theoretical Training Manual	NTTF – Bangalore
NTTF	Practical Training Manual	NTTF – Bangalore
CITD(ISTE)	Tool Engineering Parameters	CITD(ISTE) – Hyderabad
TETCOS	Transparencies	Education & Training Consultants, Bangalore
FIBRO	Standard Catalogues	--
Surrender Kumar &Umesh Chandra	Production Engineering Design	SatyaPrakashan New Delhi.
Donaldson	Fundamentals of Tool Design	Tata McGraw Hill

COURSE/MODULE TEMPLATE

SEMESTER:3

COURSE NAME:TOOL DESIGN THEORY (PLASTIC MOULD-I)

COURSE CODE:MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understand different types of moulding methods.
✓ Understand about different types of plastic moulding and machines of it.
✓ Get knowledge about component of plastic mould.

THEORY HOURS:50hrs

PRACTICAL HOURS:90hrs

THEORY MARK:100

PRACTICAL MARKS:50

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Introduction	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of plastic materials and its properties. ✓ Understand classification of plastic. ✓ Get knowledge about concept of mould. ✓ Application of mould. ✓ Different types of injection moulding machine. 	<ul style="list-style-type: none"> • Introduction basic knowledge of mass production of moulded of plastic component, • Application of plastic, • Classification of plastic material • Application of moulding machine and equipment, concept of mould material, • Application of mould. 	8	10
2	Unit II: Moulding	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of moulding machines and its parts. ✓ Understanding parameter of moulding 	<ul style="list-style-type: none"> • Understanding the injection moulding • principle of injection moulding machine, • study of injection moulding machine parts like hopper, barrel, lead screw, heater, injection system. 	12	25

	operation	<p>machine.</p> <ul style="list-style-type: none"> ✓ Understanding different types of moulding machine. ✓ Understanding mould and material use in mould. 	<ul style="list-style-type: none"> • Understanding and idea of the injection moulding machine process like pressure setting, shots setting and other function of moulding machine like clamping, feeding, heating , ejection . • Understanding of elements of injection moulding process, machine mould and material. 		
3	Unit III: Elements of mould and their function.	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of plastic mould. ✓ Understand different component use in mould. ✓ Get knowledge about different material use different component. ✓ Understand function and application of different component of mould. ✓ Understand cooling system in mould and its need in plastic mould. 	<ul style="list-style-type: none"> • Identify and obtain the injection moulding elements and their function like core and cavity, classification of core. • Function of core, cavity, principle of core cavity, material used for core cavity. • Understanding the function of feeding system by classified feeding system like runner, spruegate, gate etc, and their function and which material used for this system. • Establish and importance of cooling system. In detail like types of cooling system, baffle cooling system, angle hole cooling system, bubbler cooling system and their function. • Understanding of ejection system, various types of ejection system like pin ejection system, stripper ejection system, air ejection system, blade ejection system, D-shape ejection system and knowledge of understanding procedure of ejection system. 	15	30
4	Unit IV: Classification of mould	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of mould. ✓ Get knowledge about different parts of mould according to different types of mould. ✓ Get knowledge about parting surface , 	<ul style="list-style-type: none"> • Brief classification of injection mould like introduction, concept of ejection and feed system(two plate mould, three plate mould, stripper plate mould, stack mould. • Understanding of parting surface like flatparting , non-flat parting surface, relief of parting surface. 	14	20

		relief of parting surface			
5	Unit V: Design parameter for mould material and machine	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand design parameter which require for design of mould. ✓ Drawing different design for different types of mould. ✓ Get knowledge about selection of material for all parts. ✓ Understand process of manufacturing of each parts. ✓ Cost of manufacturing. ✓ Perfect design of plastic mould. 	<ul style="list-style-type: none"> • Understanding of design parameters like properties of plastic material, quality and quantity of plastic material • Describing the design parameters of mould 	8	15
Review and class test				3	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: III
Course Title	:TOOL DESIGN THEORY (PLASTIC MOULD-I)
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
03	--	--	03	70	--	30	--	100

Rationale:

This Subject is intended to the facts, concepts, principles and procedures of tool design techniques so that this knowledge can be used in Tool Design Practice effectively and efficiently. It is also useful in understanding technology subjects and applies them in the area such as Workshop practice, CAD/CAM, Production Planning, Estimation, Industrial Management and Quality Assurance.

Outcomes:

- Able to understand and analyse the plastic moulding process.
- Understand different types of plastic used in industry.
- Understand about different types of plastic moulding methods and plastic moulding machines.
- Get knowledge about component of plastic mould.
- Understand design and design parameter for plastic mould.
- Understand parameter require to design for different plastic material.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of plastic materials and its properties. ✓ Understand classification of plastic. ✓ Get knowledge about concept of mould. ✓ Application of mould. ✓ Different types of injection moulding machine. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Introduction basic knowledge of mass production of moulded of plastic component, • Application of plastic, • Classification of plastic material • Application of moulding machine and equipment, concept of mould material, • Application of mould. 	8	10
<p>Topic 2: Moulding operation</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of moulding machines and its parts. ✓ Understanding parameter of moulding machine. ✓ Understanding different types of moulding machine. ✓ Understanding mould and material use in mould. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Understanding the injection moulding • principle of injection moulding machine, • study of injection moulding machine parts like hopper, barrel, lead screw, heater, injection system. • Understanding and idea of the injection moulding machine process like pressure setting, shots setting and other function of moulding machine like clamping, feeding, heating, ejection. <p>Understanding of elements of injection moulding process, machine mould and material.</p>	12	25

<p>Topic 3: Elements of mould and their function.</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of plastic mould. ✓ Understand different component use in mould. ✓ Get knowledge about different material use different component. ✓ Understand function and application of different component of mould. ✓ Understand cooling system in mould and its need in plastic mould. <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Identify and obtain the injection moulding elements and their function like core and cavity, classification of core. • Function of core, cavity, principle of core cavity, material used for core cavity. • Understanding the function of feeding system by classified feeding system like runner, spruegate, gate etc., and their function and which material used for this system. • Establish and importance of cooling system. In detail like types of cooling system, baffle cooling system, angle hole cooling system, bubbler cooling system and their function. <p>Understanding of ejection system, various types of ejection system like pin ejection system, stripper ejection system, air ejection system, blade ejection system, D-shape ejection system and knowledge of understanding procedure of ejection system.</p>	15	30
<p>Topic 4: Classification of mould</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of mould. ✓ Get knowledge about different parts of mould according to different types of mould. ✓ Get knowledge about parting surface , relief of parting surface <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Brief classification of injection mould like introduction, concept of ejection and feed system(two plate mould, three plate mould, stripper plate mould, stack mould. • Understanding of parting surface like flatparting , non-flat parting surface, relief of parting surface. 	14	20
<p>Topic 5: Design parameter for mould material and machine</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand design parameter which require for design of mould. ✓ Drawing different design for different types of mould. ✓ Get knowledge about selection of material for all parts. ✓ Understand process of manufacturing of each parts. ✓ Cost of manufacturing. ✓ Perfect design of plastic mould. <p>Contents:</p>	8	15

5.1		
<ul style="list-style-type: none"> Understanding of design parameters like properties of plastic material, quality and quantity of plastic material Describing the design parameters of mould 		
Review and class test	3	
Total	60	100

Intellectual Skills:

1. Plan and organize the work order and jobs received from the Operator for mass production by using mould for plastic components.

Motor Skills:

- 1) Can able to calculate the amount of plastic material used for injecting in the injection tool of the component
- 2) able to design by identifying the type of mould required for a particular component

Learning Resources:

65. Books:

AUTHOR	TITLE	PUBLISHER
Dominick V. Rosato & Donald V. Rosato	Injection Moulding Handbook	CBS Publishers & Distributers, New Delhi
A.S. Athalye	Plastic Materials Handbook Vol. I & II	Multi – Tech Publishing Co. Mumbai.
A.S. Athalye	Moulding of Plastics	Multi – Tech Publishing Co. Mumbai.
A.S. Athalye	Injection Moulding	Multi – Tech Publishing Co. Mumbai.
Chandra & Mishra	Rubber & Plastic Technology	CBS Publishers & Distributers, New Delhi
Tetco Visual aids	Transparencies on Dies and Moulds Ref. No. 1084-Part A No of Transparencies-29 Ref. No. 1085-Part B No of Transparencies-30	The Education and Training Consultants, Bangalore. (Tetco Visual aids)
R.W.G.PYE	Injection Mould Design	Longman scientific & technical copublished in the United states

COURSE/MODULE TEMPLATE

SEMESTER:3

COURSE NAME:TOOL DESIGN PRACTICE (JIGS & FIXTURES)

COURSE CODE:MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understand different type's tool.
✓ Get knowledge about jig, fixture and gauges. Understand different parameter and principle for design of jig and fixture.
✓ Understand how to design jig and fixture for require given parts.
✓ Get knowledge for material require for jig and fixture and costing for manufacturing it.
✓ Understand different types of gauges , its material, tolerances, fits, etc.

THEORY HOURS:NA

PRACTICAL HOURS:80hrs

THEORY MARKS:NA

PRACTICAL MARKS:150

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Elements of design process	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to ✓ Understand about different types of tool. ✓ Get knowledge about concept of jig and 	<ul style="list-style-type: none"> • Definition, Types of productions, Concept of Jigs & Fixtures, Working Principle of J&F, • Principle of machining process, jigs/fixture construction • Material selection • Design Fundamentals • Sketching of Body Design Features and conceptual 	10	20

		<p>fixture.</p> <ul style="list-style-type: none"> ✓ Understand design fundamental of jig and fixture. And advantages and disadvantages of jig and fixture ✓ Get knowledge about use of jig and fixtures. 	<p>drawings</p>		
2	<p>Unit II:</p> <p>Elements of Jigs & Fixtures</p>	<p>At the end of this unit Student should be able to</p> <ul style="list-style-type: none"> ✓ Understand about the different component use in design of jig and fixture. ✓ Understand different material use for manufacturing of elements of jig and fixture. ✓ Getting the knowledge about design of element and its requirement. 	<ul style="list-style-type: none"> • Elements using in Jig, Classification of jig, Elements using in Fixtures, • Classification of Fixtures, Typical Jig, Typical Fixture, Overview Of manufacturing Process of Jigs & Fixtures, Sketching of Jigs & Fixtures. ➤ Locating Elements • Introduction and Definitions, Concept & Classification of Locators, • Degree of Freedom, • Tool positioning, • Geometrical Dimensioning and tolerances, • Types of Locators with their locating methods, Plane Locators, Concentric Locators, Profile Locators, Sketching of Locating Elements. • Clamping Elements • Introduction to clamping Elements, Overview of clamping Elements, Concept & classification of Standard Clamping Elements, • Principle of Clamping, Types of Clamping, • Material used in Clamping Units, Sketching of Clamping Elements. On-standard clamping Elements, • Concept & Classification of Non-standard clamping elements 	15	20

			<ul style="list-style-type: none"> • External & Internal equalizers & Concept, Sketching of Clamping Elements. ➤ Guiding Elements • Introduction to guiding elements in Jigs & Fixtures, Overview of guiding elements and working Principle of guiding elements, • Classification of guiding elements, Proper Guiding Elements Selection & Material Selection Method, • Sketching of Guiding Elements. ➤ Supporting Elements • Introduction, Overview of Supporting Elements, Concept and classification of Rigidity and supporting elements, Principle of Rigidity-supporting elements and material selection, All types of screw-Plunger-equalizer & Floating elements, Sketching of Supporting Elements 		
3	Unit III: Conceptual design of jigs	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about design of jigs ✓ Elements of jigs, ✓ Safety and maintenance 	<ul style="list-style-type: none"> • Overview of body features • Concept & Classification of Jig body design and body construction, • Principle of Rigid Body Design, • Selection Method of Body Features, Sketching of Body Design Features and conceptual drawings. 	10	15
4	Unit IV: Design and drawing of Jig	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand in getting knowledge of different parameters required during design. 	<ul style="list-style-type: none"> • Overview of Jig, Overview and instruction about design concept • Elements of Jig, Safety Factors, Maintenance of Jig, • Flow Chart, • Mechanical & Economic Conceptual Design, • Product Requirement, Development of alternatives, Design Concepts and sketching of jig. 	5	20

5	Unit V: Conceptual design Fixture	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to get knowledge about the design fixture. ✓ Get knowledge of deferent require parameter during design. ✓ How to create perfect design of fixture 	<ul style="list-style-type: none"> ➤ Design of Fixture <ul style="list-style-type: none"> • Overview of Fixtures, • Elements used in Fixtures, Safety Factor, • Maintenance Requirements, Material selection methods, Product Requirement, Production Rate, • Conceptual Design, Flow chart, Preparation of Conceptual design using standard parts, Alternative selection and selection of kind of particular fixture, Sketching of fixture Models. 	10	15
6	Unit VI: Design and drawing of fixture	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand how to assemble and design the detailed drawing for manufacturing and use of fixture 	<ul style="list-style-type: none"> • Concept of use of work sheet and process sheet, drawing and layout for assembly and detailed, verification of design • Selection of optimal design drawing norms 	10	25
7	Unit VII: CAD	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand use and application of CAD software for design and development 	<ul style="list-style-type: none"> • Concept of 2d drawings, data bank, software package • Principle of assembly drawing, detailed drawing 	2	5
8	Unit VIII: Conceptual design of Gauges	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand limits fits, tolerances etc. ✓ Get knowledge for require parameter for design of gauges. ✓ Selection of different material for different gauges. 	<ul style="list-style-type: none"> • Introduction and Principles, Overview of Design Parameters, Tolerances, Wear Allowances, Supportive Elements, Surface Roughness, Wear Resistance, Manufacturing methods of gauges • Practically use of TAYLOR's Principle. 	5	10
9	Unit IX: Design of Gauges	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand limits fits, tolerances etc. ✓ Get knowledge for require parameter for design of gauges. ✓ Selection of different material for different gauges. 	<ul style="list-style-type: none"> • Introduction, Design Concept and overview of gauges, • Material selection method • Calculations of Gauge Manufacturing, Assembly of Gauge. 	10	20
Review & class test				3	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: III
Course Title	:TOOL DESIGN PRACTICE (JIGS & FIXTURES)
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme					Examination Scheme			
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	04	05	--	70	30	50	150

Rationale:

This Subject describes the facts, concepts, principles, procedures of tool design techniques so that this knowledge can be used in Tool Design Practice effectively and efficiently. It is also useful in understanding technology and apply them in the area such as Workshop practice, Production Planning, Estimation and industrial Management.

Outcomes:

- Understand different type's mass production tools.
- Get knowledge about jig, fixture and gauges. Understand different parameter and principle for design of jig and fixture.
- Understand how to design jig and fixture for require given parts.
- Get knowledge for material require for jig and fixture and costing for manufacturing it.
- Understand different types of gauges , its material, tolerances, fits, etc.

Theory:

Topic and Contents	Hours	Marks
<p>Topic 1: Elements of design process</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about different types of tool. ✓ Get knowledge about concept of jig and fixture. ✓ Understand design fundamental of jig and fixture. And advantages and disadvantages of jig and fixture ✓ Get knowledge about use of jig and fixtures. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> ✓ Definition, Types of productions, Concept of Jigs & Fixtures, Working Principle of J&F, ✓ Principle of machining process, jigs/fixture construction ✓ Material selection ✓ Design Fundamentals ✓ Sketching of Body Design Features and conceptual drawings 	10	20
<p>Topic 2: Elements of Jigs & Fixtures</p> <p>Objectives:</p> <p>At the end of this unit Student should be able to</p> <ul style="list-style-type: none"> ✓ Understand about the different component use in design of jig and fixture. ✓ Understand different material use for manufacturing of elements of jig and fixture. ✓ Getting the knowledge about design of element and its requirement. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Elements using in Jig, Classification of jig, Elements using in Fixtures, • Classification of Fixtures, Typical Jig, Typical Fixture, Overview Of manufacturing Process of Jigs & Fixtures, Sketching of Jigs & Fixtures. ➤ Locating Elements <ul style="list-style-type: none"> • Introduction and Definitions, Concept & Classification of Locators, • Degree of Freedom, • Tool positioning, • Geometrical Dimensioning and tolerances, • Types of Locators with their locating methods, Plane Locators, Concentric Locators, Profile Locators, Sketching of Locating Elements. • Clamping Elements <ul style="list-style-type: none"> • Introduction to clamping Elements, Overview of clamping Elements, Concept & classification of Standard Clamping Elements, • Principle of Clamping, Types of Clamping, • Material used in Clamping Units, Sketching of Clamping Elements. On-standard clamping Elements, • Concept & Classification of Non-standard clamping elements • External & Internal equalizers & Concept, Sketching of Clamping Elements. 	15	20

<p>➤ Guiding Elements</p> <ul style="list-style-type: none"> • Introduction to guiding elements in Jigs & Fixtures, Overview of guiding elements and working Principle of guiding elements, • Classification of guiding elements, Proper Guiding Elements Selection & Material Selection Method, • Sketching of Guiding Elements. <p>➤ Supporting Elements</p> <p>Introduction, Overview of Supporting Elements, Concept and classification of Rigidity and supporting elements, Principle of Rigidity-supporting elements and material selection, All types of screw-Plunger-equalizer & Floating elements, Sketching of Supporting Elements</p>		
<p>Topic 3: Conceptual design of jigs</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about design of jigs ✓ Elements of jigs, ✓ Safety and maintenance <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Overview of body features • Concept & Classification of Jig body design and body construction, • Principle of Rigid Body Design, <p>Selection Method of Body Features, Sketching of Body Design Features and conceptual drawings.</p>	10	15
<p>Topic 4: Design and drawing of Jig</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand in getting knowledge of different parameters required during design. <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Overview of Jig, Overview and instruction about design concept • Elements of Jig, Safety Factors, Maintenance of Jig, • Flow Chart, • Mechanical & Economic Conceptual Design, • Product Requirement, Development of alternatives, Design Concepts and sketching of jig. 	5	20
<p>Topic 5: Conceptual design Fixture</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to get knowledge about the design fixture. ✓ Get knowledge of deferent require parameter during design. ✓ How to create perfect design of fixture ✓ <p>Contents:</p>	10	15

<p>5.1</p> <ul style="list-style-type: none"> ➤ Design of Fixture • Overview of Fixtures, • Elements used in Fixtures, Safety Factor, • Maintenance Requirements, Material selection methods, Product Requirement, Production Rate, • Conceptual Design, Flow chart, Preparation of Conceptual design using standard parts, Alternative selection and selection of kind of particular fixture, Sketching of fixture Models. 		
<p>Topic 6: Design and drawing of fixture</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand how to assemble and design the detailed drawing for manufacturing and use of fixture <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Concept of use of work sheet and process sheet, drawing and layout for assembly and detailed, verification of design <p>Selection of optimal design drawing norms</p>	10	25
<p>Topic 7: CAD</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand use and application of CAD software for design and development <p>Contents:</p> <p>7.1</p> <ul style="list-style-type: none"> • Concept of 2d drawings, data bank, software package <p>Principle of assembly drawing, detailed drawing</p>	2	5
<p>Topic 8: Conceptual design of Gauges</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand limits fits, tolerances etc. ✓ Get knowledge for require parameter for design of gauges. ✓ Selection of different material for different gauges. <p>Contents:</p> <p>8.1</p> <ul style="list-style-type: none"> • Introduction and Principles, Overview of Design Parameters, Tolerances, Wear Allowances, Supportive Elements, Surface Roughness, Wear Resistance, Manufacturing methods of gauges <p>Practically use of TAYLOR's Principle.</p>	5	10

Topic 9: Design of Gauges	10	20
Objectives: <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand limits fits, tolerances etc. ✓ Get knowledge for require parameter for design of gauges. ✓ Selection of different material for different gauges. Contents: <p>9.1</p> <ul style="list-style-type: none"> • Introduction, Design Concept and overview of gauges, • Material selection method Calculations of Gauge Manufacturing, Assembly of Gauge.		
Review and class test	3	
Total	80	150

Intellectual Skills:

- 1) Can able to locate& clamp any type of component without facing any problem.
- 2) Can able to design type of jigs, fixtures &gauges by studying the shape, size &operation to be carried out

Motor Skills:

- 1)Plan and organize the work order and jobs received from the Operator for mass production by using jigs, fixtures &gauges.

Learning Resources:

69. Books:

AUTHOR	TITLE	PUBLISHER
D. Eugene Osterguard	Basic Die Making ISBN-07-046090-6	McGraw Hill Book CO.
Prakash H. Joshi	Press Tools Design & Construction ISBN-81-85814-46-5	Wheeler Publishing
American Society of Tool & Manufacturing Engineering(F.W. Wilson)	Fundamentals of Tool Design ISBN-0-87692-058-10	Prentice Hall of India Pvt. Ltd. New Delhi.
C. Donaldson, George H. Lecain V.C. Gold	Tool Design ISBN-0-07-099274-6	Tata McGraw Hill
NTTF	Theoretical Training Manual	NTTF – Bangalore

NTTF	Practical Training Manual	NTTF – Bangalore
CITD(ISTE)	Tool Engineering Parameters	CITD(ISTE) – Hyderabad
TETCOS	Transparencies	Education & Training Consultants, Bangalore
FIBRO	Standard Catalogues	--
Surrender Kumar & Umesh Chandra	Production Engineering Design	SatyaPrakashan New Delhi.
Donaldson	Fundamentals of Tool Design	Tata McGraw Hill

COURSE/MODULE TEMPLATE

SEMESTER:3

COURSE NAME:TOOL DESIGN PRACTICE (PRESS TOOLS-I)

COURSE CODE:MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understand different types of tool.
✓ Understand press tool, types of press tool, operation of press tools.
✓ Get knowledge about design of press tool and its parameter.
✓ Understand different application of press tool and its need in industry.

THEORY HOURS:NA

PRACTICAL HOURS:100hrs

THEORY MARKS:NA

PRACTICAL MARKS:150

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Introduction	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about different types of tool. ✓ To get knowledge about concept of press tool. ✓ Understand design fundamental of press tool. ✓ Advantages and disadvantages of press tool ✓ Understand different operation done on 	<ul style="list-style-type: none"> • Overview of mass production of sheet metal component for use of press tool , presses and drawing to produce component sheet metal component and application by use of press tool for mass production 	5	15

		press tool.			
2	Unit II: Press tool parts	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about the different component use in design of press tool. ✓ Understand different material use for manufacturing of elements of press tool. ✓ Get knowledge for manufacturing different process to produce elements, design of element and its requirement. 	<ul style="list-style-type: none"> • Understand application of different element in press tool. • Brief knowledge of press tool and their parts. • different component of press tools like cutting die non cutting die, top plate , bottom plate, guide pillar , guide bush, stripper plate etc. • Die set 	15	30
3	Unit III: Components/ layouts	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand strip layout and blank development 	<ul style="list-style-type: none"> • Concept and classification of strip layout • Burr side, material utilization and productivity • Concept of blank development allowance • Principle of blank development 	10	15
4	Unit IV: Data/ work sheet	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the design parameter ✓ Process sheet and work sheet for optimum press tool design and tryout 	<ul style="list-style-type: none"> • Concept and classification of design parameters with respect to press tool, material, press and operation • Dimensional tolerance • Concept of process sheet and work sheet • Design parameter 	10	15
5	Unit V: Conceptual design	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand conceptual design and its application 	<ul style="list-style-type: none"> • Principle of conceptual design, developing alternatives, selecting optional design 	20	30
6	Unit VI: Design of press tools	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to get knowledge about the design of press tool. ✓ Get knowledge of deferent require parameter during design. ✓ How to create perfect design of press tool. ✓ Selection of different material for different 	<ul style="list-style-type: none"> • Brief knowledge about various parameter of design like shearing, strip layout, • Elements of press tool for cutting operation bending drawing and integrated operation with understanding of shearing angle , stripping force ,effect of shear angle, • principle of shearing and stripping force, economy 	35	45

		element.	factor material utilization , <ul style="list-style-type: none"> • Classification of die set, shaft height, concept of material selection, bending force, spring back, guiding, locating, ejection, functional element. 		
Review & class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: III
Course Title	:TOOL DESIGN PRACTICE (PRESS TOOLS-I)
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme					Examination Scheme			
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	05	05	--	70	30	50	150

Rationale:

Understand the facts, concepts, principles, procedures of tool design techniques so that this knowledge can be used in Tool Design Practice effectively and efficiently. It is also useful in understanding technology subjects and applies them in the area such as Workshop practice, CAD/CAM, CAE, Production Planning, Estimation, Industrial Management and Quality Assurance.

Outcomes:

- Understand different types of tool.
- Understand press tool, types of press tool, operation of press tools.
- Get knowledge about design of press tool and its parameter.
- Understand different application of press tool and its need in industry
- Understand use and application of press and its classification

Theory:

Topic and Contents	Hours	Marks
<p>Topic 1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none">✓ At the end of this unit Student should be able to understand about different types of tool.✓ To get knowledge about concept of press tool.✓ Understand design fundamental of press tool.✓ Advantages and disadvantages of press tool✓ Understand different operation done on press tool. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none">• Overview of mass production of sheet metal component for use of press tool , presses and drawing to produce component sheet metal component and application by use of press tool for mass production	5	15
<p>Topic 2: Press tool parts</p> <p>Objectives:</p> <ul style="list-style-type: none">✓ At the end of this unit Student should be able to understand about the different component use in design of press tool.✓ Understand different material use for manufacturing of elements of press tool.✓ Get knowledge for manufacturing different process to produce elements, design of element and its requirement. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none">• Understand application of different element in press tool.• Brief knowledge of press tool and their parts.• different component of press tools like cutting die non cutting die, top plate , bottom plate, guide pillar , guide bush, stripper plate etc.• Die set	15	30
<p>Topic 3: Components/ layouts</p> <p>Objectives:</p> <ul style="list-style-type: none">✓ At the end of this unit Student should be able to understand strip layout and blank development✓ <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none">• Concept and classification of strip layout• Burr side, material utilization and productivity	10	15

<ul style="list-style-type: none"> • Concept of blank development allowance <p>Principle of blank development</p>		
<p>Topic 4: Data/ work sheet</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the design parameter ✓ Process sheet and work sheet for optimum press tool design and tryout <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Concept and classification of design parameters with respect to press tool, material, press and operation • Dimensional tolerance • Concept of process sheet and work sheet <p>Design parameter</p>	10	15
<p>Topic 5: Conceptual design</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand conceptual design and its application <p>Contents:</p> <p>5.1</p> <p>Principle of conceptual design, developing alternatives, selecting optional design</p>	20	30
<p>Topic 6: Design of press tools</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to get knowledge about the design of press tool. ✓ Get knowledge of deferent require parameter during design. ✓ How to create perfect design of press tool. ✓ Selection of different material for different element. 	35	45

✓ Contents: 6.1		
<ul style="list-style-type: none"> Brief knowledge about various parameter of design like shearing, strip layout, Elements of press tool for cutting operation bending drawing and integrated operation with understanding of shearing angle , stripping force ,effect of shear angle, principle of shearing and stripping force, economy factor material utilization , Classification of die set, shaft height, concept of material selection, bending force, spring back, guiding, locating, ejection, functional element.		
Review and class test	5	
Total	100	150

Intellectual Skills:

- 1) Plan and organize the work order and jobs received from the Operator for mass production by using press tools

Motor Skills:

- 1) Can able to calculate the strip/sheet required for any type of component
- 2) Can able to design type of press tool required by studying the shape, size of the component.

Learning Resources:

73. Books:

AUTHOR	TITLE	PUBLISHER
D. Eugene Osterguard	Basic Die Making ISBN-07-046090-6	McGraw Hill Book CO.
Prakash H. Joshi	Press Tools Design & Construction ISBN-81-85814-46-5	Wheeler Publishing
American Society of Tool & Manufacturing	Fundamentals of Tool Design	Prentice Hall of India Pvt. Ltd.

Engineering(F.W. Wilson)	ISBN-0-87692-058-10	New Delhi.
C. Donaldson, George H. Lecain V.C. Gold	Tool Design ISBN-0-07-099274-6	Tata McGraw Hill
NTTF	Theoretical Training Manual	NTTF – Bangalore
NTTF	Practical Training Manual	NTTF – Bangalore
CITD(ISTE)	Tool Engineering Parameters	CITD(ISTE) – Hyderabad
TETCOS	Transparencies	Education & Training Consultants, Bangalore
FIBRO	Standard Catalogues	--
Surrender Kumar & Umesh Chandra	Production Engineering Design	SatyaPrakashan New Delhi.
Donaldson	Fundamentals of Tool Design	Tata McGraw Hill

COURSE/MODULE TEMPLATE

SEMESTER:3

COURSE NAME:WORKSHOP PRACTICE-III

COURSE CODE:MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Get knowledge about practical work in workshop.
✓ Get knowledge about different machine used in workshop like milling, turning, grinding, etc.
✓ Find out different problems during manufacturing of different parts and using different machine.

THEORY HOURS:NA

PRACTICAL HOURS:610hrs

THEORY MARKS:NA

PRACTICAL MARKS:400

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Workshop practice	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of machining process. ✓ Understand different machines. ✓ Making multifunctional tools integrating skills of <ul style="list-style-type: none"> • Bench work • Turning • Milling • Surface grinding ✓ Cylindrical grinding 	<ul style="list-style-type: none"> ✓ Manufacturing of hand mould/ ✓ Manufacturing of guide plate tool ✓ Basic pneumatics and basic hydraulics/EDM/micron Pantograph vertical grinder 	600	400
Review and class test				10	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: III
Course Title	:WORKSHOP PRACTICE-III
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				
TH	TU	PR		TH	PR	OR	TW	TOTAL
--	--	30.5	08	--	200	--	200	400

Rationale:

At the end of semester the trainees will be able to produce useful items by acquiring hand skill and selected machining skill in basic metal working and machine tool operations and by combining them with both knowledge of IGTR-Ahmedabad training organization and safety regulations .The trainees also manufacture machine accessories and standard parts by integrating hand skill and machine tool operation skill.

Outcomes:

- Get knowledge about practical work in workshop.
- Get knowledge about different machine used in workshop like milling, turning, grinding, etc.
- Find out different problems during manufacturing of different parts and using different machine.

Theory:

Topic and Contents	Hours	Marks
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Topic 1: Workshop practice	600	400
Objectives: <ul style="list-style-type: none"> At the end of this unit Student should be able to understand different types of machining process. Understand different machines. Making multifunctional tools integrating skills of Bench work Turning Milling Surface grinding Cylindrical grinding 		
Contents: <p>1.1</p> <ul style="list-style-type: none"> Manufacturing of hand mould/ Manufacturing of guide plate tool Basic pneumatics and basic hydraulics/EDM/micron Pantograph vertical grinder 		
Review and class test	10	
Total	20	400

Intellectual Skills:

- understand different types of machining process and different machines
- problem finding & solving during production, design, assembly and trial

Motor Skills:

- Able to make assembly properly
- Knowledge about the machine and tools used for manufacturing.

Learning Resources:

77. Books:

AUTHOR	TITLE	PUBLISHER
Chapman A.J.	Workshop Technology (Vol. I,II & III)	New Delhi: Amol Publication
Hazra S.K. & Chaoudhary S.K.	Elements of Workshop Technology	Metropolitan Publishers, Bombay.
Raghuwanshi B.S. & Others	Workshop Technology	New Heights, New Delhi.
Gupta K.N. & Kaushish J.P.	Workshop Technology Vol. I to II.	New Heights, New Delhi.

Atherton W.H.	Workshop Practice Vol. I to V	New Era Publishers, London.
Gerling	All about Machine tools	WILSEY EASTERN, Delhi.
B. Kishore	Tool & Die Maker	Saurabh& Co.
Hermann Jutz Edward Scharkus	Westermann Tables	WILSEY EASTERN, Delhi.

COURSE/MODULE TEMPLATE

SEMESTER:4

COURSE NAME:CNC TECHNOLOGY

COURSE CODE:MSME/DTE/

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Understand manual turning and milling machine and automation in CNC and milling machine.
✓ Understand and utilize codes and program.

THEORY HOURS:60hrs

PRACTICAL HOURS:NA

THEORY MARKS:100

PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Introduction	<ul style="list-style-type: none">✓ At the end of this unit Student should be able to understand CNC turning and milling machine.✓ Utilization of different G and M codes for different programs.	<ul style="list-style-type: none">• Concept of NC, CNC, DNC machining• Advantages of CNC over conventional machining process. merits and demerits of CNC machining• Environmental control for CNC machine	5	5
2	Unit II:	<ul style="list-style-type: none">✓ At the end of this unit Student should be able to understand principle of feedback control	<ul style="list-style-type: none">• Classification based on feedback control• Open loop control system, close loop control system	5	10

	Classification of NC system	<ul style="list-style-type: none"> ✓ Classification based on control system feature ✓ Classification based on co-ordinate system ✓ Classification based on identification of axis 	<ul style="list-style-type: none"> • Feedback devices • Point to point control, straight line control, continuous control system • Absolute co-ordinate, incremental co-ordinate system • Linear axis rotary axis 		
3	Unit III: Fundamental of part programming	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand manual part programming ✓ Computer aided part programming 	<ul style="list-style-type: none"> • Concept of NC codes, programming format, G&M code, Point to point control, straight line, curved surface programming • Concept of NC programming on computer, concept of sub-routine , do-loops fixed/canned cycle 	8	15
4	Unit IV: Tooling for CNC machine	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand tooling for CNC machine and application 	<ul style="list-style-type: none"> • Concept of design features of cutting tools for CNC, auto tool changer 	3	10
5	Unit V: Specification of CNC machine	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand specification of CNC machines and purpose 	<ul style="list-style-type: none"> • Concept of co-ordinate, spindle rpm, linear and rotary axis of rotation. machine control system/unit of CNC , cooling system 	4	10
6	Unit VI: CNC operation and machines	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand CNC lathe and turning operation ✓ CNC milling and milling operation ✓ CNC machining centre ✓ CNC EDM- spark erosion ✓ CNC EDM- wire cut ✓ EDM process ✓ Function of EDM cutting parameter operation ✓ CNC grinding machine 	<ul style="list-style-type: none"> • Introduction about turning operation, Understand turning operation Understand tool selection for different operation like(single point cutting tool, drilling tool ,threading tool, grooving tool, boring tool,), geometry of cutting tool (angle, cutting points etc.) • Understand G code and M code for turning • Introduction about milling operation(like facing, boring, drilling, reaming, pocket, slotting)., • Understand tool selection for different operation like(multi point cutting tool ,drilling tool ,boring 	30	50

			<p>tool, reaming tool, cutters), geometry of cutting tool (angle, cutting points etc.)</p> <ul style="list-style-type: none"> • Understand G code and M code for milling • Understand in detail about • Concept of EDM, wire cut processes • Main part work holding device, tool holding devices, cutting tools, material • Designing parameters of tools for spark erosion and wire cut in CNC machining • Machine and work reference , selection of grinding wheel in CNC part programming 		
Review & class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: IV
Course Title	:CNC TECHNOLOGY
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
03	--	--	03	70	--	30	--	100

Rationale:

The students will be able to understand the facts, principles and procedures of CNC technology. It makes the use of CNC programming for CNC control and sequence of operation performed to build the program. This technology is rapidly becoming more economical with the growth of computerization in the field of tool & dies technology.

Outcomes:

- Understand manual turning and milling machine and automation in CNC and milling machine.
- Understand and utilize codes and program.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand CNC turning and milling machine. ✓ Utilization of different G and M codes for different programs. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Concept of NC, CNC, DNC machining • Advantages of CNC over conventional machining process. merits and demerits of CNC machining • Environmental control for CNC machine 	5	5
<p>Topic 2: Classification of NC system</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand principle of feedback control ✓ Classification based on control system feature ✓ Classification based on co-ordinate system ✓ Classification based on identification of axis <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Classification based on feedback control • Open loop control system, close loop control system • Feedback devices • Point to point control, straight line control, continuous control system • Absolute co-ordinate, incremental co-ordinate system <p>Linear axis rotary axis</p>	5	10
<p>Topic 3: Fundamental of part programming</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand manual part programming ✓ Computer aided part programming <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Concept of NC codes, programming format, G&M code, Point to point control, straight line, curved surface programming <p>Concept of NC programming on computer, concept of sub-routine , do-loops fixed/canned cycle</p>	8	15

<p>Topic 4: Tooling for CNC machine</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand tooling for CNC machine and application <p>Contents:</p> <p>4.1</p> <p>Concept of design features of cutting tools for CNC, auto tool changer</p>	3	10
<p>Topic 5: Specification of CNC machine</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand specification of CNC machines and purpose <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Concept of co-ordinate, spindle rpm, linear and rotary axis of rotation. machine control system/unit of CNC , cooling system 	4	10
<p>Topic 6: CNC operation and machines</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand CNC lathe and turning operation ✓ CNC milling and milling operation ✓ CNC machining centre ✓ CNC EDM- spark erosion ✓ CNC EDM- wire cut ✓ EDM process ✓ Function of EDM cutting parameter operation ✓ CNC grinding machine <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Introduction about turning operation, Understand turning operation Understand tool selection for different operation like(single point cutting tool, drilling tool ,threading tool, grooving tool, boring tool,), geometry of cutting tool (angle, cutting points etc.) • Understand G code and M code for turning • Introduction about milling operation(like facing, boring, drilling, reaming, pocket, slotting)., • Understand tool selection for different operation like(multi point cutting tool ,drilling tool ,boring tool, reaming tool, cutters), geometry of cutting tool (angle, cutting points etc.) • Understand G code and M code for milling • Understand in detail about 	30	50

<ul style="list-style-type: none"> • Concept of EDM, wire cut processes • Main part work holding device, tool holding devices, cutting tools, material • Designing parameters of tools for spark erosion and wire cut in CNC machining • Machine and work reference , selection of grinding wheel in CNC part programming 		
Review and class test	5	
Total	60	100

Intellectual Skills:

- 1) Understand manual turning and milling machine and automation in CNC and milling machine.
- 2) Understand and utilize codes and program.

Motor Skills:

- 1) Able to make programs on different types of profile jobs.
- 2) Understanding how to operate different types of CNC machines.

Learning Resources:

81. Books:

AUTHOR	TITLE	PUBLISHER
Kundra T.K, Rao P.N. & Tewari N.K.	Numerical control & CAM	Tata McGraw Hill, New Delhi
Pabla B.S.	CNC Machines	New age International Pvt.Ltd. New Delhi
Lynch Mike	CNC Advanced Techniques	McGraw Hill, New York
Lynch Mike	Managing CNC Operations	Society of manufacturing engineers, Dearborn
Smith Graham	CNC Machining Technology	Springer Verlog, Michigon, New York
Nanfarra Frank & Uccello Tony	The CNC Work book- An introduction to CNC	Addision- Wesley, New Delhi

COURSE/MODULE TEMPLATE

SEMESTER:4

COURSE NAME:COMPUTER APPLICATION-I

COURSE CODE:MSME/DTE/

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Use the fundamental features and history of computer
✓ Understand the function and name of different types of devices used in computer
✓ Understand the computer languages and make program using these computer languages
✓ Understand and use if MS word, excel and power point

THEORY HOURS:60hrs PRACTICAL HOURS:NA THEORY MARKS:100 PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Basics of computer	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the uses of applications of the computer ✓ Use of applications of the computer components of computer ✓ Principles of computer operations ✓ Classification of Computers ✓ Input devices ✓ Output devices ✓ Storage devices ✓ Microprocessor unit ✓ Overview of the various computer systems 	<ul style="list-style-type: none"> • Introduction how to start and operate computer. • History of computer • Parts of computer • New invention in computer • Introduction use & application of Computer system in industry • Generation of computer system • Principle of Evaluation of computer system • Key Board, mouse, joystick, light pen Introduction of use & application of different input devices • Types of input devices • Principles of feeding data into computer system • Introduction of use & application of data storage 	12	10

			<ul style="list-style-type: none"> devices • Definition of storage devices • Principles of data storage • Introduction of use & application semi conductor devices in computer system • Definition of semi conductor devices • Principle of micro processor unit, operation of Micro processor unit in computer system • Introduction of use & application of different computer systems • Definition of P2, Celeron P3,P4 • Principle of application of computer system, • latest computer used system 		
2	Unit II: Data representation & number system	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the data representation with in computer & codes ✓ Number system ✓ Algorithm & flowchart 	<ul style="list-style-type: none"> • Introduction of use & application of different data types & their representation • Definition of data types, data representation, data encoding • Principle of study the concept of data representation, data types • Introduction use & application of different Number system • Definition Concept of different number system data representation, data on version , data interpretation • Principle of numbers system ,data representation, data conversion • Introduction of use & application of algorithm &flowchart • Definition of algorithm , decision table, flowchart • Principle of algorithm development, flowchart development 	12	10
3	Unit III: Computer	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Computer codes, machine code, assemble code and Machine Code 	<ul style="list-style-type: none"> • Introduction of computer codes, machine code and assemble code • Definition of concept machine structure, machine language 	6	15

	language		<ul style="list-style-type: none"> • Principle of assembly language 		
4	Unit IV: Operation system	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand introduction to operating system ✓ Disk operating system ✓ To know different type of operating system 	<ul style="list-style-type: none"> • Concept of operating system, computer structure, networking • Principle of operating system, • Principle of windows NT, windows 95, windows 2000 	8	10
5	Unit V: MS Word	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand ✓ Ms word page design with column, tables & using graphics ✓ Ms word of page design with columns tables & graphics 	<ul style="list-style-type: none"> • Introduction of use & application of graphics & designing page for extra impact • Definition of concept table creation & revision , creating animation handling line breaks, page break • Principle of table creation & revision inserting object creating animation 	4	15
6	Unit VI: MS Excel	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Ms excel 2000 basics ✓ Excel files, work books, mathematical operations used in excel sheet printing workbook and graphs generation ✓ Ms excel -Text, borders, colours ✓ Ms excel graphics & objects 	<ul style="list-style-type: none"> • Introduction of use & application of excel 2000 • Definition of concept entering data, file & work books, mathematical graphs. • Principle of entering data into excel sheet organizing files excel sheet creating graphs. • Introduction of application of text, data, format, colour, shading ,style, size alignments, format number data & time format ,custom data format, colour border, fill , shading ,background • Principle of text style, size alignment, format data, format boarder • Introduction application of graphics object, clip, art, multiple, graphic object • definition graphics object clip art, word art, multiple graphics objects • Principle of graphics object clip art, word art, multiple graphics objects 	4	20
7	Unit VII: MS Power	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand PowerPoint 2000 basics ✓ PowerPoint wizard presentation 	<ul style="list-style-type: none"> • Introduction of use and application of various power point features wizard, layout clipart, perspective , pictures 	8	20

	Point	<p>perspective sliders auto layout, text objects clipart and pictures text object</p> <ul style="list-style-type: none"> ✓ Power point presentation ✓ PowerPoint with drawing 	<ul style="list-style-type: none"> • Definition concept of PowerPoint wizard presentation perspective sliders. • Principle of auto content wizard presentation perspective • Introduction of use and application of colour, slides show, animations. • Definition concept of customizing of colour scheme • Principal of customizing presentation customizing background, formatting the masters • Introduction of text boxes shape, objects, shadows, 3D effects • Definition concept of formatting and text box, drawing object together grouping and ungrouping objects, drawing special effects principle 		
Review & class test				6	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: IV
Course Title	:COMPUTER APPLICATION-I
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
03	--	--	03	70	--	30	--	100

Rationale:

This Subject describes the facts, concepts, principles and procedures of computer applications so that this knowledge can be used in solving Engineering applications efficiently and effectively. It is useful in the application of computers In areas like CNC Technology, Tool Design and Computer aided Design, Cost estimation and industrial management. This also enables to understand the Hardware and Networking concepts and provides the opportunity to learn latest technology through the use of internet.

Outcomes:

- Get knowledge about how to use computer
- Understanding the different types of devices used in computer and their use.
- Understand the computer languages and make program using these computer languages
- Knowledge about MS office with the use of MS word, excel and power point

Theory:

Topic and Contents	Hours	Marks

Topic 1: Basics of computer	12	10
Objectives:		
<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the uses of applications of the computer ✓ Use of applications of the computer components of computer ✓ Principles of computer operations ✓ Classification of Computers ✓ Input devices ✓ Output devices ✓ Storage devices ✓ Micro processor unit ✓ Overview of the various computer systems 		
Contents:		
1.1		
<ul style="list-style-type: none"> ● Introduction how to start and operate computer. ● History of computer ● Parts of computer ● New invention in computer ● Introduction use & application of Computer system in industry ● Generation of computer system ● Principle of Evaluation of computer system ● Key Board, mouse, joystick, light pen Introduction of use & application of different input devices ● Types of input devices ● Principles of feeding data into computer system ● Introduction of use & application of data storage devices ● Definition of storage devices ● Principles of data storage ● Introduction of use & application semi conductor devices in computer system ● Definition of semi conductor devices ● Principle of micro processor unit, operation of Micro processor unit in computer system ● Introduction of use & application of different computer systems ● Definition of P2, Celeron P3,P4 ● Principle of application of computer system, ● latest computer used system 		

<p>Topic 2: Data representation & number system</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the data representation with in computer & codes ✓ Number system ✓ Algorithm & flowchart <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Introduction of use & application of different data types & their representation • Definition of data types, data representation, data encoding • Principle of study the concept of data representation, data types • Introduction use & application of different Number system • Definition Concept of different number system data representation, data on version , data interpretation • Principle of numbers system ,data representation, data conversion • Introduction of use & application of algorithm & flowchart • Definition of algorithm , decision table, flowchart <p>Principle of algorithm development, flowchart development</p>	12	10
<p>Topic 3: Computer language</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Computer codes, machine code, assemble code and Machine Code <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Introduction of computer codes, machine code and assemble code • Definition of concept machine structure, machine language <p>Principle of assembly language</p>	6	15
<p>Topic 4: Operation system</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand introduction to operating system ✓ Disk operating system ✓ To know different type of operating system <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Concept of operating system, computer structure, networking • Principle of operating system, 	8	10

Principle of windows NT, windows 95, windows 2000		
<p>Topic 5: MS Word</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand ✓ Ms word page design with column, tables & using graphics ✓ Ms word of page design with columns tables & graphics <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Introduction of use & application of graphics & designing page for extra impact • Definition of concept table creation & revision , creating animation handling line breaks, page break <p>Principle of table creation & revision inserting object creating animation</p>	4	15
<p>Topic 6: MS Excel</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understandMs excel 2000 basics ✓ Excel files, work books, mathematical operations used in excel sheet printing workbook and graphs generation ✓ Ms excel -Text, borders, colours ✓ Ms excel graphics & objects <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Introduction of use & application of excel 2000 • Definition of concept entering data, file & work books, mathematical graphs. • Principle of entering data into excel sheet organizing files excel sheet creating graphs. • Introduction of application of text, data, format, colour, shading ,style, size alignments, format number data & time format ,custom data format, colour border, fill , shading ,background • Principle of text style, size alignment, format data, format boarder <ul style="list-style-type: none"> • Introduction application of graphics object, clip, art, multiple, graphic object • definition graphics object clip art, word art, multiple graphics objects 	4	20

Principle of graphics object clip art, word art, multiple graphics objects		
Topic 7: MS Power Point Objectives: <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understandPowerPoint 2000 basics ✓ PowerPoint wizard presentation perspective sliders auto layout, text objects clipart and pictures text object ✓ Power point presentation ✓ PowerPoint with drawing Contents: 7.1 <ul style="list-style-type: none"> • Introduction of use and application of various power point features wizard, layout clipart, perspective , pictures • Definition concept of PowerPoint wizard presentation perspective sliders. • Principle of auto content wizard presentation perspective • Introduction of use and application of colour, slides show, animations. • Definition concept of customizing of colour scheme • Principal of customizing presentation customizing background, formatting the masters • Introduction of text boxes shape, objects, shadows, 3D effects • Definition concept of formatting and text box, drawing object together grouping and ungrouping objects, drawing special effects principle 	8	20
Review and class test	6	
Total	60	100

Intellectual Skills:

1. Sharing information documents sent by internal teams by the help of computer
2. Use reasoning skills to identify and resolve basic problems.
3. write information documents to internal departments/ internal teams or enter the information in online ERP systems under guidance of the supervisor

Motor Skills:

- 1) Organize all manuals so that sorting out information very fast by the use of computer
- 2) Identify the specific problems and solving the problems.

Learning Resources:

85. Books:

AUTHOR	TITLE	PUBLISHER
Ron White ISBN-81-7635257-8	How Computer works	Techmedia New Delhi.
Peter Kent	Discover Win NT Workstation 4.0	Comdex Okhla New Delhi.
Winn L. Rosch	Hardware Basic	Techmedia New Delhi.
R.K. Taxali ISBN-0-07-462467-9	PC Software made Simple	Tata McGraw Hill, New Delhi.
MadnickJonoran 007-463273-6	Operating System	TMH – New Delhi
Thomas C. Bartee 0-07-003899-6	Digital Computer Fundamentals	TMH – New Delhi
John Donovan 007-460482-1	System Programming	TMH – New Delhi
B. Ram	Fundamentals of Micro computers	Dhanpatrai New Delhi.
P.K. Sinha	Computer Fundamentals	BPB/ New Delhi
A.L. Steven 81-7029-327-9	Dos Teach Yourself	BPB/ New Delhi
Govindraju, Haq, Naraya	Introduction to computer	Willey Eastern New Delhi
Alexandraia Haddad 81-7635-287	MS – Powerpoint 2000	Techmedia New Delhi.
TrudiReisner 81-7635-286-1	MS Excel 2000	Techmedia New Delhi.
Stephen K. Cunningham ISBN-81-7029-247-6	Lear Microsoft Assembler in a day	BPB Publication New Delhi

Manaharhotia/Nair ISBN-81-7029-700-1	All about Motherboard	BPB Publication New Delhi
Satish Jain ISBN-81-7029-289-1	DOS Manual Vol.1	BPB Publication New Delhi
Aptech	Window	Aptech Notes
Aptech	Working with word	Aptech Notes
Aptech	Power Point	Aptech Notes
Gimi Courter Annette Marquis ISBN-81-7656-086-3	Office 2000	BPB Publication New Delhi
Ron Mansfield ISBN-81-7029-373-1	Microsoft Office	BPB Publication New Delhi

COURSE/MODULE TEMPLATE

SEMESTER:4

COURSE NAME:STRENGTH OF MATERIALS

COURSE CODE:MSME/DTE/

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Use the fundamental and principle of strength of material.
✓ Application of strength of material in general engineering.
✓ Understand and analyse problems encountered in core technology.

THEORY HOURS:60hrs PRACTICAL HOURS:NA THEORY MARKS:100 PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Introduction	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the objective of subject & application of this subject in the tool & die technology. ✓ To review the previous knowledge Which is required for understanding the strength of material ✓ Study the trigonometry relationships. 	<ul style="list-style-type: none"> • Subjects objectives, contents of subject, application of subject in tool & die technology. • Force, work done, power, energy, area, volume, units, unit conversions, and trigonometry. • Use conversion of units, multiplying factors. 	2	10
2	Unit II: Stresses & strains	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Concept of classification of load, stresses, strains, types of stress and strains. ✓ Hooke's law, young modulus of elasticity, nominal stress, yield point, plastic stage. 	<ul style="list-style-type: none"> • Principle of elasticity, stresses, strains, types of stress and strains. • Hooke's law, young modulus of elasticity, nominal stress, yield point, plastic stage. • Stresses and strains, deformation of body due to load, relationship of stress and strain. 	10	15

		<ul style="list-style-type: none"> ✓ Proof stress, working stress, factor of safety. ✓ Bars of varying cross-section. ✓ Related problems on shear stress and strain, modulus of elasticity and rigidity. 	<ul style="list-style-type: none"> • Concept of ultimate strength and breaking stress, percentage elongation. • Concept of shear stress, strain. • Modulus of rigidity, Poisson's ratio. • Relationship between modulus of elasticity and rigidity. 		
3	Unit III: Shear force and bending moment	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Shear force and bending moment 	<ul style="list-style-type: none"> • Concept of beam, form of loading, end supports-roller, hinged and fixed . • Bending moment and shear force. • Related problem on bending moment and shear force diagram for cantilever beam • simple supported beams subjected to concentrated and uniformly distributed load (UDL). 	10	12
4	Unit IV: Stresses in beam	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Theory of simple bending ✓ Moment of inertia and its application. ✓ Application of moment of inertia, second moment of area of common geometrical sections. 	<ul style="list-style-type: none"> • Principle of simple bending, bending stresses, moment of resistance, bending equation, bending stress diagram. • Principle of moment of inertia, second moment, parallel axis theorem, perpendicular axis theorem, modulus of section. 	7	13
5	Unit V: Deflection	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the relationship between slope, deflection and radius of curvature. 	<ul style="list-style-type: none"> • Concept of slope and deflection, radius of curvature. • Methods on slope and deflection. • Principle of slope, deflection, relationship between slope, deflection & radius of curvature. 	5	12
6	Unit VI: Column & strut	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Euler formula. ✓ Principle of column and strut, short and long column, effective length, slenderness ratio, buckling load, crushing load. 	<ul style="list-style-type: none"> • Concept and classification of column and strut, short and long column, effective length, slenderness ratio, buckling load, crushing load. • Apply Euler theory of column. Rankin formula for solution of problems on column and strut. 	5	8
7	Unit VII: Torsion	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand principle of torque and torsion, torsion equation, torsional rigidity, angle of twist, hollow and solid shaft. ✓ Principle of torque, power transmitted, 	<ul style="list-style-type: none"> • Torsion, Torsion equation and torsional rigidity • Concept of torque and torsion, angle of twist, hollow and solid shaft. • Power, torque and size of shaft. • Concept of torque, power transmitted, angular 	10	20

		angular displacement, shaft size, shear stress.	displacement, shaft size, shear stress <ul style="list-style-type: none"> Determine size of shaft, shear stress to solve related problems. 		
8	Unit VIII: Spring	✓ At the end of this unit Student should be able to understand the principle of leaf spring, deflection, stiffness, strain energy stored in leaf spring.	<ul style="list-style-type: none"> Leaf spring and calculation of stresses. Concept of leaf spring, deflection, stiffness, strain energy stored in leaf spring. Describe stresses in leaf spring, length of spring. Apply formula for calculating deflection, strain energy stored in leaf spring. 	6	10
Review & class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: IV
Course Title	:STRENGTH OF MATERIALS
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme					Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL	
03	--	--	03	70	--	30	--	70	

Rationale:

Understand the scientific facts, concepts, principles and procedures of strength of material used along with applications in manufacturing, process planning, estimation, inspection and QC including supervisory management to express the ideas, conveying instructions for carrying out jobs in Tool & Die Technology. It is also useful in understanding technology subject such as tool design, workshop practice, workshop technology, production planning & estimation.

Outcomes:

- Use the fundamental and principle of strength of material.
- Application of strength of material in general engineering.
- Understand and analyse problems encountered in core technology.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the objective of subject & application of this subject in the tool & die technology. ✓ To review the previous knowledge Which is required for understanding the strength of material ✓ Study the trigonometry relationships. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Subjects objectives, contents of subject, application of subject in tool & die technology. • Force, work done, power, energy, area, volume, units, unit conversions, and trigonometry. • Use conversion of units, multiplying factors. 	2	10
<p>Topic 2: Stresses & strains</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Concept of classification of load, stresses, strains, types of stress and strains. ✓ Hooke’s law, young modulus of elasticity, nominal stress, yield point, plastic stage. ✓ Proof stress, working stress, factor of safety. ✓ Bars of varying cross-section. ✓ Related problems on shear stress and strain, modulus of elasticity and rigidity. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Principle of elasticity, stresses, strains, types of stress and strains. • Hooke’s law, young modulus of elasticity, nominal stress, yield point, plastic stage. • Stresses and strains, deformation of body due to load, relationship of stress and strain. • Concept of ultimate strength and breaking stress, percentage elongation. • Concept of shear stress, strain. • Modulus of rigidity, Poisson’s ratio. <p>Relationship between modulus of elasticity and rigidity.</p>	10	15
<p>Topic 3: Shear force and bending moment</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Shear force and bending moment <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Concept of beam, form of loading, end supports-roller, hinged and fixed . • Bending moment and shear force. • Related problem on bending moment and shear force diagram for cantilever beam simple supported beams subjected to concentrated and uniformly distributed load (UDL). 	10	12

<p>Topic 4: Stresses in beam</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Theory of simple bending ✓ Moment of inertia and its application. ✓ Application of moment of inertia, second moment of area of common geometrical sections. <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Principle of simple bending, bending stresses, moment of resistance, bending equation, bending stress diagram. <p>Principle of moment of inertia, second moment, parallel axis theorem, perpendicular axis theorem, modulus of section</p>	7	13
<p>Topic 5: Deflection</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the relationship between slope, deflection and radius of curvature. <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Concept of slope and deflection, radius of curvature. • Methods on slope and deflection. <p>Principle of slope, deflection, relationship between slope, deflection & radius of curvature.</p>	5	12
<p>Topic 6: Column & strut</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Euler formula. ✓ Principle of column and strut, short and long column, effective length, slenderness ratio, buckling load, crushing load. <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Concept and classification of column and strut, short and long column, effective length, slenderness ratio, buckling load, crushing load. <p>Apply Euler theory of column. Rankin formula for solution of problems on column and strut.</p>	5	8
<p>Topic 7: Torsion</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand principle of torque and torsion, torsion equation, torsional rigidity, angle of twist, hollow and solid shaft. ✓ Principle of torque, power transmitted, angular displacement, shaft size, shear stress <p>Contents:</p> <p>7.1</p> <ul style="list-style-type: none"> • Torsion, Torsion equation and torsional rigidity Concept of torque and torsion, angle of twist, 	10	20

hollow and solid shaft. <ul style="list-style-type: none"> • Power, torque and size of shaft. • Concept of torque, power transmitted, angular displacement, shaft size, shear stress Determine size of shaft, shear stress to solve related problems.		
Topic 8: Spring Objectives: ✓ At the end of this unit Student should be able to understand the principle of leaf spring, deflection, stiffness, strain energy stored in leaf spring. Contents: 8.1 <ul style="list-style-type: none"> • Leaf spring and calculation of stresses. Concept of leaf spring, deflection, stiffness, strain energy stored in leaf spring. • Describe stresses in leaf spring, length of spring. Apply formula for calculating deflection, strain energy stored in leaf spring.	6	10
Review and class test	5	
Total	60	100

Intellectual Skills:

- 1) Use the fundamental and principle of strength of material.
- 2) Application of strength of material in general engineering.

Motor Skills:

- 1) Understand and analyse problems encountered in core technology.

Learning Resources:

89. Books:

AUTHOR	TITLE	PUBLISHER
R.S.Khurmi	A textbook of engineering method-(S.I.) units	S.Chand and Co.Ltd.,Delhi
R.S.Khurmi&J.K.Gupta	Engineering Mechanics and Strength of Materials	S.Chand and Co.Ltd.,Delhi
Harry parker & James Ambrose	Simple Mechanics and Strength of Materials	John Willey and Sons,Inc
J.B.Prasad	Applied Mechanics and Strength of Materials	Khannapublishers.Delhi
S.K.Aggarwal&P.K.Gupta	Strength of Materials	Metropolitan Book Co.,New Delhi

COURSE/MODULE TEMPLATE

SEMESTER:4

COURSE NAME:HEAT TREATMENT

COURSE CODE:MSME/DTE/

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Use the fundamental and principle of strength of material.
✓ Application of strength of material in general engineering.
✓ Understand and analyze problems encountered in core technology.

THEORY HOURS:60hrs PRACTICAL HOURS:NA THEORY MARKS:100 PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Introduction	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Heat Treatment and its application. 	<ul style="list-style-type: none"> • Concept of heating & cooling of metals. • Principle of Heat treatment 	2	5
2	Unit II: Phase diagram with special references to iron & steel	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand Iron – Carbon phase diagram ✓ Draw and explain Iron – Carbon phase diagram, phase constituents. ✓ Micro constituents of iron and carbon system ✓ Transformation of hypo, hyper & eutectoid 	<ul style="list-style-type: none"> • Iron-carbon phase diagram and its application. • Classification of phases. • Concept of allotropy of iron. • Principle of iron-carbon phase diagram. • Transformation of phases. • Allotropy of iron. • Understand Micro constituents of iron and carbon system. 	10	17

		steel	<ul style="list-style-type: none"> • Concept of Micro constituents of various phases. • Describe Micro constituents of iron and carbon system and phase structure. • Concept of Hypo eutectoid, Hyper eutectoid & eutectoid steel. • Describe constituents of Hypo eutectoid, Hyper eutectoid & eutectoid steel. 		
3	Unit III: Isothermal transformation (T-T-T curve)	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand Transformation of Austenite, Pearlite, Bainite, Martensite& cementite. 	<ul style="list-style-type: none"> • Time- temperature -transformation (TTT) curve in heat Treatment of steel. • Concept of transformation at constant temperature into various phases. • Describe transformation into various phases of steel with help of TTT curve. 	5	10
4	Unit IV: Heat treatment process of steel	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand different processes of heat treatment of steel. ✓ Quenching medium and application. ✓ Hardenability and its application. ✓ 	<ul style="list-style-type: none"> • Different processes of heat treatment of steel. • Concept of annealing, Normalizing, hardening, tempering. • Concept of quenching and classification of quenching medium. • Concept of Hardenability, jominy test.. • Describe of Hardenability, determination of Hardenability and jominy test. 	8	15
5	Unit V: Case hardening of steel	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand Thermo chemical treatment and its application. ✓ Surface hardening and its application. ✓ Various steps in process of flame hardening and induction hardening. 	<ul style="list-style-type: none"> • Concept of different processes of thermo chemical treatment such as Nitriding, Carbo-nitriding, nitro carbonizing, carbonizing, cyaniding. • Concept of flame hardening & induction hardening. • Concept of flame hardening & induction hardening. 	5	8
6	Unit VI: Heat treatment of plain carbon	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand the uses and application of plain carbon steel. ✓ 	<ul style="list-style-type: none"> • Concept of change the mechanical properties plain carbon steel. • Principle of iron-iron cementite diagram, T.T.T Curve • Study about selection of temperature, selection of quenching media. 	5	10

	steel				
7	Unit VII: Heat treatment of tool steel	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about tool steels in tool & die making and its types. ✓ Principle and classification of tool steel. DIN and BIS Standards. ✓ Heat Treatment process for tool steel. 	<ul style="list-style-type: none"> • Concept and classification of tool steel, effect of alloying elements in tool steel. DIN and BIS standards. • Study chemical composition of different type of tool steel and effects following elements. • Concept of heat treatment for tool steel and alloy steel. • Describe process of hardening tool steel and alloy steel. 	6	10
8	Unit VIII: Heat treatment of cast iron	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand Different types of cast iron ✓ Study classification and application of cast iron. 	<ul style="list-style-type: none"> • Classification of cast iron such as grey cast iron, white cast iron, malleable cast iron, spheroid cast iron. 	4	7
9	Unit IX: Furnaces & equipment	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand about Furnaces in heat treatment and their use. 	<ul style="list-style-type: none"> • Concept of different type of furnaces such as induction furnace, salt bath furnaces, Fluidized bed furnace. • Principles of working of furnaces, selection of furnaces. 	5	8
10	Unit X: Defects causes & prevention during heat treatment	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand defects, causes and their prevention ✓ Overview of consumables used in heat treatment process & its effects on health 	<ul style="list-style-type: none"> • Concept of defects such as decarburization, quenching cracks, excessive hardness, less hardness, soft spots. • Concept of prevention and remedies • Concept of disposal of consumables. concept of health hazards and prevention 	5	10
Review & class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: IV
Course Title	:HEAT TREATMENT
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
03	--	--	03	70	--	30	--	100

Rationale:

Understand the scientific facts, concepts, principles and procedures of heat treatment of ferrous materials. So that knowledge can be carried out for jobs in Tool & Die Technology. It is also useful in selection of proper materials, designing of tools, w/s practice and production planning.

Outcomes:

- Use the fundamental and principle of strength of material.
- Application of strength of material in general engineering.
- Understand and analyze problems encountered in core technology

Theory:

Topic and Contents	Hours	Marks
<p>Topic 1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none"> • At the end of this unit Student should be able to understand Heat Treatment and its application. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Concept of heating & cooling of metals. • Principle of Heat treatment 	2	5

<p>Topic 2: Phase diagram with special references to iron & steel</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand Iron – Carbon phase diagram ✓ Draw and explain Iron – Carbon phase diagram, phase constituents. ✓ Micro constituents of iron and carbon system ✓ Transformation of hypo, hyper & eutectoid steel <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Iron-carbon phase diagram and its application. • Classification of phases. • Concept of allotropy of iron. • Principle of iron-carbon phase diagram. • Transformation of phases. • Allotropy of iron.Understand Micro constituents of iron and carbon system. • Concept of Micro constituents of various phases. • Describe Micro constituents of iron and carbon system and phase structure.Concept of Hypo eutectoid, Hyper eutectoid & eutectoid steel. <p>Describe constituents of Hypo eutectoid, Hyper eutectoid & eutectoid steel.</p>	10	17
<p>Topic 3: Isothermal transformation (T-T-T curve)</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand Transformation of Austenite, Pearlite, Bainite, Martensite& cementite. <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Time- temperature -transformation (TTT) curve in heat Treatment of steel. • Concept of transformation at constant temperature into various phases. • Describe transformation into various phases of steel with help of TTT curve. 	5	10
<p>Topic 4: Heat treatment process of steel</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand different processes of heat treatment of steel. ✓ Quenching medium and application. ✓ Hardenability and its application. <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Different processes of heat treatment of steel. • Concept of annealing, Normalizing, hardening, tempering. • Concept of quenching and classification of quenching medium. • Concept of Hardenability, jominy test.. 	8	15

Describe of Hardenability, determination of Hardenability and jominy test.		
<p>Topic 5: Case hardening of steel</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand Thermo chemical treatment and its application. ✓ Surface hardening and its application. ✓ Various steps in process of flame hardening and induction hardening. <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Concept of different processes of thermo chemical treatment such as Nitriding, Carbonitriding, nitro carbonizing, carbonizing, cyaniding. • Concept of flame hardening & induction hardening. <p>Concept of flame hardening & induction hardening.</p>	5	8
<p>Topic 6: Heat treatment of plain carbon steel</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand the uses and application of plain carbon steel. ✓ <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Concept of change the mechanical properties plain carbon steel. • Principle of iron-iron cementite diagram, T.T.T Curve <p>Study about selection of temperature, selection of quenching media.</p>	5	10
<p>Topic 7: Heat treatment of tool steel</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about tool steels in tool & die making and its types. ✓ Principle and classification of tool steel. DIN and BIS Standards. ✓ Heat Treatment process for tool steel. <p>Contents:</p> <p>7.1</p> <ul style="list-style-type: none"> • Concept and classification of tool steel, effect of alloying elements in tool steel.DIN and BIS standards. • Study chemical composition of different type of tool steel and effects following elements. • Concept of heat treatment for tool steel and alloy steel. <p>Describe process of hardening tool steel and alloy steel.</p>	6	10

<p>Topic 8: Heat treatment of cast iron</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand Different types of cast iron ✓ Study classification and application of cast iron. <p>Contents:</p> <p>8.1</p> <p>Classification of cast iron such as grey cast iron, white cast iron, malleable cast iron, spheroid cast iron.</p>	4	7
<p>Topic 9: Furnaces & equipment</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand about Furnaces in heat treatment and their use. <p>Contents:</p> <p>9.1</p> <ul style="list-style-type: none"> • Concept of different type of furnaces such as induction furnace, salt bath furnaces, Fluidized bed furnace. <p>Principles of working of furnaces, selection of furnaces.</p>	5	8
<p>Topic 10: Defects causes & prevention during heat treatment</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able To understand defects, causes and their prevention ✓ Overview of consumables used in heat treatment process & its effects on health <p>Contents:</p> <p>10.1</p> <ul style="list-style-type: none"> • Concept of defects such as decarburization, quenching cracks, excessive hardness, less hardness, soft spots. • Concept of prevention and remedies <p>Concept of disposal of consumables. concept of health hazards and prevention</p>	5	10
<p>Review and class test</p>	5	
Total	60	100

Intellectual Skills:

- 1) Use the fundamental and principle of strength of material.
- 2) Application of strength of material in general engineering.

Motor Skills:

- 1) Understand and analyze problems encountered in core technology.

Learning Resources:**93. Books:**

AUTHOR	TITLE	PUBLISHER
G.B.S.Narang	Material science	Khanna publishers Delhi-6
B.K.Agarwal	Introduction to engineering material	Tata McGraw Hill Publishing Co.Ltd., New Delhi.
G.K.Narula,K.S.Narula&V.K.Gupta	Material science	Tata McGraw Hill Publishing Co.Ltd., New Delhi.
O.P.Khanna	A text book of materials & metallurgy	Dhanpatrai publications Pvt.Ltd, New Delhi.
Higgins	Materials & metallurgy	Industrial Press,USA

COURSE/MODULE TEMPLATE

SEMESTER:4

COURSE NAME:TOOL DESIGN THEORY (PLASTIC MOULD-II)

COURSE CODE:MSME/DTE/

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Understand different types of moulding methods.
✓ Understand about different types of plastic moulding and machines of it.
✓ Get knowledge about component of plastic mould.

THEORY HOURS:100hrs PRACTICAL HOURS:NA THEORY MARKS:100 PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Introduction	<ul style="list-style-type: none">✓ At the end of this unit Student should be able to know different types of plastic materials and its properties.✓ Understanding the classification of plastic.✓ To Get knowledge about the concept of mould.✓ Application of mould.✓ Different types of injection moulding machine.	<ul style="list-style-type: none">• Introduction basic knowledge of mass production of moulded of plastic component,application of plastic,• Classification of plastic material, and application of moulding machine and equipment, concept of mould material, application of mould.	4	10

2	Unit II: Moulding operation	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to know about compression moulding machine and process ✓ Functions of compression moulding machines and their process application ✓ Transfer moulding machine and process ✓ Functions of transfer moulding machines and their process application 	<ul style="list-style-type: none"> • Parts & functions of compression moulding machine such as clamping, heating, feeding, process set-up data • Compression moulding process elements: material machine & parts • Parts & functions of transfer moulding press such as clamping, heating, feeding, process set-up data • transfer moulding process elements: material press&mould 	24	15
3	Unit III: Elements of mould and their function.	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the hot runner system, <ul style="list-style-type: none"> ✓ feeding system, ✓ heating system, ✓ ejection system, ✓ core & cavity retainer plates ✓ Transfer mould and application 	<ul style="list-style-type: none"> • Classification and functions of hot runner system, feeding, heating system • Material used for core & cavity, mould • Types of transfer mould, temperature control, parting surface, heating elements 	20	20
4	Unit IV: Classification of mould	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of mould compression moulds and transfer moulds ✓ Get knowledge about different parts of mould according to different types of mould. ✓ Get knowledge about parting surface , relief of parting surface 	<ul style="list-style-type: none"> • Positive mould, semi positive mould, flash mould inclined flash mould landed positive mould • Plunger type transfer mould <ul style="list-style-type: none"> a) top plunger type b) bottom plunger type c) side plunger type • Screw type transfer mould 	16	15
5	Unit V: Design parameter for mould material and	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the design parameter which require for design of mould.. ✓ Get knowledge about selection of material for all parts. ✓ Understand process of manufacturing of each parts its costing of manufacturing. ✓ Perfect design of plastic mould. 	<ul style="list-style-type: none"> • Understanding of design parameters like properties of plastic material, quality and quantity of plastic material and describe design parameter of mould 	20	30

	machine				
6	Unit VI: Specification	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about the specification for pertaining to mould ✓ Selection of material and machine for tool design data 	<ul style="list-style-type: none"> • Concept of mould specification • plastic material specification, • machine specification • Processing material 	4	5
7	Unit VII: Introduction to simulation package	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand simulation package and application 	<ul style="list-style-type: none"> • Concept of process parameters • Classification of simulation package • Selection of process parameter 	6	5
Review & class test				6	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: IV
Course Title	:TOOL DESIGN THEORY (PLASTIC MOULD-II)
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
05	--	--	03	70	--	30	--	100

Rationale:

This Subject is intended to the facts, concepts, principles and procedures of tool design techniques so that this knowledge can be used in Tool Design Practice effectively and efficiently. It is also useful in understanding technology subjects and applies them in the area such as Workshop practice, CAD/CAM, Production Planning, Estimation, Industrial Management and Quality Assurance.

Outcomes:

- Able to understand and analyse the plastic moulding process.
- Understand different types of plastic used in industry.
- Understand about different types of plastic moulding methods and plastic moulding machines.
- Get knowledge about component of plastic mould.
- Understand design and design parameter for plastic mould.
- Understand parameter require to design for different plastic material.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to know different types of plastic materials and its properties. ✓ Understanding the classification of plastic. ✓ To Get knowledge about the concept of mould. ✓ Application of mould. ✓ Different types of injection moulding machine. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Introduction basic knowledge of mass production of moulded of plastic component, application of plastic, • Classification of plastic material, and application of moulding machine and equipment, concept of mould material, application of mould. 	4	10
<p>Topic 2: Moulding operation</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to know about compression moulding machine and process ✓ Functions of compression moulding machines and their process application ✓ Transfer moulding machine and process ✓ Functions of transfer moulding machines and their process application <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Parts & functions of compression moulding machine such as clamping, heating, feeding, process set-up data • Compression moulding process elements: material machine & parts • Parts & functions of transfer moulding press such as clamping, heating, feeding, process set-up data <p>transfer moulding process elements: material press&mould</p>	24	15
<p>Topic 3: Elements of mould and their function.</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the hot runner system, <ul style="list-style-type: none"> ✓ feeding system, ✓ heating system, ✓ ejection system, ✓ core & cavity retainer plates ✓ Transfer mould and application <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Classification and functions of hot runner system, feeding, heating system 	20	20

<ul style="list-style-type: none"> Material used for core & cavity, mould Types of transfer mould, temperature control, parting surface, heating elements		
<p>Topic 4: Classification of mould</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of mould compression moulds and transfer moulds ✓ Get knowledge about different parts of mould according to different types of mould. ✓ Get knowledge about parting surface , relief of parting surface <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> Positive mould, semi positive mould, flash mould inclined flash mould landed positive mould Plunger type transfer mould <ul style="list-style-type: none"> d) top plunger type e) bottom plunger type f) side plunger type Screw type transfer mould	16	15
<p>Topic 5: Design parameter for mould material and machine</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to Understand the design parameter which require for design of mould.. ✓ Get knowledge about selection of material for all parts. ✓ Understand process of manufacturing of each parts its costing of manufacturing. ✓ Perfect design of plastic mould <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> Understanding of design parameters like properties of plastic material, quality and quantity of plastic material and describe design parameter of mould 	20	30
<p>Topic 6: Specification</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about the specification for pertaining to mould ✓ Selection of material and machine for tool design data <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> Concept of mould specification plastic material specification, machine specification Processing material	4	5

Topic 7: Introduction to simulation package	6	5
Objectives: ✓ At the end of this unit Student should be able to understand simulation package and application Contents: 7.1 <ul style="list-style-type: none"> • Concept of process parameters • Classification of simulation package Selection of process parameter		
Review and class test	6	
Total	100	100

Intellectual Skills:

- 1) Plan and organize the work order and jobs received from the Operator for mass production by using mould for plastic components.

Motor Skills:

- 1) Can able to calculate the amount of plastic material used for injecting in the injection tool of the component
- 2) able to design by identifying the type of mould required for a particular component

Learning Resources:

97. **Books:**

AUTHOR	TITLE	PUBLISHER
Dominick V. Rosato& Donald V. Rosato	Injection Moulding Handbook	CBS Publishers & Distributers, New Delhi
A.S. Athalye	Plastic Materials Handbook Vol. I & II	Multi – Tech Publishing Co. Mumbai.
A.S. Athalye	Moulding of Plastics	Multi – Tech Publishing Co. Mumbai.
A.S. Athalye	Injection Moulding	Multi – Tech Publishing Co. Mumbai.
Chandra & Mishra	Rubber & Plastic Technology	CBS Publishers & Distributers, New Delhi
Tetco Visual aids	Transparencies on Dies and Moulds Ref. No. 1084-Part A No of Transparencies-29 Ref. No. 1085-Part B No of Transparencies-30	The Education and Training Consultants, Banglore. (Tetco Visual aids)
R.W.G.PYE	Injection Mould Design	Longman scientific & technical copublished in the United states

COURSE/MODULE TEMPLATE

SEMESTER:4

COURSE NAME:COMPUTER AIDED DESIGN & DRAWING-I (THEORY &PRACTICE)

COURSE CODE:MSME/DTE/

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Use the fundamental features and precision drafting tools in AUTOCAD to develop accurate technical drawings
✓ Present drawings in a detailed and visually impressive manner.
✓ Customize the application to meet your specific design in AUTOCAD.
✓ Interpret drawings, draw interferences and workout other technical details.

THEORY HOURS:100hrs PRACTICAL HOURS:NA THEORY MARKS:100 PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Introduction	<ul style="list-style-type: none">✓ At the end of this unit Student should be able to understand the functions in CAD section✓ Use of computer and CAD software in area of design and drawing	<ul style="list-style-type: none">• Review of computer fundamentals, instructions with respect to computer labs, file handling in windows operating system.• Concept of conventional design process, computer operation and control, CAD software used in tool room	10	--

2	Unit II: Introduction of AutoCAD equipment	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the procedure to be adopted for computer aided drawings ✓ Describing the co-ordinate system. ✓ Using the AutoCAD workspace and user interface. ✓ Understand and reading of engineering drawing, industrial drawing, and technical terms used in drawing. 	<ul style="list-style-type: none"> • Basic knowledge of 2D & 3D design & drawing view in Auto-CAD. • Generating new file or open, save or rename and Exit a file. • Tools bar in AutoCAD, different command in AutoCAD, • Creating objects in AutoCAD • Tutorials in learning assistance, creating and editing objects • Using co-ordinate system to specify points, shifting and rotating co-ordinate system 	40	15
3	Unit III: Creation/editing of lines	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to use commands effectively. ✓ Use advanced editing and construction techniques. ✓ Can understand the 2D sketcher commands and how to utilize them. ✓ Creation of 2D sketches. 	<ul style="list-style-type: none"> • Understanding various terminology in sketcher with mouse control, sketcher constrains to create geometric creation in sketcher like line, Extend to next, rectangle, hatch etc. • Generate fully defined sketch with the aid of various constrain, like connect, horizontal /vertical, Tangent, symmetric, collinear, symmetric axis, relationship etc. 	15	15
4	Unit IV: Creation/editing of curves	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to use the commands effectively. ✓ Can use advanced editing and construction techniques. ✓ Understand the 2D sketcher commands and how to utilize them. ✓ Creation of 2D sketcher drafting. 	<ul style="list-style-type: none"> • Understanding various terminology in sketcher with mouse control, sketcher constrains to create geometric creation in sketcher like curve, point, arc by centre point, arc by start centre end, arc by start centre angle, arc by start centre length, arc by start end angle, arc by start end direction, arc by start end radius, arc by centre start end, arc by centre start angle, arc by centre start length, arc by continuous, fillet, chamfer, circle by centre point, circle by 3 point, circle by radius, circle by 2 point, circle by 3 point, circle by tan radius, circle by tan, ellipse by centre, ellipse by axis end, elliptical arc.. 	15	20

5	Unit V: Creation/editing of subjects	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to use the commands effectively. ✓ Use advanced editing and construction techniques followed in AutoCAD ✓ Understanding the 2D sketcher commands and how to utilize them. ✓ Creation of 2D sketches. 	<ul style="list-style-type: none"> • Principle of orthographic views of objects: front, top, left side, right side views • Concept of drawing to scale, dimensioning and text, tolerance, to modify dimension and tolerance. • Generate fully defined sketch with the aid of various constrain, like connect, horizontal /vertical, Tangent, symmetric, collinear, symmetric axis, relationship etc. 	15	50
Review & class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: IV
Course Title	:COMPUTER AIDED DESIGN & DRAWING-I (THEORY &PRACTICE)
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
05	--	--	03	70	--	30	--	100

Rationale:

This Subject describes the scientific facts, concepts, principles and procedures of Computer Aided Design & Drafting used in Tool Design, Manufacturing and Quality Control including Supervisory Management to express the ideas, convey instructions for carrying out jobs in Tool & Die Technology. It is also useful in understanding technology subjects such as Tool Design, Workshop Practice, CNC Technology, and Industrial Management.

It also described the concepts, principles and procedures of developing models and design using CAD Software.

Outcomes:

- Understanding the use of AUTOCAD for representation of drawing
- Understand various dimensioning types to sketch in Auto Cad.
- How to edit and customize the software.
- Modifying the features and make revision drawings with table formats and different texting styles.
- Importance of use of layer settings and its application.
- Preparing of 3D part modelling by using various commands
- Presenting the drawings in a detail and clear.

- Interpreting the drawings, drawing interferences and workout other technical details.

Theory:

Topic and Contents	Hours	Marks
<p>Topic 1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the functions in CAD section ✓ Use of computer and CAD software in area of design and drawing <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Review of computer fundamentals, instructions with respect to computer labs, file handling in windows operating system. • Concept of conventional design process, computer operation and control, CAD software used in tool room 	10	--
<p>Topic 2: Introduction of AutoCAD equipment</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the procedure to be adopted for computer aided drawings ✓ Describing the co-ordinate system. ✓ Using the AutoCAD workspace and user interface. ✓ Understand and reading of engineering drawing, industrial drawing, and technical terms used in drawing. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Basic knowledge of 2D & 3D design & drawing view in Auto-CAD. • Generating new file or open, save or rename and Exit a file. • Tools bar in AutoCAD, different command in AutoCAD, • Creating objects in AutoCAD • Tutorials in learning assistance, creating and editing objects <p>Using co-ordinate system to specify points, shifting and rotating co-ordinate system</p>	40	15

<p>Topic 3: Creation/editing of lines</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to use commands effectively. ✓ Use advanced editing and construction techniques. ✓ Can understand the 2D sketcher commands and how to utilize them. ✓ Creation of 2D sketches. <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Understanding various terminology in sketcher with mouse control, sketcher constrains to create geometric creation in sketcher like line, Extend to next, rectangle, hatch etc. <p>Generate fully defined sketch with the aid of various constrain, like connect, horizontal /vertical, Tangent, symmetric, collinear, symmetric axis, relationship etc.</p>	15	15
<p>Topic 4: Creation/editing of curves</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to use the commands effectively. ✓ Can use advanced editing and construction techniques. ✓ Understand the 2D sketcher commands and how to utilize them. ✓ Creation of 2D sketcher drafting. <p>Contents:</p> <p>4.1</p> <p>Understanding various terminology in sketcher with mouse control, sketcher constrains to create geometric creation in sketcher like curve, point, arc by centre point, arc by start centre end, arc by start centre angle, arc by start centre length, arc by start end angle, arc by start end direction, arc by start end radius, arc by centre start end, arc by centre start angle, arc by centre start length, arc by continuous, fillet, chamfer, circle by centre point, circle by 3 point, circle by radius, circle by 2 point, circle by 3 point, circle by tan radius, circle by tan, ellipse by centre, ellipse by axis end, elliptical arc..</p>	15	20
<p>Topic 5: Creation/editing of subjects</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to use the commands effectively. ✓ Use advanced editing and construction techniques followed in AutoCAD ✓ Understanding the 2D sketcher commands and how to utilize them. ✓ Creation of 2D sketches. <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Principle of orthographic views of objects: front, top, left side, right side views • Concept of drawing to scale, dimensioning and text, tolerance, to modify dimension and tolerance. 	15	50

Generate fully defined sketch with the aid of various constrain, like connect, horizontal /vertical, Tangent, symmetric, collinear, symmetric axis, relationship etc.		
Review and class test	5	
Total	100	100

Intellectual Skills:

- 1) read software manuals and process documents to understand the software and processes better
- 2) Draw basic level geometrical/ mechanical drawings and charts .

Motor Skills:

- 1) Visualize the final job product after understanding the given drawing/Sketches.
- 2) plan work assigned on a daily basis and provide design as required to the customer

Learning Resources:

101. Books:

AUTHOR	TITLE	PUBLISHER
Bowman & Bowman	Understanding CAD/CAM	BPB Publications B-14, Cannaught Place, New Delhi.
Oliver W. M.	Illustrated Auto Usp	BPB Publications B-14, Cannaught Place, New Delhi.
N.K. Bhagat ISBN-81-7029-712-9	Auto Usp and customization made simple	BPB Publications B-14, Cannaught Place, New Delhi.
George Omura	The ABC's of Auto Usp	BPB Publications B-14, Cannaught Place, New Delhi.

Head Georgeo	Auto Lisp in plain English	Galgotia Publications Pvt. Ltd.- 5, Ansari Raod, Darya Ganj, New Delhi.
Ibrahim Zeid ISBN-0-07-072857	CAD/CAM Theory & Practice	Tata McGraw – Hill Publishing Co. Ltd, S.P. Printers Noida.
Beall& Fulmer ISBN-81-7635-036-2	Auto CAD 14 Fundamentals	TechmediaMunish Plaza, 20 Ansari Road, Darya Ganj, New Delhi.
Toriya H. &Chiyokura H. ISBN-3-540-56507-8 ISBN-0-387-56507-8	3D CAD Principles and Applications	Springer-verlag Berlin-Heideberg, Germany.
S.A.R. Scrivener ISBN-0-08-0286011	Computer aided design and manufacture Slot of the art Report	PergomenInfotech Ltd., Maidenhead, Berkshire, England.
Auto Desk Inc. Manual	Auto CAD R-14, User Guide	Auto Desk.
CS. Krishnamoorthy& S. Rajeev ISBN-81-85198-39-x	Computer Aided Design - Software & Analytical Tools	Narosa Publishing House 6 Community Centre Park, New Delhi.
Auto Desk MDT Tutorials	MDT Release – 3 Tutorial	Auto Desk Inc.
Auto Desk CD-of Quick Tour & Learning assistance	Quick Tour & Learning Assistance CD	Auto Desk Inc CD's.

COURSE/MODULE TEMPLATE

SEMESTER:4

COURSE NAME:TOOL DESIGN PRACTICE (PLASTIC MOULD-I)

COURSE CODE:MSME/DTE/

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Understand different types of moulding methods.
✓ Understand about different types of plastic moulding and machines of it.
✓ Get knowledge about component of plastic mould.
✓ Understand design and design parameter for plastic mould.
✓ Understand parameter require to design for different plastic material.

THEORY HOURS:NA

PRACTICAL HOURS:100hrs

THEORY MARKS:NA

PRACTICAL MARKS:150

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Elements of design process	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of plastic materials and its properties. ✓ Understand classification of plastic. ✓ Get knowledge about concept of mould. ✓ Application of mould. 	<ul style="list-style-type: none"> • Introduction basic knowledge of mass production of moulded of plastic component, application of plastic, classification of plastic material, and application of moulding machine and equipment, concept of mould material, application of mould. 	10	15
2	Unit II: Moulding	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able tounderstand different types of plastic mould. ✓ Understand different component use in mould. 	<ul style="list-style-type: none"> • Identify and obtain the injection moulding elements and their function like core and cavity, classification of core. • Function of core, cavity, principle of core cavity, material used for core cavity. 	20	30

	parts	<ul style="list-style-type: none"> ✓ To get knowledge about different material use different component. ✓ Understanding the functions and applications of different component of mould. ✓ Understand cooling system in mould and its need in plastic mould. 	<ul style="list-style-type: none"> • Understanding the function of feeding system by classified feeding system like runner, spruegate, gate etc, and their function and which material used for this system. • Establish and importance of cooling system. In detail like types of cooling system, baffle cooling system, angle hole cooling system, bubbler cooling system and their function. • Understanding of ejection system, various types of ejection system like pin ejection system, stripper ejection system, air ejection system, blade ejection system, D-shape ejection system and knowledge of understanding procedure of ejection system. 		
3	Unit III: Components & layout	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the component drawing ✓ Runner and gating system layout ✓ Cooling/heating layout 	<ul style="list-style-type: none"> • Concept and principle of shrinkage, allowances. • Classification of feed system, runner & gate. • Principle of layout of cavities, feed system, layout of runner and gating system • Concept of mould construction, cooling/heating layout 	12	15
4	Unit IV: Work/data sheet	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand how to calculate the design parameters with respect to mould, material and machine ✓ Preparation of work/data sheet for mould, material and machine 	<ul style="list-style-type: none"> • Classification of design parameters with respect to mould, material and machine. • Classification of design parameters according to the mould operation. • Concepts of mould, plastics materials specification, • Estimation of material, machining hours and process parameters, data sheet formats 	8	10
5	Unit V: Conceptual design	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand design parameter which require for design of mould. ✓ Understand different designs for different types of mould. ✓ Get knowledge about selection of material for all parts. ✓ Understand process of manufacturing of each parts. ✓ Finding the cost of manufacturing. 	<ul style="list-style-type: none"> • Understanding of design parameters like properties of plastic material, • Quality and quantity of plastic material and describe design parameter of mould 	25	35

		✓ Perfect design of plastic mould.			
6	Unit VI: Design of moulds	✓ At the end of this unit Student should be able to understand how to assemble the parts by detailed drawings for manufacturing of mould	<ul style="list-style-type: none"> • Concept of use of design data sheet. concept of drawing & layout for assembly & details • Drawing the mould layout, drawing norms & practices • Drawing assembly and detailed drawings of mould 	10	25
7	Unit VII: Mould data	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the bill of material and its use ✓ Mould data in the production of component 	<ul style="list-style-type: none"> • Principle of bill of material, selection of material, standard parts material for processing. • Concept of machine set-up, processing parameter 	5	10
8	Unit VIII: CAD	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand software packages and application ✓ CAD software for mould design 	<ul style="list-style-type: none"> • Concept of software packages. • Classification of software packages. • Concept of 3D model, data book, and software packages. 	5	10
Review & class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: IV
Course Title	:TOOL DESIGN PRACTICE (PLASTIC MOULD-I)
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme					Examination Scheme			
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	05	05	--	70	30	50	150

Rationale:

This Subject is intended to the facts, concepts, principles and procedures of tool design techniques so that this knowledge can be used in Tool Design Practice effectively and efficiently. It is also useful in understanding technology subjects and applies them in the area such as Workshop practice, CAD/CAM, Production Planning, Estimation, Industrial Management and Quality Assurance.

Outcomes:

- Understand different types of moulding methods.
- Understand about different types of plastic moulding and machines of it.
- Get knowledge about component of plastic mould.
- Understand design and design parameter for plastic mould.
- Understand parameter require to design for different plastic material.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Elements of design process</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of plastic materials and its properties. ✓ Understand classification of plastic. ✓ Get knowledge about concept of mould. ✓ Application of mould. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Introduction basic knowledge of mass production of moulded of plastic component, application of plastic, classification of plastic material, and application of moulding machine and equipment, concept of mould material, application of mould 	10	15
<p>Topic 2: Moulding parts</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of plastic mould. ✓ Understand different component use in mould. ✓ To get knowledge about different material use different component. ✓ Understanding the functions and applications of different component of mould. ✓ Understand cooling system in mould and its need in plastic mould. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Identify and obtain the injection moulding elements and their function like core and cavity, classification of core. • Function of core, cavity, principle of core cavity, material used for core cavity. • Understanding the function of feeding system by classified feeding system like runner, spruegate, gate etc., and their function and which material used for this system. • Establish and importance of cooling system. In detail like types of cooling system, baffle cooling system, angle hole cooling system, bubbler cooling system and their function. <p>Understanding of ejection system, various types of ejection system like pin ejection system, stripper ejection system, air ejection system, blade ejection system, D-shape ejection system and knowledge of understanding procedure of ejection system.</p>	20	30
<p>Topic 3: Components & layout</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the component drawing ✓ Runner and gating system layout ✓ Cooling/heating layout <p>Contents:</p> <p>3.1</p>	12	15

<ul style="list-style-type: none"> • Concept and principle of shrinkage, allowances. • Classification of feed system, runner & gate. • Principle of layout of cavities, feed system, layout of runner and gating system <p>Concept of mould construction, cooling/heating layout</p>		
<p>Topic 4: Work/data sheet</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand how to calculate the design parameters with respect to mould, material and machine ✓ Preparation of work/data sheet for mould, material and machine <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Classification of design parameters with respect to mould, material and machine. • Classification of design parameters according to the mould operation. • Concepts of mould, plastics materials specification, <p>Estimation of material, machining hours and process parameters, data sheet formats</p>	8	10
<p>Topic 5: Conceptual design</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand design parameter which require for design of mould. ✓ Understand different designs for different types of mould. ✓ Get knowledge about selection of material for all parts. ✓ Understand process of manufacturing of each parts. ✓ Finding the cost of manufacturing. ✓ Perfect design of plastic mould. <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Understanding of design parameters like properties of plastic material, • Quality and quantity of plastic material and describe design parameter of mould 	25	35

<p>Topic 6: Design of moulds</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand how to assemble the parts by detailed drawings for manufacturing of mould <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Concept of use of design data sheet. concept of drawing & layout for assembly & details • Drawing the mould layout, drawing norms & practices <p>Drawing assembly and detailed drawings of mould</p>	10	25
<p>Topic 7: Mould data</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the bill of material and its use ✓ Mould data in the production of component <p>Contents:</p> <p>7.1</p> <ul style="list-style-type: none"> • Principle of bill of material, selection of material, standard parts material for processing. <p>Concept of machine set-up, processing parameter</p>	5	10
<p>Topic 8: CAD</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to Understand software packages and application ✓ CAD software for mould design <p>Contents:</p> <p>8.1</p> <ul style="list-style-type: none"> • Concept of software packages. • Classification of software packages. <p>Concept of 3D model, data book, and software packages.</p>	5	10
<p>Review and class test</p>	5	
Total	100	100

Intellectual Skills:

- 1) Understand different types of moulding methods.
- 2) Understand about different types of plastic moulding and machines of it.
- 3) Get knowledge about component of plastic mould

Motor Skills:

- 1) Understand design and design parameter for plastic mould.
- 2) Understand parameter require to design for different plastic material

Learning Resources:

105. Books:

AUTHOR	TITLE	PUBLISHER
Dominick V. Rosato& Donald V. Rosato	Injection Moulding Handbook	CBS Publishers & Distributers, New Delhi
A.S. Athalye	Plastic Materials Handbook Vol. I & II	Multi – Tech Publishing Co. Mumbai.
A.S. Athalye	Moulding of Plastics	Multi – Tech Publishing Co. Mumbai.
A.S. Athalye	Injection Moulding	Multi – Tech Publishing Co. Mumbai.
Chandra & Mishra	Rubber & Plastic Technology	CBS Publishers & Distributers, New Delhi
Tetco Visual aids	Transparencies on Dies and Moulds Ref. No. 1084-Part A No of Transparencies-29 Ref. No. 1085-Part B No of Transparencies-30	The Education and Training Consultants, Banglore. (Tetco Visual aids)
R.W.G.PYE	Injection Mould Design	Longman scientific & technical copublished in the United states

COURSE/MODULE TEMPLATE

SEMESTER:4

COURSE NAME:TOOL DESIGN PRACTICE (PRESS TOOL-II)

COURSE CODE:MSME/DTE/

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Get knowledge about component of press tool and draw press tools for a given component.
✓ Understand design and design parameter for sheet material
✓ Use of CAD/CAM to produce press tools for emerging needs of sheet material components

THEORY HOURS:NA

PRACTICAL HOURS:100hrs

THEORY MARKS:NA

PRACTICAL MARKS:150

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Components & layout	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand component drawing ✓ Can find the Strip layout ✓ Can calculate the Blank area required as per its application 	<ul style="list-style-type: none"> • Concept and classification of strip layouts. • Principle of grain direction, burr side, material utilization, productivity • Concept of blank development, allowance 	10	20
2	Unit II: Work/data sheet	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand design parameters ✓ Process sheet and work sheet for optimum press tool design and try-out 	<ul style="list-style-type: none"> • Classification of design parameters with respect to tool, material, press and operation • Component geometry, dimensional tolerances, quality and quantity requirement. • Concept of process sheet, work sheet • Principle of sheet material, press tool and press. 	15	20
3	Unit III:	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand conceptual design and its application. 	<ul style="list-style-type: none"> • Principle of conceptual design, developing alternative, selecting optional design • Evaluate and compare alternative conceptual 	25	40

	Conceptual design		design		
4	Unit IV: Design of press tool	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand assembly & detailed drawings for manufacturing of press tool. 	<ul style="list-style-type: none"> • Concept of use of design data sheet. concept of drawing & layout for assembly & details • Drawing of drawing of press tool layout, drawing norms & practices • Draw assembly and detailed drawings of press tool Draw blank development, design and draw strip layout 	30	45
5	Unit V: Press tool data	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand bill of material and use tool data in the production of component 	<ul style="list-style-type: none"> • Principle of bill of material, selection of material, standard parts material for processing. • Concept of tool data, tool material selection, processing parameter, handling and storage 	10	15
6	Unit VI: CAD	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand software packages and application CAD software for mould design 	<ul style="list-style-type: none"> • Concept of software packages. • Classification of software packages. • Concept of 3D model, data book, and software packages. 	5	10
Review & class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: IV
Course Title	:TOOL DESIGN PRACTICE (PRESS TOOL-II)
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
--	--	05	05	--	70	30	50	150

Rationale:

Understand the facts, concepts, principles, procedures of tool design techniques so that this knowledge can be used in Tool Design Practice effectively and efficiently. It is also useful in understanding technology subjects and applies them in the area such as Workshop practice, CAD/CAM, CAE, Production Planning, Estimation, Industrial Management and Quality Assurance.

Outcomes:

- Get knowledge about component of press tool and draw press tools for a given component.
- Understand design and design parameter for sheet material
- Use of CAD/CAM to produce press tools for emerging needs of sheet material components

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Components & layout</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand component drawing ✓ Can find the Strip layout ✓ Can calculate the Blank area required as per its application <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Concept and classification of strip layouts. • Principle of grain direction, burr side, material utilization, productivity • Concept of blank development, allowance 	10	20
<p>Topic 2: Work/data sheet</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand design parameters ✓ Process sheet and work sheet for optimum press tool design and try-out <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Classification of design parameters with respect to tool, material, press and operation • Component geometry, dimensional tolerances, quality and quantity requirement. • Concept of process sheet, work sheet <p>Principle of sheet material, press tool and press.</p>	15	20
<p>Topic 3: Conceptual design</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand conceptual design and its application. <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Principle of conceptual design, developing alternative, selecting optional design <p>Evaluate and compare alternative conceptual design</p>	25	40
<p>Topic 4: Design of press tool</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand assembly & detailed drawings for manufacturing of press tool. <p>Contents:</p>	30	45

<p>4.1</p> <ul style="list-style-type: none"> • Concept of use of design data sheet. concept of drawing & layout for assembly & details • Drawing of drawing of press tool layout, drawing norms & practices <p>Draw assembly and detailed drawings of press tool Draw blank development, design and draw strip layout</p>		
<p>Topic 5: Press tool data</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand bill of material and use ✓ tool data in the production of component <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Principle of bill of material, selection of material, standard parts material for processing. <p>Concept of tool data, tool material selection, processing parameter, handling and storage</p>	10	15
<p>Topic 6: CAD</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able toVunderstand software packages and application ✓ CAD software for mould design <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Concept of software packages. • Classification of software packages. • Concept of 3D model, data book, and software packages. 	5	10
Review and class test	5	
Total	100	150

Intellectual Skills:

- 1) Plan and organize the work order and jobs received from the Operator for mass production by using press tools

Motor Skills:

- 1) Can able to calculate the strip/sheet required for any type of component

- 2) Can able to design type of press tool required by studying the shape, size of the component.

Learning Resources:

109. Books:

AUTHOR	TITLE	PUBLISHER
D. Eugene Osterguard	Basic Die Making ISBN-07-046090-6	McGraw Hill Book CO.
Prakash H. Joshi	Press Tools Design & Construction ISBN-81-85814-46-5	Wheeler Publishing
American Society of Tool & Manufacturing Engineering(F.W. Wilson)	Fundamentals of Tool Design ISBN-0-87692-058-10	Prentice Hall of India Pvt. Ltd. New Delhi.
C. Donaldson, George H. Lecain V.C. Gold	Tool Design ISBN-0-07-099274-6	Tata McGraw Hill
NTTF	Theoretical Training Manual	NTTF – Bangalore
NTTF	Practical Training Manual	NTTF – Bangalore
CITD(ISTE)	Tool Engineering Parameters	CITD(ISTE) – Hyderabad
TETCOS	Transparencies	Education & Training Consultants, Bangalore
FIBRO	Standard Catalogues	--
Surrender Kumar & Umesh Chandra	Production Engineering Design	SatyaPrakashan New Delhi.
Donaldson	Fundamentals of Tool Design	Tata McGraw Hill

COURSE/MODULE TEMPLATE

SEMESTER:4

COURSE NAME:WORKSHOP PRACTICE-IV

COURSE CODE:MSME/DTE/

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Get knowledge about practical work in workshop.
✓ Get knowledge about different machine used in workshop like milling, turning, grinding, etc.
✓ Find out different problems during manufacturing of different parts and using different machine.
✓ manufacturing of jigs and fixture and its different parts

THEORY HOURS:NA PRACTICAL HOURS:600hrs THEORY MARKS:NA PRACTICAL MARKS:400

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Workshop	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of machining process. ✓ Understand different machines used for different parts 	<ul style="list-style-type: none"> ✓ Manufacturing of jigs and fixture ✓ CNC milling programming and handling ✓ CNC turning programming and handling ✓ Wire cut CN milling programming and handling the machine. ✓ CNC EDM programming and handling programming and simulation on software. 	580	400
Review & class test				20	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: IV
Course Title	:WORKSHOP PRACTICE-IV
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme					Examination Scheme			
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	30	08	--	200	--	200	400

Rationale:

At the end of semester the trainees will be able to produce useful items by acquiring hand skill and selected machining skill in basic metal working and machine tool operations and by combining them with both knowledge of IGTR-Ahmedabad training organization and safety regulations .The trainees also manufacture machine accessories and standard parts by integrating hand skill and machine tool operation skill.

Outcomes:

- Get knowledge about practical work in workshop.
- Get knowledge about different machine used in workshop like milling, turning, grinding, etc.
- Find out different problems during manufacturing of different parts and using different machine.

Theory:

Topic and Contents	Hours	Marks
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Topic 1: Workshop practice	580	400
Objectives: <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand different types of machining process. ✓ Understand different machines used for different parts Contents: <p>1.1</p> <ul style="list-style-type: none"> • Manufacturing of jigs and fixture • CNC milling programming and handling • CNC turning programming and handling • Wire cut CN milling programming and handling the machine. • CNC EDM programming and handling • Programming and simulation on software. 		
Review and class test	20	
Total	600	400

Intellectual Skills:

- 1) understand different types of machining process and different machines
- 2) problem finding & solving during production, design, assembly and trial

Motor Skills:

- 1)Able to make assembly properly
- 2)Knowledge about the machine and tools used for manufacturing.

Learning Resources:

113. Books:

AUTHOR	TITLE	PUBLISHER
Chapman A.J.	Workshop Technology (Vol. I,II & III)	New Delhi: Amol Publication
Hazra S.K. &Chaoudhary S.K.	Elements of Workshop Technology	Metropolitan Publishers, Bombay.
Raghuwanshi B.S. & Others	Workshop Technology	New Heights, New Delhi.
Gupta K.N. &Kaushish J.P.	Workshop Technology Vol. I to II.	New Heights, New Delhi.
Atherton W.H.	Workshop Practice Vol. I to V	New Era Publishers, London.
Gerling	All about Machine tools	WILSEY EASTERN, Delhi.

B. Kishore	Tool & Die Maker	Saurabh& Co.
Hermann Jutz Edward Scharkus	Westermann Tables	WILSEY EASTERN, Delhi.

COURSE/MODULE TEMPLATE

SEMESTER:5

COURSE NAME:ENTREPRENEURSHIP DEVELOPMENT

COURSE CODE:MSME/DTE/

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Understand Concept of Entrepreneurship Development.
✓ Understand about Product & service design.
✓ Get knowledge about Evaluation & quality control Risk management
✓ Understand SSI and its promotional agencies

THEORY HOURS:50hrs

PRACTICAL HOURS:NA

THEORY MARKS:100

PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Introduction	✓ At the end of this unit Student should be able to know what is Entrepreneur - ship Development	<ul style="list-style-type: none"> • Introduction basic knowledge andConcept of Entrepreneurship Development 	1	5
2	Unit II: Information gathering for	✓ At the end of this unit Student should be able to understand the Concept of entrepreneurship	<ul style="list-style-type: none"> • Understanding the entrepreneur opportunity & innovation • The information sources for business opportunity • Information gathering techniques 	4	5

	identification of opportunity				
3	Unit III: Product & service design	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about the industrial survey 	<ul style="list-style-type: none"> • Specification industrial survey • Principle of market surveys • Analysis of survey data 	4	10
4	Unit IV: Project & formulation for establishing own business	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about the project format ✓ Estimation of resource 	<ul style="list-style-type: none"> • Brief System concept & project format based on job design for manufacturing product or creating service capabilities • Estimation of resource required for establishing the enterprise or starting business. 	6	15
5	Unit V: Managing critical resources	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand how to manage the resource availability 	<ul style="list-style-type: none"> • Understanding of design parameters like properties • Managing finance Terminology in finance management concept of balance sheet and fund flow statement managing working capital its importance • Source of finance • Types of advantages cost managing human resource 	8	20
6	Unit VI: Acquisition of resources required for starting business	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the concept of quality resource 	<ul style="list-style-type: none"> • The Concept of quality resource preparation of specification & identification of specific need of physical resource • Approach for the resources 	4	10
7	Unit VII:	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the concept of 	<ul style="list-style-type: none"> • The concept of managing enterprise • Production & scale of product 	2	5

	Establishing the running enterprise	<p>enterprise</p> <p>✓ How to establish and manage the enterprise to run</p>			
8	Unit VIII: Evaluation & quality control	<p>✓ At the end of this unit Student should be able to understand how to follow the Steps for quality control</p>	<ul style="list-style-type: none"> • Concept of evolution & quality control • Principle of evolution & quality control 	4	10
9	Unit IX: Assignment to each trained student as project report	<p>✓ At the end of this unit Student should be able to understand how to prepare project</p>	<ul style="list-style-type: none"> • Prepare a Project report for setting up a small industries mentioning all essential input and outputs in and to obtain registration as small scale industry 	2	5
10	Unit X: Risk management	<p>✓ At the end of this unit Student should be able to understand what is Risk management and its importance</p>	<ul style="list-style-type: none"> • Introduction of risk management • Concept of risk management simulation concept and application of seucitivity analysis 	4	10
11	Unit XI: Case studies	<p>✓ At the end of this unit Student should be able to understand the different case studies and their solution</p>	<ul style="list-style-type: none"> • Case studies of successful entrepreneur, important feature success analyzing, success criteria. • Case studies of failed entrepreneur importance change failure criteria suggest steps. 	4	10
12	Unit XII: SSI and its promotional agencies	<p>✓ At the end of this unit Student should be able to understand SSI agencies in details</p>	<ul style="list-style-type: none"> • Definition of SSI government policy, • annulling need and importance, promotional agencies 	4	5
Review & class test				3	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: V
Course Title	:ENTREPRENEURSHIP DEVELOPMENT
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
2.5	--	--	03	70	--	30	--	100

Rationale:

Entrepreneurship Development is a human science subject intended to make students aware about importance of entrepreneurship and to teach the basic concepts, principles and procedures related to the entrepreneurship development. The students are exposed to real life problems related to an entrepreneurship or business by case study and visits to the industrial establishments of similar nature.

Outcomes:

- Understand Concept of Entrepreneurship Development.
- Understand about Product & service design.
- Get knowledge about Evaluation & quality control Risk management
- Understand SSI and its promotional agencies

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to know what is Entrepreneur - ship Development <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Introduction basic knowledge and Concept of Entrepreneurship Development 	1	5
<p>Topic 2: Information gathering for identification of opportunity</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Concept of entrepreneurship <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Understanding the entrepreneur opportunity & innovation • The information sources for business opportunity Information gathering techniques 	4	5
<p>Topic 3: Product & service design</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about the industrial survey <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Specification industrial survey • Principle of market surveys • Analysis of survey data 	4	10
<p>Topic 4: Project & formulation for establishing own business</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about the project format ✓ Estimation of resource <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Brief System concept & project format based on job design for manufacturing product or creating service capabilities • Estimation of resource required for establishing the enterprise or starting business. 	6	15

<p>Topic 5: Managing critical resources</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand how to manage the resource availability <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Understanding of design parameters like properties • Managing finance Terminology in finance management concept of balance sheet and fund flow statement managing working capital its importance • Source of finance • Types of advantages cost managing human resource 	8	20
<p>Topic 6: Acquisition of resources required for stating business</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the concept of quality resource <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • The Concept of quality resource preparation of specification & identification of specific need of physical resource • Approach for the resources 	4	10
<p>Topic 7: Establishing running the enterprise</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the concept of enterprise ✓ How to establish and manage the enterprise to run <p>Contents:</p> <p>7.1</p> <ul style="list-style-type: none"> • The concept of managing enterprise • Production & scale of product 	2	5
<p>Topic 8: Evaluation & quality control</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand how to follow the Steps for quality control <p>Contents:</p> <p>8.1</p> <ul style="list-style-type: none"> • Concept of evolution & quality control • Principle of evolution & quality control 	4	10

<p>Topic 9: Assignment to each trained student as project report</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand how to prepare project <p>Contents:</p> <p>9.1</p> <ul style="list-style-type: none"> • Prepare a Project report for setting up a small industries mentioning all essential input and outputs in and to obtain registration as small scale industry 	2	5
<p>Topic 10: Risk management</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand what is Risk management and its importance <p>Contents:</p> <p>10.1</p> <ul style="list-style-type: none"> • Introduction of risk management • Concept of risk management simulation • concept and application of seucitivity analysis 	4	10
<p>Topic 11: Case studies</p> <p>Objectives:</p> <p>At the end of this unit Student should be able to understand the different case studies and their solution</p> <p>Contents:</p> <p>11.1</p> <ul style="list-style-type: none"> • Case studies of successful entrepreneur, important feature success analyzing, success criteria. • Case studies of failed entrepreneur importance change failure criteria suggest steps. 	4	10
<p>Topic 12: SSI and its promotional agencies</p> <p>Objectives:</p> <p>At the end of this unit Student should be able to understand SSI agencies in details</p> <p>Contents:</p> <p>12.1</p> <ul style="list-style-type: none"> • Definition of SSI government policy, annulling need and importance, promotional agencies 	4	5
<p>Review and class test</p>	3	
Total	50	100

Intellectual Skills:

- 1) Gain information & documents required to setup an enterprise.
- 2) Get knowledge & be capable of developing and managing the status of an entrepreneur & an enterprise.

Motor Skills:

- 1) How to develop and manage an enterprise
- 2) Essentials required for establishing/running an enterprise.

Learning Resources:

117. Books:

AUTHOR	TITLE	PUBLISHER
O.P. Khanna	Industrial Engineering & Management	Dhanpatrai Publication Pvt. Ltd, New Delhi.
T.R. Bunga N.K. Agrawal S.C. Sharma	Industrial Engineering & Management Science	Khanna Publishers, New Delhi.
Learning Resources Development Center	Industrial Management	Department of Technical Education, Ahmedabad.
TTTI Bhopal	Industrial Management	TTTI Bhopal
National Productivity Council	Management Guide Series 1 to 26	National Productivity Council Utpadakta Bhawan, Lodi Road, New Delhi 110003
Kiyoshi Suzuki	The new shop floor management	The Free Press

COURSE/MODULE TEMPLATE

SEMESTER:5

COURSE NAME:CONTROL TECHNOLOGY

COURSE CODE:MSME/DTE/

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Understand Concepts, principles of control technology to use in tool design.
✓ To acquire the skills in building up of simple circuits and troubleshooting.
✓ Applying the technology of low cost automation to reducing cost of the product by increasing productivity.

THEORY HOURS:60hrs PRACTICAL HOURS:NA THEORY MARKS:100 PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Introduction	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the overview of control technology and its application. 	<ul style="list-style-type: none"> • Concept of control technology system in tool engineering, jigs & fixtures, plastic moulds, die casting dies & forging dies • Machine tools • Concept and working of control technology system, block diagram of basic control technology system. 	5	10
2	Unit II: Fundamental principle	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand properties of air and its application ✓ Properties of fluid and its application 	<ul style="list-style-type: none"> • Concept of pressure, pressure head, pressure drop, force, power, work, flow through pipes, expansion and compression of gases, gas laws. • Charle's & Boyle's pressure laws, general gas equation • Concept of density, specific volume, specific weight, specific gravity, viscosity, compressibility, surfacetension, effect of temperature on viscosity. 	10	25

			<ul style="list-style-type: none"> types of fluid flow Pascal's law 		
3	Unit III: Energy supply elements	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand energy supply elements related to pneumatics and their application ✓ Energy supply element related to hydraulics and its application. 	<ul style="list-style-type: none"> Concept of air compressors, air filters, air lubricators, air regulators, air dryers. Structure and single flow of pneumatic system. Air generation and distribution system. Concept of hydraulic pumps, drive system, filter & reservoir, cooler, heater, oil level gauge, temperature gauge. 	15	25
4	Unit IV: Valves	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand directional control valves and pressure control valves ✓ Non-return valve, flow control valve, two pressure valve, shuttle valve, quick exhaust valve, combination valve 	<ul style="list-style-type: none"> ISO symbol designation, Function of direct control valves, pressure control valve, types of control valves Function of non-return valve, flow control valve, two pressure valve, shuttle valve, quick exhaust valve, combination valve 	15	15
5	Unit V: Output elements	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand types of actuators linear, rotary and application 	<ul style="list-style-type: none"> Concept of actuator, types of actuators and output elements. linear motion actuators, rotary motion actuators 	5	10
6	Unit VI: Circuit design and application	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand basic circuit design and application 	<ul style="list-style-type: none"> Concept and control system, circuit design and diagram Selection of suitable cylinder or motor, suitable valves, suitable energy supply elements 	7	15
Review & class test				3	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: V
Course Title	:CONTROL TECHNOLOGY
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
03	--	--	03	70	--	30	--	100

Rationale:

Understand the scientific facts, concepts, principles and procedures of control technology used in tool design, advanced m/c tool tech. , CNC tech. so, that to apply in w/s practice , design of tools. To acquire the skills in building up the simple circuits and troubleshooting, so that to apply in m/c tool application, maintenance. By applying the tech. of low cost automation to reduce cost of the product by increasing the productivity, quality and safety.

Outcomes:

- Understand Concepts, principles of control technology to use in tool design.
- To acquire the skills in building up of simple circuits and troubleshooting.
- Applying the technology of low cost automation to reducing cost of the product by increasing productivity.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none"> • At the end of this unit Student should be able to understand the overview of control technology and its application <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Concept of control technology system in tool engineering, jigs & fixtures, plastic moulds, die casting dies & forging dies • Machine tools • Concept and working of control technology system, block diagram of basic control technology system. 	5	10
<p>Topic 2: Fundamental principle</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand properties of air and its application ✓ Properties of fluid and its application ✓ <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Concept of pressure, pressure head, pressure drop, force, power, work, flow through pipes, expansion and compression of gases, gas laws. • Charles's & Boyle's pressure laws, general gas equation • Concept of density, specific volume, specific weight, specific gravity, viscosity, compressibility, surface tension, effect of temperature on viscosity. • types of fluid flow Pascal's law 	10	25
<p>Topic 3: Energy supply elements</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand energy supply elements related to pneumatics and their application ✓ Energy supply element related to hydraulics and its application. <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Concept of air compressors, air filters, air lubricators, air regulators, air dryers. • Structure and single flow of pneumatic system. • Air generation and distribution system. • Concept of hydraulic pumps, drive system, filter & reservoir, cooler, heater, oil level gauge, temperature gauge. 	15	25

<p>Topic 4: Valves</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand directional control valves and pressure control valves ✓ Non-return valve, flow control valve, two pressure valve, shuttle valve, quick exhaust valve, combination valve <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • ISO symbol designation, • Function of direct control valves, pressure control valve, types of control valves • Function of non-return valve, flow control valve, two pressure valve, shuttle valve, quick exhaust valve, combination valve 	15	15
<p>Topic 5: Output elements</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to ✓ understand types of actuators linear, rotary and application <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Concept of actuator, types of actuators and output elements. linear motion actuators, rotary motion actuators 	5	10
<p>Topic 6: Circuit design and application</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand basic circuit design and application ✓ <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Concept and control system, circuit design and diagram • Selection of suitable cylinder or motor, suitable valves, suitable energy supply elements 	7	15
<p>Review and class test</p>	3	
Total	60	100

Intellectual Skills:

- 1) Understand Concepts, principles of control technology to use in tool design.
- 2) To acquire the skills in building up of simple circuits and troubleshooting.

Motor Skills:

- 1) Applying the technology of low cost automation to reducing cost of the product by increasing productivity.

Learning Resources:

Books:

AUTHOR	TITLE	PUBLISHER
P.Croser	Pneumatics (Festo),Basic level T P 101,Text Book	Festo Didactic Germany
D.Merkle	Hydraulics (Festo),Basic level T P 501,Text Book	Festo Didactic Germany
S.R.Majumdar	Pneumatics system	Tata McGraw Hills Pub.Co.Ltd.,New Delhi.
W.Bolten	Pneumatics and Hydraulics system	Butter Worth, Heinemann, Great Britain
Chris Stacey	Practical Pneumatics	DilysAlam, Great Britain
D.Waller&H.Werner	Pneumatics (Festo),Basic level T P 101,Work Book	Festo Germany
N.Reulecke&M.Schwart	Hydraulics (Festo),Basic level T P 501,Work Book	Festo Germany
Video Cassette	Pneumatics Basic level	Festo Germany
Video Cassette	Hydraulics Basic level	Festo Germany
CD-Fluid Sim-P	Pneumatics Simulation program	Festo Germany
CD-Fluid Sim-H	Hydraulics Simulation program	Festo Germany

COURSE/MODULE TEMPLATE

SEMESTER:5

COURSE NAME:PRODUCTION, PLANNING AND CONTROL, ESTIMATION & COSTING

COURSE CODE:MSME/IGTRAHD/DTE/01

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Understand Concepts, principles and procedure of production, planning and cost estimation.
✓ To acquire in learning the process, planning, production control and elements of cost structure.

THEORY HOURS:60hrs

PRACTICAL HOURS:NA

THEORY MARKS:100

PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Introduction	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand production and its methods ✓ Productivity and its influence in industry. 	<ul style="list-style-type: none"> • Concept of production system, inputs, manufacturing process, output • Job production, batch production and mass production • Concept of productivity, productivity improvement, factors influencing productivity. 	5	10
2	Unit II: Production planning	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand stores and inventory control ✓ Material planning ✓ Process planning 	<ul style="list-style-type: none"> • Concept of storing, centralize and decentralize store, economical order quantity, ABC analysis, inventory control with respect to cost reduction. • Concept of material planning, master schedule, bill of material. • concept of inventory. 	15	20
3	Unit III: Production	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand routing and scheduling phases of production 	<ul style="list-style-type: none"> • Concept of routing, scheduling, critical ratio scheduling, • Production control 	10	25

	control	<p>control</p> <ul style="list-style-type: none"> ✓ Loading , dispatching and follow-up 	<ul style="list-style-type: none"> • concept of charts • Concept of loading, dispatching & follow up, job cards, progress card, auditing, value analysis. 		
4	Unit IV: Elements of cost	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand cost structure and break even analysis ✓ Overhead and depreciation 	<ul style="list-style-type: none"> • Concept of cost, fixed cost, variable cost, labour cost, material cost, prime cost, factory cost. • Concept of breakeven analysis, graphical representation. • Concept of overheads, sinking fund method, depreciation, straight line method. 	10	20
5	Unit V: Cost estimation	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand components of job estimation ✓ Estimating procedure and estimation of cost of component 	<ul style="list-style-type: none"> • Concept of estimate and cost, pricing, profit and loss. • Proper selection of machines and other resources, cost comparison. • Concept of reading drawings, manufacturing procedure, time estimation. concept of material cost, overhead cost • Raw material estimation, overhead expenses. 	10	15
6	Unit VI: Profit & budget	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand profit and loss and its importance 	<ul style="list-style-type: none"> • Concept of profit and loss 	5	10
Review & class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: V
Course Title	: PRODUCTION, PLANNING AND CONTROL, ESTIMATION & COSTING
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	--	03	70	--	30	--	100

Rationale:

Understand the scientific facts, concepts, principles and procedures of production, planning and cost estimation. The knowledge is acquired in learning the process planning, production control, and elements of cost structure. The knowledge and skill is useful in designing tools and dies, production process, w/s tech., w/s practice and industrial management.

Outcomes:

- Understand Concepts, principles and procedure of production, planning and cost estimation.
- To acquire in learning the process, planning, production control and elements of cost structure.

Theory:

Topic and Contents	Hours	Marks

<p>Topic 1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand production and its methods ✓ Productivity and its influence in industry. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> ✓ Concept of production system, inputs, manufacturing process, output ✓ Job production, batch production and mass production ✓ Concept of productivity, productivity improvement, factors influencing productivity. 	5	10
<p>Topic 2: Production planning</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand stores and inventory control ✓ Material planning ✓ Process planning <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Concept of storing, centralize and decentralize store, economical order quantity, ABC analysis, inventory control with respect to cost reduction. • Concept of material planning, master schedule, bill of material. • concept of inventory. 	15	20
<p>Topic 3: Production control</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand routing and scheduling phases of production control ✓ Loading , dispatching and follow-up <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Concept of routing, scheduling, critical ratio scheduling, • Production control • concept of charts • Concept of loading, dispatching & follow up, job cards, progress card, auditing, value analysis. 	10	25
<p>Topic 4: Elements of cost</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand cost structure and break even analysis ✓ Overhead and depreciation <p>Contents:</p>	10	20

<p>4.1</p> <ul style="list-style-type: none"> • Concept of cost, fixed cost, variable cost, labour cost, material cost, prime cost, factory cost. • Concept of breakeven analysis, graphical representation. • Concept of overheads, sinking fund method. 		
<p>Topic 5: Cost estimation</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand components of job estimation ✓ Estimating procedure and estimation of cost of component <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Concept of estimate and cost, pricing, profit and loss. • Proper selection of machines and other resources, cost comparison. • Concept of reading drawings, manufacturing procedure, time estimation. concept of material cost, overhead cost • Raw material estimation, overhead expenses. 	10	15
<p>Topic 6: Profit & budget</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand profit and loss and its importance <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Concept of profit and loss 	5	10
Review and class test	5	
Total	60	100

Intellectual Skills:

- 1) Understand Concepts, principles and procedure of production, planning and cost estimation.
- 2) To acquire in learning the process, planning, production control and elements of cost structure.

Motor Skills:

- 1) The knowledge is acquired in learning the process planning, production control, and elements of cost structure.
- 2) The knowledge and skill is useful in designing tools and dies, production process, w/s tech., w/s practice and industrial management.

Learning Resources:**124. Books:**

AUTHOR	TITLE	PUBLISHER
M.Adithan&B.S.Pabla	Production Engineering, Estimation and Costing	Konark publishers, New Delhi
T.R.Bangra, N.K.Agarwal&S.C.Sharma	Industrial Engineering & Management Science	Khanna publishers, New Delhi
Rory Burke	Project Management	John Wiley & sons Ltd.
O.P.Khanna	Industrial Engineering & Management	DhanpatRai publishers, New Delhi
T.R.Bangra&S.C.Sharma	Industrial Organisation &Engineering Economics	Khanna publishers, New Delhi
National productivity council	Management Guide Series 1 to 26	National productivity council, UtpadaktaBhavan, Lodi Road, New Delhi.

COURSE/MODULE TEMPLATE

SEMESTER:5

COURSE NAME:TOOL DESIGN PRACTICE (PLASTIC MOULD-II)

COURSE CODE:MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understand different types of moulding methods.
✓ Understand about different types of plastic moulding and machines of it.
✓ Get knowledge about component of plastic mould.

THEORY HOURS:NA PRACTICAL HOURS:100hrs THEORY MARKS:NA PRACTICAL MARKS:150

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Components & layout	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the component drawing ✓ Runner and gating system layout ✓ Cooling/heating layout 	<ul style="list-style-type: none"> • Concept and principle of shrinkage, allowances. • Classification of feed system, runner & gate. • Principle of layout of cavities, feed system, layout of runner and gating system • Concept of mould construction, cooling/heating layout 	10	20
2	Unit II: Work/data sheet	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand calculate design parameters with respect to mould, material and machine ✓ Preparation of work/data sheet for mould, 	<ul style="list-style-type: none"> • Classification of design parameters with respect to mould, material and machine. • Classification of design parameters according to the mould operation. • Concepts of mould, plastics materials specification, estimation of material, machining hours and 	15	20

		material and machine	process parameters, data sheet formats		
3	Unit III: Conceptual design	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to Understand design parameter which require for design of mould. ✓ Understanding the different design for different types of mould. ✓ Getting knowledge about the selection of material for all parts. ✓ Understanding the process of manufacturing of each parts. ✓ Cost of manufacturing. ✓ Perfect design of plastic mould. 	<ul style="list-style-type: none"> • Understanding of design parameters like properties of plastic material, quality and quantity of plastic material and describe design parameter of mould 	25	40
4	Unit IV: Design of moulds	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand assembly & detailed drawings for manufacturing of mould 	<ul style="list-style-type: none"> • Concept of use of design data sheet. concept of drawing & layout for assembly & details • Drawing of drawing of mould layout, drawing norms & practices • Draw assembly and detailed drawings of mould • Compression mould and Transfer mould 	30	45
5	Unit V: Mould data	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about bill of material and its use ✓ Mould data in the production of component 	<ul style="list-style-type: none"> • Principle of bill of material, selection of material, standard parts material for processing. • Concept of machine set-up, processing parameter 	10	15
6	Unit VI: CAD	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand software packages and application ✓ CAD software for mould design 	<ul style="list-style-type: none"> • Concept of software packages. classification of software packages. • Concept of 3D model. concept of data book. concept of software packages. 	5	10
Review & class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: V
Course Title	:TOOL DESIGN PRACTICE (PLASTIC MOULD-II)
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	05	05	--	70	30	50	150

Rationale:

This Subject is intended to the facts, concepts, principles and procedures of tool design techniques so that this knowledge can be used in Tool Design Practice effectively and efficiently. It is also useful in understanding technology subjects and applies them in the area such as Workshop practice, CAD/CAM, Production Planning, Estimation, Industrial Management and Quality Assurance.

Outcomes:

- Able to understand and analyse the plastic moulding process.
- Understand different types of plastic used in industry.
- Understand about different types of plastic moulding methods and plastic moulding machines.
- Get knowledge about component of plastic mould.
- Understand design and design parameter for plastic mould.
- Understand parameter require to design for different plastic material.

Theory:

Topic and Contents	Hours	Marks
<p>Topic 1: Components & layout</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the component drawing ✓ Runner and gating system layout ✓ Cooling/heating layout <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> ✓ Concept and principle of shrinkage, allowances. ✓ Classification of feed system, runner & gate. ✓ Principle of layout of cavities, feed system, layout of runner and gating system ✓ Concept of mould construction, cooling/heating layout 	10	20
<p>Topic 2: Work/data sheet</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand calculate design parameters with respect to mould, material and machine ✓ Preparation of work/data sheet for mould, material and machine <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Classification of design parameters with respect to mould, material and machine. • Classification of design parameters according to the mould operation. • Concepts of mould, plastics materials specification, estimation of material, machining hours and process parameters, data sheet formats 	15	20
<p>Topic 3: Conceptual design</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to Understand design parameter which require for design of mould. ✓ Understanding the different design for different types of mould. ✓ Getting knowledge about the selection of material for all parts. ✓ Understanding the process of manufacturing of each parts. ✓ Cost of manufacturing. ✓ Perfect design of plastic mould. <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Understanding of design parameters like properties of plastic material, quality and quantity of plastic material and describe design parameter of mould 	25	40

<p>Topic 4: Design of moulds</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to ✓ understand assembly & detailed drawings for manufacturing of mould <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Concept of use of design data sheet. concept of drawing & layout for assembly & details • Drawing of drawing of mould layout, drawing norms & practices • Draw assembly and detailed drawings of mould-Compression mould and Transfer mould 	30	45
<p>Topic 5: Mould data</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about bill of material and its use ✓ Mould data in the production of component <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Principle of bill of material, selection of material, standard parts material for processing. Concept of machine set-up, processing parameter 	10	15
<p>Topic 6: CAD</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand software packages and application ✓ CAD software for mould design <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Concept of software packages. classification of software packages. Concept of 3D model. concept of data book. concept of software packages. 	5	10
<p>Review and class test</p>	5	
Total	100	150

Intellectual Skills:

- 1) Plan and organize the work order and jobs received from the Operator for mass production by using mould for plastic components.

Motor Skills:

- 1) Can able to calculate the amount of plastic material used for injecting in the injection tool of the component
- 2) able to design by identifying the type of mould required for a particular component

Learning Resources:**128. Books:**

AUTHOR	TITLE	PUBLISHER
Dominick V. Rosato& Donald V. Rosato	Injection Moulding Handbook	CBS Publishers & Distributers, New Delhi
A.S. Athalye	Plastic Materials Handbook Vol. I & II	Multi – Tech Publishing Co. Mumbai.
A.S. Athalye	Moulding of Plastics	Multi – Tech Publishing Co. Mumbai.
A.S. Athalye	Injection Moulding	Multi – Tech Publishing Co. Mumbai.
Chandra & Mishra	Rubber & Plastic Technology	CBS Publishers & Distributers, New Delhi
Tetco Visual aids	Transparencies on Dies and Moulds Ref. No. 1084-Part A No of Transparencies-29 Ref. No. 1085-Part B No of Transparencies-30	The Education and Training Consultants, Bangalore. (Tetco Visual aids)
R.W.G.PYE	Injection Mould Design	Longman scientific & technical co-published in the United states

COURSE/MODULE TEMPLATE

SEMESTER:5

COURSE NAME:INDUSTRIAL ENGINEERING

COURSE CODE:MSME/DTE/

COURSE OUTCOMES:After completion of course Student should be able to:

✓ Understand Concepts, principles and procedure of industrial engineering
✓ To acquire in learning the process, planning, production control and elements of cost structure.

THEORY HOURS:60hrs

PRACTICAL HOURS:NA

THEORY MARKS:100

PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Introduction	✓ At the end of this unit Student should be able to understand industrial engineering and its application	<ul style="list-style-type: none"> • Concept of industrial engineering, concept of system. • Concept of men, material & equipment, industrial engineering activities such as work study, plant layout & material handling and inventory control 	2	5
2	Unit II: Plant layout	✓ At the end of this unit Student should be able to understand the methods and procedure of plant layout	<ul style="list-style-type: none"> • Concept of plant, plant location, factors governing plant location, plant layout. • Classification of plant layout and concept of work station 	4	10
3	Unit III: Productivity and work study	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand productivity and its influence ✓ Method study and its application. ✓ Work measurement and its application. 	<ul style="list-style-type: none"> • Concept of productivity, factors affecting productivity, productivity measure • Concept of work study, method study, micro motion study, symbols. • Concept of flow process chart, simo chart, low diagram, string diagram, motion economy. 	12	15

			<ul style="list-style-type: none"> • Concept of work study, work measurement, uses of time study, time study method, time study recording, methods of rating, allowances & standard data, work sampling 		
4	Unit IV: Value analysis	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand value analysis process and its application 	<ul style="list-style-type: none"> • Concept of value engineering, function/utility, value and classification • Process, standardization 	2	5
5	Unit V: Network analysis	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand network techniques of CPM & PERT 	<ul style="list-style-type: none"> • Concept of network analysis, classification of network technique • Concept of CPM and PERT technique • Time estimation in CPM & PERT 	10	15
6	Unit VI: Quality management	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand inspection and inspection department ✓ ISO quality system ✓ Total quality management 	<ul style="list-style-type: none"> • Concept of inspection, classification of inspection, incoming inspection, in process inspection, finished goods inspection • Concept of quality control & quality assurance, quality system standards. • Concept of ISO 9000. • Quality system documentation structure. • Concept of terminology such as quality, quality policy, quality planning, quality management system and quality audit. • Concept of total quality management, tools for total quality control, total quality management structure. 	11	25
7	Unit VII: Facilities planning	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the facilities of planning and its needs 	<ul style="list-style-type: none"> • Concept and classification of layout • Conventional approach to layout problem 	6	10
8	Unit VIII:	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand what is inventory 	<ul style="list-style-type: none"> • Re-order level, economic order quality • Inventory carrying costing 	7	10

	Inventory control	control, models and application and its need for inventory ✓ Need of practice of inventory control	<ul style="list-style-type: none"> • Concept and classification of practice of inventory control. 		
9	Unit IX: Engineering Economics	✓ At the end of this unit Student should be able to understand need of engineering economics.	<ul style="list-style-type: none"> • Concept of engineering economics. • Different ways of comparison of alternatives. 	3	5
Review and Class test				3	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: V
Course Title	:INDUSTRIAL ENGINEERING
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
03	--	--	03	70	--	30	--	100

Rationale:

Industrial engineering is classified as technology subject. It is intended to teach the trainees the fact about the management concepts, human behavior, organizational structure, supervisory functions, accountancy and purchase management, so that this is used in w/s floor management. This is also used to develop as a entrepreneur.

Outcomes:

- Understand Concepts, principles and procedure of industrial engineering
- To acquire in learning the process, planning, production control and elements of cost structure.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none"> At the end of this unit Student should be able to understand industrial engineering and its application <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> Concept of industrial engineering, concept of system. Concept of men, material & equipment, industrial engineering activities such as work study, plant layout & material handling and inventory control 	2	5
<p>Topic 2: Plant layout</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the methods and procedure of plant layout <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> Concept of plant, plant location, factors governing plant location, plant layout. Classification of plant layout and concept of work station 	4	10
<p>Topic 3: Productivity and work study</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand productivity and its influence ✓ Method study and its application. ✓ Work measurement and its application. <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> Concept of productivity, factors affecting productivity, productivity measure Concept of work study, method study, micro motion study, symbols. concept of flow process chart, simo chart, low diagram, string diagram, motion economy. Concept of work study, work measurement, uses of time study, time study method, time study recording, methods of rating, allowances & standard data, work sampling 	12	15
<p>Topic 4: Value analysis</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand value analysis process and its application <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> Concept of value engineering, function/utility, value and classification Process, standardization 	2	5

<p>Topic 5: Network analysis</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand network techniques of CPM & PERT <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Concept of network analysis, classification of network technique • Concept of CPM and PERT technique. • Time estimation in CPM & PERT 	10	15
<p>Topic 6: Quality management</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand inspection and inspection department ✓ ISO quality system ✓ Total quality management <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Concept of inspection, classification of inspection, incoming inspection, in process inspection, finished goods inspection • Concept of quality control & quality assurance, quality system standards. Concept of ISO 9000. • Quality system documentation structure. • Concept of terminology such as quality, quality policy, quality planning, quality management system and quality audit. • Concept of total quality management, tools for total quality control, total quality management structure. 	11	25
<p>Topic 7: Facilities planning</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the facilities of planning and its needs <p>Contents:</p> <p>7.1</p> <ul style="list-style-type: none"> • Concept and classification of layout • Conventional approach to layout problem 	6	10
<p>Topic 8: Inventory control</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand what is inventory control, models and application and its need for inventory ✓ Need of practice of inventory control <p>Contents:</p> <p>8.1</p>	7	10

<ul style="list-style-type: none"> • Re-order level, economic order quality • Inventory carrying costing • Concept and classification of practice of inventory control. 		
Topic 9: Engineering Economics Objectives: ✓ At the end of this unit Student should be able to understand need of engineering economics. Contents: 9.1 <ul style="list-style-type: none"> • Concept of engineering economics. • Different ways of comparison of alternatives. 	3	5
Review and class test	3	
Total	60	100

Intellectual Skills:

- 1) Understand Concepts, principles and procedure of industrial engineering
- 2) To acquire in learning the process, planning, production control and elements of cost structure.

Motor Skills:

- 1) It is intended to teach the trainees the fact about the management concepts, human behavior, organizational structure, supervisory functions, accountancy and purchase management, so that this is used in w/s floor management. This is also used to develop as a entrepreneur.

Learning Resources:

132. Books:

AUTHOR	TITLE	PUBLISHER
O.P. Khanna	Industrial Engineering & Management	Dhanpatrai Publication Pvt. Ltd, New Delhi.
T.R. Bunga N.K. Agrawal S.C. Sharma	Industrial Engineering & Management Science	Khanna Publishers, New Delhi.
Learning Resources Development Center	Industrial Management	Department of Technical Education, Ahmedabad.
TTTI Bhopal	Industrial Management	TTTI Bhopal
National Productivity Council	Management Guide Series 1 to 26	National Productivity Council UtpadaktaBhawan, Lodi Road, New Delhi 110003
Kiyoshi Suzaki	The new shop floor management	The Free Press

COURSE/MODULE TEMPLATE

SEMESTER:5

COURSE NAME:COMPUTER APPLICATION-II

COURSE CODE:MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understand the function and name of different types of devices used in computer.
✓ Understand the computer languages and make program using these computer languages.
✓ Understand the hardware and networking concepts.
✓ Understand latest technology through the use of internet.

THEORY HOURS:60hrs PRACTICAL HOURS:NA THEORY MARKS:100 PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Data base management system	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Creating Database and can be used. ✓ To create, modify and print forms. ✓ Creating report and application. ✓ Creating query in database management system. 	<ul style="list-style-type: none"> • Concept of database creation, creating a table, entering and modifying data, primary key selection, feature of menu • Concept of form creation and printing, form modification, formatting & changing properties. • Principle of creating forms, printing forms, modifying form design, formatting & arranging from control properties. • concept of creating modifying & saving report, formatting control customizing headers & footers, adding & deleting controls, formatting controls. 	10	15

			<ul style="list-style-type: none"> • Concept of using calculation in queries, modifying a query, creating a query, building summary of queries. 		
2	Unit II: Programming language	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand C/C++ in solving engineering problems and for customizing of CAD, CAM software. ✓ Variable and operator in a programming language. ✓ System principle of control flow. ✓ Pre-processor & functioning of Input / Output files. ✓ Understand OOP, classes & features of C++. 	<ul style="list-style-type: none"> • Define programming language familiarize C/C++ as a programming language, the feature of C/C++, writing a simple program. • Concept of variables, constant, operator. • Principles of variable and the standard to define variables, develop use of operator, constants. • Concept of looping and types of loops, types loops, types of jumping statement, define functions, arrays, unions, structures, pointers. • Define files, Input/output files. Buffered standard Input / Output. • Principles of creating files, getting output, giving input, functioning of pre-processor. • Define OOP, define classes in C++, list features of C++, define inheritance. 	20	30
3	Unit III: Visual basic-6	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Features of visual Basic and controls used in VB & application of VB. ✓ Understand development of interface & study object building to print & development. ✓ Connecting to database and work with report designer. ✓ To create user interface. 	<ul style="list-style-type: none"> • Features of VB, concept of data access, application development, control & application, design capabilities. • Principles of data access, development tools, application development, controls & application design capabilities. • Concept of interface development, menus, coding environments, object development. • Concept of databases interface, designing databases, report generation. • Concept of using toolbars, building menu interface, testing interface, using animation & time events, toolbar interface features. 	15	30
4	Unit IV:	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand 	<ul style="list-style-type: none"> • Concept of networking, LAN, WAN. • Difference between KLAN, WAN MAN. • Principle of Communication. Principle of 	10	25

	Networking/communication	<p>LAN, WAN, MAN in the communication system & networking and application.</p> <p>✓ Internet & email and application</p>	<p>networking. Principle of LAN, WAN,MAN, use of networking procedure of communication.</p> <ul style="list-style-type: none"> • Concept of internet & modem, addressing system, different types of networking & hardware 		
Review & class test				5	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: V
Course Title	:COMPUTER APPLICATION-II
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
03	--	--	03	70	--	30	--	100

Rationale:

This Subject describes the facts, concepts, principles and procedures of computer applications so that this knowledge can be used in solving Engineering applications efficiently and effectively. It is useful in the application of computers In areas like CNC Technology, Tool Design and Computer aided Design, Cost estimation and industrial management. This also enables to understand the Hardware and Networking concepts and provides the opportunity to learn latest technology through the use of internet.

Outcomes:

- Get knowledge about how to use computer
- Understanding the different types of devices used in computer and their use.
- Understand the computer languages and make program using these computer languages
- Knowledge about LAN,C,C++. Etc.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Data base management system</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Creating Database and can be used ✓ To create, modify and print forms. ✓ Creating report and application. ✓ Creating query in database management system. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> ✓ Concept of database creation, creating a table, entering and modifying data, primary key selection, feature of menu ✓ Concept of form creation and printing, form modification, formatting & changing properties. ✓ Principle of creating forms, printing forms, modifying form design, formatting & arranging from control properties. ✓ concept of creating modifying & saving report, formatting control customizing headers & footers, adding & deleting controls, formatting controls. ✓ Concept of using calculation in queries, modifying a query, creating a query, building summary of queries. 	10	15
<p>Topic 2: Programming language</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand C/C++ in solving engineering problems and for customizing of CAD, CAM software. ✓ Variable and operator in a programming language. ✓ System principle of control flow. ✓ Pre-processor & functioning of Input / Output files. ✓ Understand OOP, classes & features of C++. <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Define programming language familiarize C/C++ as a programming language, the feature of C/C++, writing a simple program. • Concept of variables, constant, operator. • Principles of variable and the standard to define variables, develop use of operator, constants. • Concept of looping and types of loops, types loops, types of jumping statement, define functions, arrays, unions, structures, pointers. • Define files, Input/output files. Buffered standard Input / Output. • Principles of creating files, getting output, giving input, functioning of pre-processor. • Define OOP, define classes in C++, list features of C++, Define inheritance. 	20	30

<p>Topic 3: Visual basic-6</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Features of visual Basic and controls used in VB & application of VB. ✓ Understand development of interface & study object building to print & development. ✓ Connecting to database and work with report designer. ✓ To create user interface. <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Features of VB, concept of data access, application development, control & application, design capabilities. • Principles of data access, development tools, application development, controls & application design capabilities. • Concept of interface development, menus, coding environments, object development. • Concept of databases interface, designing databases, report generation. • Concept of using toolbars, building menu interface, testing interface, using animation & time events, toolbar interface features. 	15	30
<p>Topic 4: Networking/communication</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand LAN, WAN, MAN in the communication system & networking and application. ✓ Internet & email and application <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Concept of networking, LAN, WAN. • Difference between LAN, WAN, MAN • Principle of Communication. Principle of networking. Principle of LAN, WAN, MAN, use of networking procedure of communication. • Concept of internet & modem, addressing system, different types of networking & hardware 	10	25
<p>Review and class test</p>	5	
Total	60	100

Intellectual Skills:

1. Sharing information documents sent by internal teams by the help of computer
2. Use reasoning skills to identify and resolve basic problems.
3. write information documents to internal departments/ internal teams or enter the information in online ERP systems under guidance of the supervisor

Motor Skills:

- 1) Organize all manuals so that sorting out information very fast by the use of computer
- 2) Identify the specific problems and solving the problems.

Learning Resources:**136. Books:**

AUTHOR	TITLE	PUBLISHER
Ron White ISBN-81-7635257-8	How Computer works	Techmedia New Delhi.
Peter Kent	Discover Win NT Workstation 4.0	Comdex Okhla New Delhi.
Winn L. Rosch	Hardware Basic	Techmedia New Delhi.
R.K. Taxali ISBN-0-07-462467-9	PC Software made Simple	Tata McGraw Hill, New Delhi.
MadnickJonoran 007-463273-6	Operating System	TMH – New Delhi
Thomas C. Bartee 0-07-003899-6	Digital Computer Fundamentals	TMH – New Delhi
John Donovan 007-460482-1	System Programming	TMH – New Delhi
B. Ram	Fundamentals of Micro computers	Dhanpatrai New Delhi.
P.K. Sinha	Computer Fundamentals	BPB/ New Delhi
A.L. Steven 81-7029-327-9	Dos Teach Yourself	BPB/ New Delhi
Govindraju, Haq, Naraya	Introduction to computer	Willey Eastern New Delhi
Alexandraia Haddad 81-7635-287	MS – Powerpoint 2000	Techmedia New Delhi.
TrudiReisner 81-7635-286-1	MS Excel 2000	Techmedia New Delhi.
Stephen K. Cunningham ISBN-81-7029-247-6	Lear Microsoft Assembler in a day	BPB Publication New Delhi

Manaharhotia/Nair ISBN-81-7029-700-1	All about Motherboard	BPB Publication New Delhi
Satish Jain ISBN-81-7029-289-1	DOS Manual Vol.1	BPB Publication New Delhi
Aptech	Window	Aptech Notes
Aptech	Working with word	Aptech Notes
Aptech	Power Point	Aptech Notes
Gimi Courter Annette Marquis ISBN-81-7656-086-3	Office 2000	BPB Publication New Delhi
Ron Mansfield ISBN-81-7029-373-1	Microsoft Office	BPB Publication New Delhi

COURSE/MODULE TEMPLATE

SEMESTER:5

COURSE NAME:COMPUTER AIDED DRAWING AND DESIGN-II

COURSE CODE:MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understand the function and procedures of CAD used in manufacturing and quality control.
✓ Understanding the concepts, principles and procedure of developing models and designs using CAD software
✓ Using CAD software for understanding subjects like press tool, plastics mould.

THEORY HOURS:100hrs PRACTICAL HOURS:NA THEORY MARKS:100 PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Creation/Editing of curves	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the types Of Curves ✓ Modifying Curves ✓ Precision construction of curved objects. 	<ul style="list-style-type: none"> • Drawing Curved Objects, creating point objects, changing drawing order of objects, creating solid fill areas and regions. • Editing Methods of different types of curved objects. • Concept of precision construction of curved objects. Different types of curved objects with precision 	10	10
2	Unit II: Creation/Editing	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about Orthographic view of Objects (M.D.T.) 	<ul style="list-style-type: none"> • Definition of orthographic views of object: Front, Top, left side, Right side. • Concept of Drawing to scale, dimensioning and 	40	15

	of objects	<ul style="list-style-type: none"> ✓ Scale, dimension, text (for 3D drawings) ✓ Sectioning and hatching 	<p>text, tolerances, modifying dimension and tolerance.</p> <ul style="list-style-type: none"> • Definition of sectional views: types of sections, section planes, assembly sectioning and hatching. 		
3	Unit III: Creation/Editing of 3D objects	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Isometric views of Drawing ✓ Working with wire frame model - Practice ✓ Introduction to parametric sketches - practice ✓ Surface Modelling 	<ul style="list-style-type: none"> • Definition of WCS, UCS, Point Filters, elevation, drawing basic entities, concept of Isometric axes, isometric lines, isometric planes, isometric model. • Definition of Basic entities (lines and arcs), Elevation. Point filters, UCS. • Definition of Constraints, construction geometry, cut line sketch, Degree of freedom, Feature, Geometric Constraints, path sketch, split line. • Definition of line, base surface, derived surface, and motion based surface, skin surface, surface normal. 	15	15
4	Unit IV: Creation/Editing of Simple assemblies up to 6 elements	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Assembly parts up to 6 elements - practice ✓ Creating orthographic views and sectioning details ✓ Assembly with external references 	<ul style="list-style-type: none"> • Definition of Assembly catalogue, Material Assembly, Constraints, Insert, Assembly tree and constraints, Bottom-up Design, Root, Localized Part. • Definition of assembly catalogue, assembly tree, attach, detach, external reference, insert constraints, path, scene, trail, tweak. • Definition of drawing new view, edit scale, create view, base view, parent view, reference dimension. 	15	20
5	Unit V: Creation/Editing of simple assemblies for press tools	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Assembling parts - practice ✓ Assembling with external references - practice ✓ Creating Orthographic views and sectioning details - practice 	<ul style="list-style-type: none"> • Definition of Assembly catalogue, Material Assembly constraints , Insert, assembly free and constraints, bottom-up design, Root, Localized parts. • Definition of assembly catalogue, assembly tree, attach, detach, external references, insert constraints, path, scene, trail, tweak. • Definition of drawing new view, edit scale, create view, base view, Model View, reference dimension. 	5	40

Review & class test	5	
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COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: V
Course Title	:COMPUTER AIDED DRAWING AND DESIGN-II
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
05	--	--	03	70	--	30	--	100

Rationale:

The practice oriented subjects describes the facts, concepts, principles and procedures of computer aided design used in tool design, manufacturing, process planning, estimation, inspection and QC including supervisory management to express the ideas, conveying instructions for carrying out jobs in Tool & Die Technology. It is also useful in understanding technology subject such as tool design, workshop practice,& CNC tech. It also describes the concepts, principles and procedures of developing models and design using CAD software's for CAM.

Outcomes:

- Understand the function and procedures of CAD used in manufacturing and quality control.
- Understanding the concepts, principles and procedure of developing models and designs using CAD software
- Using CAD software for understanding subjects like press tool, plastics mould.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Creation / Editing of curves</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the types Of Curves ✓ Modifying Curves ✓ Precision construction of curved objects. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> ✓ Drawing Curved Objects, creating point objects, changing drawing order of objects, creating solid fill areas and regions. ✓ Editing Methods of different types of curved objects. ✓ Concept of precision construction of curved objects. Different types of curved objects with precision 	10	10
<p>Topic 2: Creation / Editing of objects</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand about Orthographic view of Objects (M.D.T.) ✓ Scale, dimension, text (for 3D drawings) ✓ Sectioning and hatching <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Definition of orthographic views of object: Front, Top, left side, Right side. • Concept of Drawing to scale, dimensioning and text, tolerances, modifying dimension and tolerance. <p>Definition of sectional views: types of sections, section planes, assembly sectioning and hatching.</p>	40	15
<p>Topic 3: Creation / Editing of 3D objects</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Isometric views of Drawing ✓ Working with wire frame model - Practice ✓ Introduction to parametric sketches - practice ✓ Surface Modelling <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Definition of WCS, UCS, Point Filters, elevation, drawing basic entities, concept of Isometric axes, isometric lines, isometric planes, isometric model. • Definition of Basic entities (lines and arcs), Elevation. Point filters, UCS. • Definition of Constraints, construction geometry, cut line sketch, Degree of freedom, Feature, Geometric Constraints, path sketch, split line. • Definition of line, base surface, derived surface, and motion based surface, skin surface, surface normal. 	15	15

<p>Topic 4: Creation / Editing of simple assemblies up to 6 elements</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand Assembly parts up to 6 elements - practice ✓ Creating orthographic views and sectioning details ✓ Assembly with external references <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Definition of Assembly catalogue, Material Assembly, Constraints, Insert, Assembly tree and constraints, Bottom-up Design, Root, Localized Part. • Definition of assembly catalogue, assembly tree, attach, detach, external reference, insert constraints, path, scene, trail, tweak. • Definition of drawing new view, edit scale, create view, base view, parent view, reference dimension. 	15	20
<p>Topic 5: Creation / Editing of simple assemblies for press tools</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Assembling parts - practice ✓ Assembling with external references - practice ✓ Creating Orthographic views and sectioning details - practice <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> • Definition of Assembly catalogue, Material Assembly constraints , Insert, assembly free and constraints, bottom-up design, Root, Localized parts. • Definition of assembly catalogue, assembly tree, attach, detach, external references, insert constraints, path, scene, trail, tweak. <p>Definition of drawing new view, edit scale, create view, base view, Model View, reference dimension.</p>	5	40
<p>Review and class test</p>	5	
Total	100	100

Intellectual Skills:

- 1) Understand the function and procedures of CAD used in manufacturing and quality control.
- 2) Understanding the concepts, principles and procedure of developing models and designs using CAD software
- 3) Using CAD software for understanding subjects like press tool, plastics mould.

Motor Skills:

- 1) Creation / Editing of 3D objects
- 2) Understanding the concepts, principles and procedure of developing models and designs using CAD software

Learning Resources:**140. Books:**

AUTHOR	TITLE	PUBLISHER
Bowman & Bowman	Understanding CAD/CAM	BPB Publications B-14, Cannought Place, New Delhi.
Sham Tickoo	Solid edge S4	--
Ibrahim Zeid ISBN-0-07-072857	CAD/CAM Theory & Practice	Tata McGraw – Hill Publishing Co. Ltd, S.P. Printers Noida.
Toriya H. &Chiyokura H. ISBN-3-540-56507-8 ISBN-0-387-56507-8	3D CAD Principles and Applications	Springer-verlag Berlin- Heideberg, Germany.
S.A.R. Scrivener ISBN-0-08-0286011	Computer aided design and manufacture Slot of the art Report	PergomenInfotech Ltd., Maidenhead, Berkshire, England.
CS. Krishnamoorthy& S. Rajeev ISBN-81-85198-39-x	Computer Aided Design - Software & Analytical Tools	Narosa Publishing House 6 Community Centre Park, New Delhi.
Auto Desk CD-of Quick Tour & Learning assistance	Quick Tour & Learning Assistance CD	Auto Desk Inc CD's.

COURSE/MODULE TEMPLATE

SEMESTER:5

COURSE NAME:MAINTENANCE & SAFETY ENGINEERING

COURSE CODE:MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Understand the basics of maintenance and general practice in industry.
✓ To diagnose the maintenance problem.
✓ Importance of maintenance in production department and its effect on productivity.

THEORY HOURS:80hrs PRACTICAL HOURS:NA THEORY MARKS:100 PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Significance of maintenance	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand importance of maintenance , need and scope 	<ul style="list-style-type: none"> • Introduction to maintenance, its needs and economic significance • Effect on productivity scope and functions of maintenance, organizational structure of maintenance department. 	5	7
2	Unit II: Concept of Basic maintenance practices	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand methods of maintenance ✓ Preparation methods 	<ul style="list-style-type: none"> • Different maintenance practices. Basic concepts, advantages and disadvantages, • Principles and procedures of preventive maintenance, schedule preparation for maintenance, maintenance hand tools and measuring equipment's, • Maintainability definition and objective. 	16	20

3	Unit III: Wears and its effects	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand effects of wear on performance, methods of measurement of wear 	<ul style="list-style-type: none"> • Definition causes of wear, types of wear with examples, concepts of permissible wear, wear reduction factors, component replacement. 	10	15
4	Unit IV: Lubrication and Lubrication system	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand types of lubricants ✓ Lubricating methods ✓ Procedure of applying lubrication. 	<ul style="list-style-type: none"> • Functions, principle of liquid lubrication, types of lubrication-hydrodynamic, boundary layer, externally pressurized, selection of lubrications, prevention of lubricants, types of lubrication, causes of lubrication failures. 	12	15
5	Unit V: Fault tracing, trouble shooting and remedies	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand troubles during maintenance ✓ And their remedies 	<ul style="list-style-type: none"> • Definition of purpose, • Sequence of activities in fault finding, measurement to prevent repetition of similar faults, troubleshooting charts, • Identification of operational errors and replacement. 	5	10
6	Unit VI: Leakages	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand leakages and its prevention methods 	<ul style="list-style-type: none"> • Checking and stopping of leakages, different methods of detection of leakages, types of seals and packing. 	4	5
7	Unit VII: Assembly and Disassembly of M/C parts	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand types of assembly and disassembly and its procedure 	<ul style="list-style-type: none"> • Process and steps of assembly and disassembly of M/C parts like Bearings, Belts, Pulleys, Gears, Clutches, Couplings, Gear box etc. 	5	8
8	Unit VIII: Maintenance	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand hydraulic system ✓ Pneumatic system ✓ Valves, cylinder 	<ul style="list-style-type: none"> • Working Principles, common troubles & repair methods, assembly and disassembly of pneumatic valves, cylinders. 	5	6

	of hydraulics and pneumatics system				
9	Unit IX: Preventive maintenance	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the importance of preventive maintenance in industry ✓ Methods of preventive maintenance 	<ul style="list-style-type: none"> • Preventive maintenance - steps and need of preventive maintenance - advantage - two merger division of activities - frequency cycle - program schedule of preventive maintenance - repair complexity - typical forms for preventive maintenance - aids to good preventive maintenance, its types and effects on preventive maintenance. 	8	8
10	Unit X: Safety Engineering	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Safety Principles and practices, safe layout, safety aspects of machines to include putting guards, provision of interlocking and vibration damping etc ✓ Factors governing housekeeping to include proper layout & Equipment 	<ul style="list-style-type: none"> • Safety arrangement during manufacturing processes like Welding, Grinding, Machining, Handling of chemical etc., • Regular Plant inspection & safety audit, hazard analysis, • Safety of electrical installations & general electrical safety practices, • M/C maintenance, lubrication, safety during material handling, safety management. Accident & their classification (minor, reportable, fatal, dangerous occurrences), salient points of safety regulations for mechanical & electrical machines / equipment's and chemical products etc. fire safety measures, fire potential areas, fire fighting measures, equipment's, training, requirements, regular drill. • First aid, safe working environment. safety consciousness, Industrial Housekeeping • Correct material handling & Storage, cleanliness and orderliness, proper equipment, tools & Supplies, work schedules, assistance from another workinggroup, housekeeping inspections. 	6	6

Review & class test	4	
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COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: V
Course Title	:MAINTENANCE & SAFETY ENGINEERING
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme			PAPER HRS	Examination Scheme				TOTAL
TH	TU	PR		TH	PR	OR	TW	
04	--	--	03	70	30	--	--	100

Rationale:

Job of maintenance is the backbone of industries and is similar to that of a physician. It has vital effect on production as well as on productivity of the industries as a whole. The curriculum provides the basics of maintenance and general practice in industry. A knowledgeable engineer appreciates the importance and maintenance in planning and scheduling production in industry to meet the target.

Outcomes:

- Understand the basics of maintenance and general practice in industry.
- To diagnose the maintenance problem.
- Importance of maintenance in production department and its effect on productivity.

Theory:

Topic and Contents	Hours	Marks
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<p>Topic 1: Significance of maintenance</p> <p>Objectives:</p> <ul style="list-style-type: none"> • At the end of this unit Student should be able to understand importance of maintenance , need and scope <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Introduction to maintenance, its needs and economic significance • Effect on productivity scope and functions of maintenance, organizational structure of maintenance department. 	5	7
<p>Topic 2: Concept of Basic maintenance practices</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand methods of maintenance ✓ Preparation methods <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Different maintenance practices. Basic concepts, advantages and disadvantages, • Principles and procedures of preventive maintenance, schedule preparation for maintenance, maintenance hand tools and measuring equipment's, • Maintainability definition and objective. 	16	20
<p>Topic 3: Wears and its effects</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand effects of wear on performance, methods of measurement of wear <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Definition causes of wear, types of wear with examples, concepts of permissible wear, wear reduction factors, component replacement. 	10	15
<p>Topic 4: Lubrication and Lubrication system</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand types of lubricants ✓ Lubricating methods ✓ Procedure of applying lubrication. <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Functions, principle of liquid lubrication, types of lubrication-hydrodynamic, boundary layer, externally pressurized selection of lubrications, prevention of lubricants, types of lubrication, 	12	15

and causes of lubrication failures.		
<p>Topic 5: Fault tracing, trouble shooting and remedies</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand troubles during maintenance and their remedies <p>Contents:</p> <p>5.1</p> <ul style="list-style-type: none"> ✓ Definition of purpose, ✓ Sequence of activities in fault finding, measurement to prevent repetition of similar faults, troubleshooting charts, ✓ Identification of operational errors and replacement. 	5	10
<p>Topic 6: Leakages</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand leakages and its prevention methods <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Checking and stopping of leakages, different methods of detection of leakages, types of seals and packing. 	4	5
<p>Topic 7: Assembly and Disassembly of M/C parts</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand types of assembly and disassembly and its procedure <p>Contents:</p> <p>7.1</p> <ul style="list-style-type: none"> • Process and steps of assembly and disassembly of M/C parts like Bearings, Belts, Pulleys, Gears, Clutches, Couplings, Gear box etc. 	5	8

<p>Topic 8: Maintenance of hydraulics and pneumatics system</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand hydraulic system ✓ Pneumatic system ✓ Valves, cylinder <p>Contents:</p> <p>8.1</p> <ul style="list-style-type: none"> ✓ Working Principles, common troubles & repair methods, assembly and disassembly of pneumatic valves, cylinders. 	5	6
<p>Topic 9: Preventive maintenance</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the importance of preventive maintenance in industry ✓ Methods of preventive maintenance <p>Contents:</p> <p>9.1</p> <ul style="list-style-type: none"> ✓ Preventive maintenance - steps and need of preventive maintenance - advantage - two merger division of activities - frequency cycle - program schedule of preventive maintenance - repair complexity - typical forms for preventive maintenance - aids to good preventive maintenance, its types and effects on preventive maintenance. 	8	8
<p>Topic 10: Safety Engineering</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the Safety Principles and practices, safe layout, safety aspects of machines to include putting guards, provision of interlocking and vibration damping etc. ✓ Factors governing housekeeping to include proper layout & Equipment <p>Contents:</p> <p>10.1</p> <ul style="list-style-type: none"> ✓ Safety arrangement during manufacturing processes like Welding, Grinding, Machining, Handling of chemical etc., ✓ Regular Plant inspection & safety audit, hazard analysis, ✓ Safety of electrical installations & general electrical safety practices, ✓ M/C maintenance, lubrication, safety during material handling, safety management. Accident & their classification (minor, reportable, fatal, dangerous occurrences), salient points of safety regulations for mechanical & electrical machines / equipment's and chemical products etc. fire safety measures, fire potential areas, fire fighting measures, equipment's, training, requirements, regular drill. ✓ First aid, safe working environment. safety consciousness, Industrial Housekeeping ✓ Correct material handling & Storage, cleanliness and orderliness, proper equipment, tools & 	6	6

Supplies, work schedules, assistance from another workinggroup, housekeeping inspections.		
Review and class test	4	
Total	80	100

Intellectual Skills:

- 1) To diagnose the maintenance problem.
- 2) Importance of maintenance in production department and its effect on productivity

Motor Skills:

- 1) Importance of maintenance in production department and its effect on productivity
- 2) It provides the basics of maintenance and general practice in industry.

Learning Resources:

144. Books:

AUTHOR	TITLE	PUBLISHER
Frank E.McEloroy,P.E& C.S.P.	Accident Prevention Manual for Industrial operations	Chief national Safety council, Chcago,U.S.A.
Frank E.McEloroy,P.E& C.S.P.	Accident Prevention Manual for Administration and Programmes	Chief national Safety council, Chcago,U.S.A.
KrishanlalSethi	Commentary on DFactory Acts with M.P.	The Lawyers Home,Indore-7
H.W.Heinrich	Industrial Accident Prevention	McGraw Hill Book

		Company,IWC
H.V Mst watt	A guide to efficient maintenance management	--

COURSE/MODULE TEMPLATE

SEMESTER:5

COURSE NAME:INDUSTRIAL MANAGEMENT

COURSE CODE:MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Get knowledge about the management concepts, human behaviour, organizational structure, supervisory functions.
✓ Get knowledge about accountancy and purchase management.
✓ To develop as a entrepreneur.

THEORY HOURS:60hrs PRACTICAL HOURS:NA THEORY MARKS:100 PRACTICAL MARKS:NA

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks
1	Unit I: Introduction	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand the system concept, management concept and scientific management 	<ul style="list-style-type: none"> • Concept and classification of management • Scientific management. concept of system, system designs 	5	5
2	Unit II: Human relation	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand patterns of <ul style="list-style-type: none"> ➤ human behaviours ➤ Motivation ➤ Attitude ➤ Communication ➤ Stress management ➤ Decision making 	<ul style="list-style-type: none"> • Concept of industrial psychology. • Concept of individual behaviour, group behaviour. concept of morale, motivation • Concept & importance of motivation-types-positive-motivation-negative motivation • Concept & importance of positive attitude and openness of mind, importance of mental health • Concept & definitions objective types downward, upward, lateral, grapevine • Concept of stress management, technique of relieve 	12	20

			<p>stress</p> <ul style="list-style-type: none"> • Importance of decision making in context of productivity, quality, cost consciousness, factors affecting decision making 		
3	Unit III: Structure of Industrial organization	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand organization structure ✓ Dynamic organization ✓ Types of organization in industry 	<ul style="list-style-type: none"> • Concept of organization, organization structure. concept of authority & responsibilities, span of control, goal achievement • Concept of line & staff function, delegation of function, organizational chart • Concept of dynamic organization, growth and decay, effective communication, motivation and morality and leadership. • Concept of single ownership, partnership & classification, joint stock company & classification. • Co-operative organization & classification. • State & central government owned organization & classification. 	8	16
4	Unit IV: Supervision & leadership	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand duties of supervisor and leadership ✓ Effective supervision and its role ✓ Supervisor's activities 	<ul style="list-style-type: none"> • Concept & classification of management • Top, middle, junior management • Concept & classification of leadership. • Concept of effective supervision, towards work and people. concepts of achieving target, controlling cost, cooperation, improvement in work system, motivation, team development, discipline, management of change, human relations, leadership, communication • Qualification and qualities of supervisor. • Concept of daily schedule, weekly schedule, monthly schedule, yearly schedule, monitoring, reviewing, corrective action. 	8	16
5	Unit V: Industrial legislation	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand history & necessity of industrial legislation ✓ Factory Act 1948 ✓ Laws related to wages & welfare ✓ Laws related to association 	<ul style="list-style-type: none"> • Concept of industrial legislation, social justice, social equality, national economy, international uniformity. • Concept of Factory Act 1948. concept of terms related to Factory act. • Concept of registration. concept of health, safety, 	8	15

			<p>hours of work, work environment, employee welfare & leave with wages.</p> <ul style="list-style-type: none"> • Concept of payment of wages act, 1936, minimum wages act 1948, workmen's compensation act, ESI act, EPF act • Concept of Trade Union Act 1926, industrial dispute act, contract labour act. 		
6	Unit VI: Wages and incentives	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand wages and incentives in an organization 	<ul style="list-style-type: none"> • Concept & classification of wages. • Classification of incentives. • Factors influencing wages and incentives. 	8	12
7	Unit VII: Accounting & budgeting	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand accounting system ✓ Budgeting ✓ Taxes and duties 	<ul style="list-style-type: none"> • Concept & classification of "capital", Accounting & book keeping, assets & liabilities, journal & ledger, profit & loss, balance sheet • Concept of budget, budget control, classification of budget, preparation of budget • Concept & classification of direct and indirect taxes. • Concept & classification of duties 	4	8
8	Unit VIII: Purchase management	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand purchasing ✓ Contracting ✓ Documentation of contracting 	<ul style="list-style-type: none"> • Concept of purchasing, economical order quality, inventory control, storing and planning • Concept of contracting, costing, accounting, manufacturing and buying • Concept of costing & accounting, loss & profit. • Concept of sourcing. 	4	8
Review & class test				3	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: V
Course Title	:INDUSTRIAL MANAGEMENT
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	--	03	70	--	30	--	100

Rationale:

The Subject is from engineering science group intended to teach the students/trainees the overall work flow of manufacturing process in an engineering industry to enable them for networking (motion study, work study, method study) using systems thinking for age in work shop practice and industrial management. This subject also intended to teach the concepts, principles and procedures of quality management.

Industrial management is classified as technology subject. It is intended to teach the trainees the fact about the management concepts, human behavior, organizational structure, supervisory functions, accountancy and purchase management, so that this is used in w/s floor management. This is also used to develop as a entrepreneur.

Outcomes:

- Understand different types human relation.
- Understand about different types organization.
- Get knowledge about Supervision , Leadership and Purchase Management
- Get knowledge about the management concepts, human behaviour, organizational structure, supervisory functions.

- Get knowledge about accountancy and purchase management.
- To develop as a entrepreneur.

Theory:

Topic and Contents	Hours	Marks
<p>Topic 1: Introduction</p> <p>Objectives:</p> <ul style="list-style-type: none"> • At the end of this unit Student should be able to understand the system concept, management concept and scientific management <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> • Concept and classification of management • Scientific management. concept of system, system designs 	5	5
<p>Topic 2: Human relation</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand patterns of <ul style="list-style-type: none"> ➤ human behaviours ➤ Motivation ➤ Attitude ➤ Communication ➤ Stress management ✓ Decision making <p>Contents:</p> <p>2.1</p> <ul style="list-style-type: none"> • Concept of industrial psychology. • Concept of individual behaviour, group behaviour. concept of morale, motivation • Concept & importance of motivation-types-positive-motivation-negative motivation • Concept & importance of positive attitude and openness of mind, importance of mental health • Concept & definitions objective types downward, upward, lateral, grapevine • Concept of stress management, technique of relieve stress • Importance of decision making in context of productivity, quality, cost consciousness, factors affecting decision making 	12	20

<p>Topic 3: Structure of Industrial organization</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand organization structure ✓ Dynamic organization ✓ Types of organization in industry <p>Contents:</p> <p>3.1</p> <ul style="list-style-type: none"> • Concept of organization, organization structure. concept of authority & responsibilities, span of control, goal achievement • Concept of line & staff function, delegation of function, organizational chart • Concept of dynamic organization, growth and decay, effective communication, motivation and morality and leadership. • Concept of single ownership, partnership & classification, joint stock company & classification. • Co-operative organization & classification. • State & central government owned organization & classification. 	8	16
<p>Topic 4: Supervision & leadership</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand duties of supervisor and leadership ✓ Effective supervision and its role ✓ Supervisor's activities <p>Contents:</p> <p>4.1</p> <ul style="list-style-type: none"> • Concept & classification of management • Top, middle, junior management • Concept & classification of leadership. • Concept of effective supervision, towards work and people. concepts of achieving target, controlling cost, cooperation, improvement in work system, motivation, team development, discipline, management of change, human relations, leadership, communication • Qualification and qualities of supervisor. • Concept of daily schedule, weekly schedule, monthly schedule, yearly schedule, monitoring, reviewing, corrective action 	8	16
<p>Topic 5: Industrial legislation</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand history & necessity of industrial legislation ✓ Factory Act 1948 ✓ Laws related to wages & welfare ✓ Laws related to association <p>Contents:</p>	8	15

<p>5.1</p> <ul style="list-style-type: none"> • Concept of industrial legislation, social justice, social equality, national economy, international uniformity. • Concept of Factory Act 1948. • Concept of terms related to Factory act. • Concept of registration. • Concept of health, safety, hours of work, work environment, employee welfare & leave with wages. • Concept of payment of wages act, 1936, minimum wages act1948, workmen's compensation act, ESI act, EPF act • Concept of Trade Union Act 1926, industrial dispute act, contract labour act. 		
<p>Topic 6: Wages and incentives</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand wages and incentives in an organization <p>Contents:</p> <p>6.1</p> <ul style="list-style-type: none"> • Concept & classification of wages. • Classification of incentives. • Factors influencing wages and incentives 	8	12
<p>Topic 7: Accounting & budgeting</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand accounting system ✓ Budgeting ✓ Taxes and duties <p>Contents:</p> <p>7.1</p> <ul style="list-style-type: none"> • Concept & classification of "capital", Accounting& book keeping, assets & liabilities, journal & ledger, profit & loss, balance sheet • Concept of budget, budget control, classification of budget, preparation of budget • Concept & classification of direct and indirect taxes. • Concept & classification of duties 	4	8
<p>Topic 8: Purchase management</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand purchasing ✓ Contracting ✓ Documentation of contracting <p>Contents:</p>	4	8

8.1		
<ul style="list-style-type: none"> • Concept of purchasing, economical order quality, inventory control, storing and planning • Concept of contracting, costing, accounting, manufacturing and buying • Concept of costing & accounting, loss & profit. • Concept of sourcing. 		
Review and class test	3	
Total	60	100

Intellectual Skills:

- 1) Get knowledge about Supervision , Leadership and Purchase Management
- 2) Understand different types human relation.
- 3) Understand about different types organization

Motor Skills:

- 1) Discuss task lists, schedules and activities-supervision , Leadership and Purchase Management
- 2) Get knowledge about accountancy and purchase management.
- 3) To develop as a entrepreneur.

Learning Resources:

148. Books:

AUTHOR	TITLE	PUBLISHER
O.P. Khanna	Industrial Engineering & Management	Dhanpatrai Publication Pvt. Ltd, New Delhi.
T.R. Bunga N.K. Agrawal S.C. Sharma	Industrial Engineering & Management Science	Khanna Publishers, New Delhi.
Learning Resources Development Center	Industrial Management	Department of Technical Education, Ahmedabad.

TTTI Bhopal	Industrial Management	TTTI Bhopal
National Productivity Council	Management Guide Series 1 to 26	National Productivity Council Utpadakta Bhawan, Lodi Road, New Delhi 110003
Kiyoshi Suzaki	The new shop floor management	The Free Press

COURSE/MODULE TEMPLATE

SEMESTER:5

COURSE NAME:WORKSHOP PRACTICE-V

COURSE CODE:MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Get knowledge about practical work in workshop.
✓ Get knowledge about different machine used in workshop like milling, turning, grinding, etc.
✓ Find out different problems during manufacturing of different parts and using different machine.
✓ Selection of components, design of components material selection.

THEORY HOURS :NA PRACTICAL HOURS:360hrs THEORY MARKS:NA PRACTICAL MARKS:400

Unit No.	Unit Name	Unit level outcomes	Contents (chapters/topics)	TH hours	Marks

1	Unit I: Group project work	<ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand part component which we have to design in project. ✓ Utilize skill of design, production, and other and creation of project. ✓ Work in group with effectively output. 	<ul style="list-style-type: none"> • To understand about selection of component according to the requirement • To understand about component design based on the selection of component and also selecting material as well. • To understand about material testing and selection based on the selection of component and also selecting material as well. • To understand about design of mould for the component according to the requirement. • To understand about Design of core and cavity insert material based on component. • To learn about preparation of part process sheet of various parts of press tool. • To understand according to the design proper selection raw material size and finally manufacturing the various parts of the mould. • To learn about the assembly sequences of manufactured mould parts during the workshop practice 	350	400
Review & class test				10	

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: V
Course Title	:WORKSHOP PRACTICE-V
Course Code	: MSME /DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	18	8	--	200	--	200	400

Rationale:

At the end of semester the trainees will be able to produce useful items by acquiring hand skill and selected machining skill in basic metal working and machine tool operations and by combining them with both knowledge of IGTR-Ahmedabad training organization and safety regulations .The trainees also manufacture machine accessories and standard parts by integrating hand skill and machine tool operation skill.

Outcomes:

- Get knowledge about practical work in workshop.
- Get knowledge about different machine used in workshop like milling, turning, grinding, etc.
- Find out different problems during manufacturing of different parts and using different machine.

Theory:

Topic and Contents	Hours	Marks
<p>Topic 1: Group project work</p> <p>Objectives:</p> <ul style="list-style-type: none"> ✓ At the end of this unit Student should be able to understand part component which we have to design in project. ✓ Utilize skill of design, production, and other and creation of project. ✓ Work in group with effectively output. <p>Contents:</p> <p>1.1</p> <ul style="list-style-type: none"> ✓ To understand about selection of component according to the requirement ✓ To understand about component design based on the selection of component and also selecting material as well. ✓ To understand about material testing and selection based on the selection of component and also selecting material as well. ✓ To understand about design of mould for the component according to the requirement. ✓ To understand about Design of core and cavity insert material based on component. ✓ To learn about preparation of part process sheet of various parts of press tool. ✓ To understand according to the design proper selection raw material size and finally manufacturing the various parts of the mould. ✓ To learn about the assembly sequences of manufactured mould parts during the workshop practice. 	350	400
Review and class test	10	
Total	360	400

Intellectual Skills:

5. understand different types of machining process and different machines
6. problem finding & solving during production, design, assembly and trial

Motor Skills:

- 1)Able to make assembly properly
- 2)Knowledge about the machine and tools used for manufacturing.

Learning Resources:

152. **Books:**

AUTHOR	TITLE	PUBLISHER
Chapman A.J.	Workshop Technology (Vol. I,II & III)	New Delhi: Amol Publication
Hazra S.K. &Chaoudhary S.K.	Elements of Workshop Technology	Metropolitan Publishers, Bombay.
Raghuwanshi B.S. & Others	Workshop Technology	New Heights, New Delhi.
Gupta K.N. &Kaushish J.P.	Workshop Technology Vol. I to II.	New Heights, New Delhi.
Atherton W.H.	Workshop Practice Vol. I to V	New Era Publishers, London.
Gerling	All about Machine tools	WILSEY EASTERN, Delhi.
B. Kishore	Tool & Die Maker	Saurabh& Co.
Hermann Jutz Edward Scharkus	Westermann Tables	WILSEY EASTERN, Delhi.

COURSE/MODULE TEMPLATE

SEMESTER:6

COURSE NAME:INTERSHIP IN TRAINING AND PRODUCTION

COURSE CODE:MSME/DTE/

COURSE OUTCOMES: After completion of course Student should be able to:

✓ Get knowledge about practical work in industry.
✓ Get knowledge about different department of workshop like design, production, assembly, trial, quality control.
✓ Find out different problems during design, production and assembly.
✓ Get knowledge how to work in industry.

COURSE WISE DETAILS CONTENTS

Program Name	: DIPLOMA IN TOOL& DIE ENGINEERING
Semester	: VI
Course Title	: INTERSHIP IN TRAINING AND PRODUCTION
Course Code	: MSME/DTE/

Teaching and Examination Scheme:

Teaching Scheme				Examination Scheme				
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
---	--	08	03	---	---	400	--	400