



# Shri Vaishnav Vidhyapeeth Vishwavidhyalaya, Indore

Shri Vaishnav<sup>SM</sup> Institute of Technology & Science, Indore

Department of Mechanical Engineering

## COURSE FILE

Course Title/ Code: Machine Drawing / BTAU 305

Year: II & Semester: III

Name of the Faculty: *Mr. SUNIL PIPELEYA*

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Total numbers of actual class's working days as per the Academic Calendar from **10/07/2017** to **08/11/2017** are      days.

Total numbers of class lecture hours as per the Time Table from \_\_\_\_\_

**Note-** Actual number of hours after deduction of days of holiday, MST 1<sup>st</sup> and 2<sup>nd</sup> and co-curricular activities (sports, culture, literary activities etc.)

### Availability of number of hours (Branch wise and day wise)

Branch	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Availability
Total no. of days							
AU 2 YEAER (TH)	0	1	0	1	0	0	2
Total							
AU 2 YEAER (PR)	2 (L3,L4) 2 (L1,L2)	0	2 (L3,L4)	0	2 (L1,L2)	0	8



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### Time assigned to take lectures in a week

Branch	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
AU	NA	11-12	NA	1:30-2:30	NA	Extra Classes on I and II Saturday *

### Time assigned to take Practical in a week

Branch	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
AU	10:00-12:00 01:30-03:30	NA	01:30-03:30	NA	10:00-12:00	NA

#### ➤ Course Educational Objectives (CEO)

1. This course provides comprehensive knowledge of production drawing, assembly drawings and Orthographic Sectional views.
2. This course provides comprehensive knowledge of computer applications in production drawing assembly drawing, solid modelling & graphics standards.

#### ➤ Course Outcomes (CO's)

1. Students will be able to understand all drawing conventions, symbols and concepts of machine drawing Creation.
2. Student would be able to convert functional specification of mechanical engineering parts and assembly requirements into manufacturing drawing in a manner consistent with standards.
3. Students will be able to interpret manufacturing and assembly drawings and Acquire skill in preparing production drawings pertaining to various designs.
4. On completion of this course the students will be able to acquire knowledge of the applications of computers in design, parts creation, assembling and production drawing creation, mechanism and manufacturing activity.



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## ➤ Unit Layout

Unit	Content	Lecture Hours	Laboratory hours
I	<p><b>Introduction of Machine Drawing and Drawing Conventions:</b> Introduction, classification of machine drawings, principles of drawing, elements of drawing, types of machine drawing, Drawing standards, Drawing Instruments, sheet layout and title block, Application of types of lines, lettering and numbering, Sketching, Dimensioning, screw threads, screw fastening bolt, nut, washer, screw, locking arrangements of nuts, foundation bolts, keys, cotter-joints and pin joint, pipe joint and valves, Riveted joints and welded joints, shaft bearings, brackets and hangers, shaft coupling, clutches and brakes.</p> <p><b>Drawing Conventions and Symbols:</b> Conventional materials, Conventional breaks, Convention of rivets and bolts, welding conventions, Convention of roughness of surface, Convention of machine operation and parts, Convention of gear and gear transmission, convention of springs, Symbolic Representation of fasteners, Holes and bolts, profile section, pipe fittings and valve symbols, Electric symbols</p>		
II	<p><b>Production Drawing Elements and Assembly Drawings:</b> Introduction, geometric tolerance types and representation, dimensional tolerance types and representation, Limits and fits, hole basis and shaft basis system of fits, surface roughness, indication of surface roughness, roughness value and grade symbol, Assembly concepts, introduction, types, sequence of preparing the assembly drawing, sectional views, convention in sectioning, bill of materials, plotting techniques. <b>Assembly Drawing</b></p> <p><b>Shaft joints:</b> knuckle joint, cotter joints and types etc.</p> <p><b>Keys &amp; Shaft coupling:</b> Muff, Flanged, Flexible, Universal and Oldham's coupling etc.</p> <p><b>Pipe joint:</b> Flanged joint, Socket and Spigot joint, Hydraulic joint, Union joint, Gland &amp; Stuffing Box etc.</p> <p><b>Bearing:</b> Plummer block, Pedestal bearing etc.</p> <p><b>Engine Parts:</b> Steam engine, Piston, connecting rod, Stuffing box, cross head, crank shaft etc.</p>		
III	<p><b>Orthographic Conversion, Sectional and Interpretation of Views:</b> Principle and method of projection, orthographic projection, first angle, third angle, isometric, oblique and perspective projection, conversion of pictorial views into orthographic views illustrative problems,</p> <p><b>Sectional views and Interpretation:</b> Types of sectional views, full section, half section, partial section, removed section, revolved section, offset section, sectioning conventions. Reading of orthographic views, blue print reading, missing lines and views, identification of planes, illustrative problems.</p>		
IV	<p><b>Production and Assembly Drawing Creation through CAD:</b> Introduction to CAD, Why CAD Software, Scope, objective, benefit and limitations, CAD Interface, Coordinate system, Create Objects and Modify Object. Layers &amp; Blocks, Text, Table &amp; Dimensions, Introducing Printing, Plotting, and Layouts.</p> <p><b>Drawing practice sheet:</b> Indicate the surface roughness symbols, welding symbols, tolerances, all production drawing symbols and conventions in drawing practice sheets of AutoCAD Mechanical. <b>Parts Assembly, Visualization &amp; Graphics standards:</b> Assembly Creation methods, Parts Modeling &amp; Representation, Assembly Constraints, Mechanism &amp; Mechanism Analysis, Mass Properties Data exchange standards - IGES - STEP - CALS - DXF - STL.</p>		



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## Note-

- 1 Hours required to complete course
- 2 Hours available to complete course \_\_\_\_.
- 3 Extra Hours for lecture \_\_\_\_.

## Textbooks

- Machine drawing- N.D.Bhatt. & V.M. Panchal , Published by Charotar Publishing house.
- Machine Drawing & Design - Dr. K.K. Dwivedi & Dr. Mukesh Pandey, Dhanpat Rai Publications.
- Machine drawing – P.S. Gill S.K. Kataria & Sons Delhi.
- Fundamentals of Machine Drawing by Sadhu Singh & Shah, PHI
- Design of Machine Elements from V.B. Bhandari, TMH Publications.
- Introduction to Engineering Design, McGraw Hill.
- Mastering CAD George Omura with Brian Benton Autodesk

## Reference Books:

- Machine Design – P.C.Sharma & D.K. Agrawal-Kataria & Sons Publications.
- Principles of Mechanical Design - R. Phelan – McGraw Hill Pub.
- Machine Design - An Integrated Approach Robert-L-Norton Published by Addison Wesley Longman
- (Singapore) Machine Design – M. F. Spott – PHI
- Machine Design, Theory & Practice – J. Michels Walter, E. Wilson Charles – Add MacMilan Publishers, New York.

## Evaluation Scheme:

### 1 On the basis of theory

Evaluation Criteria	Marks
TERM EXAM-01	Average of the two test out of 20
TERM EXAM-02	
Teacher Assessment	20
End Sem	60
<b>Total</b>	<b>100</b>



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### 2. On the basis of practical

Evaluation Criteria	Marks
End Sem University exam	30
Teacher Assessment	20
<b>Total</b>	<b>50</b>

### 2 Credit distribution

Criteria	Credit
Lecture	2
Tutorial	0
Practical	2
<b>Total</b>	<b>4</b>

### ➤ Mapping of Course Objective and Program Outcomes

Course Outcomes	Program Outcomes										
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11
CO1	V	v									
CO2	V	v									
CO3	V	V									
CO4	V	v		v							
CO5	V	v									



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## ➤ Delivery Methodology

### 1 Method

- Lecture notes would be provided in softcopies.
- Assignments are provided in softcopies after completion of each topic.
- To better understand animation videos has been provided.
- Paper presentations over the various topics have been organized.
- Sets of questions are provided over each topic for better practice.

### 2 Supporting Tools

- Black Board had been used to teach.
- Projectors are used for paper presentation.
- Computers and Laptops are used for Computer-Aided Drafting (CAD) and solid modeling.

### 3 Demonstration

- Maximum number of questions is solved in class over the black board.
- Good quantity of questions is provided in assignments over each topic.
- Assignments were checked on scheduled.
- Mid semester tests were organized to check student growth.

## ➤ Assessment Methodology

### 1 Test

- Mid Semester Test-1
- Mid Semester Test-2

### 2 Assignment (Teacher Assessment)

- Hardcopies for the drawing.
- Softcopies for the software.

### 3 Quiz & paper presentation (Teacher Assessment)

- Paper test
- Verbal test
- Paper presentation

### 4 End Semester Exam

- Organized by the SVVV university



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S. No.	Topic	Hours		Date of Completion
		Exp LECT	Cond. LECT	
1(a)	Introduction, classification of machine drawings, principles of drawing, elements of drawing, types of machine drawing, Drawing standards, Drawing Instruments, sheet layout and title block, Application of types of lines, lettering and numbering, Sketching, Dimensioning, screw threads, screw fastening bolt, nut, washer, screw, locking arrangements of nuts, foundation bolts, keys, cotter-joints and pin joint, pipe joint and valves, Riveted joints and welded joints, shaft bearings, brackets and hangers, shaft coupling, clutches and brakes.			
1(b)	Conventional materials, Conventional breaks, Convention of rivets and bolts, welding conventions, Convention of roughness of surface, Convention of machine operation and parts, Convention of gear and gear transmission, convention of springs, Symbolic Representation of fasteners, Holes and bolts, profile section, pipe fittings and valve symbols, Electric symbols			
2(a)	<b>Production Drawing Elements and Assembly Drawings:</b> Introduction, geometric tolerance types and representation, dimensional tolerance types and representation, Limits and fits, hole basis and shaft basis system of fits, surface roughness, indication of surface roughness, roughness value and grade symbol, Assembly concepts, introduction, types, sequence of preparing the assembly drawing, sectional views, convention in sectioning, bill of materials, plotting techniques.			
2(b)	<b>Shaft joints:</b> knuckle joint, cotter joints and types etc. <b>Keys &amp; Shaft coupling:</b> Muff, Flanged, Flexible, Universal and Oldham's coupling etc. <b>Pipe joint:</b> Flanged joint, Socket and Spigot joint, Hydraulic joint, Union joint, Gland & Stuffing Box etc. <b>Bearing:</b> Plummer block, Pedestal bearing etc. <b>Engine Parts:</b> Steam engine, Piston, connecting rod, Stuffing box, cross head, crank shaft etc.			
3(a)	Principle and method of projection, orthographic projection, first angle, third angle, isometric, oblique and perspective projection, conversion of pictorial views into orthographic views illustrative problems.			
3(b)	Types of sectional views, full section, half section, partial section, removed section, revolved section, offset section, sectioning conventions. Reading of orthographic views, blue print reading, missing lines and views, identification of planes, illustrative problems.			
4(a)	Introduction to CAD, Why CAD Software, Scope, objective, benefit and limitations, CAD Interface, Coordinate system, Create Objects and Modify Object. Layers & Blocks, Text, Table & Dimensions, Introducing Printing, Plotting, and Layouts.			
4(b)	Indicate the surface roughness symbols, welding symbols, tolerances, all production drawing symbols and conventions in drawing practice sheets of AutoCAD Mechanical. Assembly Creation methods, Parts Modeling & Representation, Assembly Constraints, Mechanism & Mechanism Analysis, Mass Properties Data exchange standards - IGES - STEP - CALS - DXF - STL.			



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➤ **Daily Lesson Plan (Repeat format for each topic/unit/chapter)**

<b>TOPIC/UNIT/ CHAPTER: 1</b> Title _____ Date: _____ Day: _____
<b><u>UNIT -I</u></b> <b>INTRODUCTION OF MACHINE DRAWING AND DRAWING CONVENTIOS</b>
<b>Topic/Unit/Chapter Objectives:</b> <b>Broad Objectives of the chapter/topic are:</b>  1. Students will be able to understand all drawing conventions, symbols and concepts of machine drawing Creation.
<b>Once the student has completed this topic/ chapter he/she will be able to answer following questions/perform the following activities (Performance Criteria/Indicators with Levels of Bloom's Taxonomy):</b> 1. Basic machine drawing Concepts. 2. Drawing conventions & Symbols.
<b>HOME WORK: related to Topic objective and outcome as expressed in terms of indicators/criteria</b> 1. Practice sheet related Drawing Convention & Symbols
<b>QUIZ: related to Topic objective and outcome</b> 1. Drawing Convention & Symbols quiz





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<b>TOPIC/UNIT/ CHAPTER: 2</b> Title _____ Date: _____ Day: _____
<b><u>UNIT -II</u></b> <b>PRODUCTION DRAWING ELEMENTS AND ASSEMBLY DRAWINGS</b>
<b>Topic/Unit/Chapter Objectives:</b> <b>Broad Objectives of the chapter/topic are:</b> 1. Students will be able to interpret manufacturing and assembly drawings and Acquire skill in preparing production drawings pertaining to various designs.
<b>Once the student has completed this topic/ chapter he/she will be able to answer following questions/perform the following activities (Performance Criteria/Indicators with Levels of Bloom's Taxonomy):</b> 1. Production drawing Concepts , tolerances , Surface Roughness symbols. 2. Assembly drawing concepts.
<b>HOME WORK: related to Topic objective and outcome as expressed in terms of indicators/criteria</b> 1. Production drawing Related example. 2. Assembly drawing Sheets.
<b>QUIZ: related to Topic objective and outcome</b> 1. Production & Assembly drawing Quiz.



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<b>TOPIC/UNIT/ CHAPTER: 3</b>
Title _____ Date: _____ Day: _____
<b>UNIT -III</b> <b>ORTHOGRAPHIC CONVERSION, SECTIONAL AND INTERPRETATION OF VIEWS</b>
<b>Topic/Unit/Chapter Objectives:</b> <b>Broad Objectives of the chapter/topic are:</b> 1. Student will be able to understand principle of isometric & Orthographic views . 2. Student will be able to understand the terminology behind isometric view, Sectional views and Interpretation
<b>Once the student has completed this topic/ chapter he/she will be able to answer following questions/perform the following activities (Performance Criteria/Indicators with Levels of Bloom's Taxonomy):</b> 1. Isometric projection & Orthographic view 2. Sectional views and Interpretation
<b>HOME WORK: related to Topic objective and outcome as expressed in terms of indicators/criteria</b> 1. Isometric projection & Orthographic view 2. Sectional views and Interpretation
<b>QUIZ: related to Topic objective and outcome</b> 1. Isometric projection & Orthographic view 2. Sectional views and Interpretation



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<b>TOPIC/UNIT/ CHAPTER: 4</b> Title _____ Date: _____ Day: _____
<b><u>UNIT -IV</u></b> <b>PRODUCTION AND ASSEMBLY DRAWING CREATION THROUGH CAD</b>
<b>Topic/Unit/Chapter Objectives:</b> <b>Broad Objectives of the chapter/topic are:</b> 1. On completion of this course the students will be able to acquire knowledge of the applications of computers in design, parts creation , assembling and production drawing creation, mechanism and manufacturing activity.
<b>Once the student has completed this topic/ chapter he/she will be able to answer following questions/perform the following activities (Performance Criteria/Indicators with Levels of Bloom's Taxonomy):</b> 1. Cartesian , Polar , Absolute and Relative Co-ordinates systems 2. Drawing Editing, Dimension & plotting Commands 3. Parts assembly , Visualization & Graphics standards
<b>HOME WORK: related to Topic objective and outcome as expressed in terms of indicators/criteria</b> 1. Practice Related to production drawing & Assembly Drawing 2. Practice Related to 3D Modelling & Parts Assembly .
<b>QUIZ: related to Topic objective and outcome</b> 1. Related to Computer-Aided Drafting. 2. Related to Cartesian & Polar co-ordinates system and absolute & Relative co-ordinates system. 3. Related to drawing & solid Modelling.



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- **Teaching Strategy/Method**
  - Black/White Board
  - Power Point Presentation
  - Soft copy of the Lecture Notes
  - Live demonstration
  - Used design & analysis software
  - Assignments
  - Question Bank
  
- **Analysis of Students performance in the course**
  - MST conducted at least twice.
  - Power Point Presentation conduction.
  - Check software Knowledge.
  - Prepare model & assembly on 3d modelling software.
  - Quiz Conduction.
  - Give live Example in Assignments to the students performed poorly.
  - University Results.
  
- **Analysis of Student Feed Back**
  - Certificate/Warning of appreciation to the Course Teacher.
  - Effect in the Self Appraisal Report of the course teacher.
  
- **Teacher Self Assessment (at the completion of course)**
  - Identification of the Poor Student and submission of the list to the HOD for attention in the higher semesters.
  - Modification in the Teaching Strategy if the End Semester Result is poor.
  
- **Recommendations/Suggestions for improvement by faculty**
  - Feedback about the overall quality of the Class to the HOD.
  - Identification of the Strength and Weaknesses of the Class.
  - Suggestion for the Teaching Strategy.
  
- **Result Assessment**
  - From MST Tests weaker student identified and extra class/attention arranged, assignment provided.
  - University Results affects the increment in the salary of the Course Teacher.



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NAME WITH ROLL NUMBER OF STUDENT WHOSE ACADEMIC PERFORMANCE IS NOT SATISFACTORY			
S. No.	Name of student	Roll No	Remedial measures taken by teacher
1.			
2.			
3.			
4.			
5.			



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### CERTIFICATE

I, the undersigned, have completed the course allotted to me as shown below,

S. No.	Semester	Subject with Code	Total Units/ Chapters	Remarks
1.	III	BTAU 305	4	

Date:

Signature of Faculty

Submitted to HOD

### Certificate by HOD

I, the undersigned, certify that *Mr. Sunil Pipleya* Assistant Professor in Mechanical Engineering Department has completed the course work allotted to him satisfactorily.

Date:

Signature of HOD

Submitted to Principal

Date:

Signature of Principal