

Name of Institute : **Indus Institute of Technology & Engineering**
Name of Faculty : **Mechanical Engineering**

Course code : **ME0428**
Course name : **Drawing of Machine Elements**
Pre-requisites : Basic Engineering Graphics knowledge
Credit points : 4
Offered Semester : IV

Course Coordinator

Full Name : Prof. Bhavik Soneji
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Consultation times : 9 AM to 5 PM

Course lecturer

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Consultation times : 9 AM to 5 PM

Course objective

1. To acquire knowledge of fastening arrangements such as welding, riveting and screwed fasteners.
2. To provide the knowledge of design practices for common machine elements, assembly drawings and blue print reading.
3. To know about production drawing enables to do tolerance analysis and specify appropriate tolerances for machine design applications.

Course outcomes

1. Students will be able to know different types of fasteners and its terminology.
2. At the end of this course, students will be able to do tolerance analysis and specify appropriate tolerances for machine design applications.
3. Students will be able to improve their technical Drawing skills.

Course Outline

UNIT-I

[08]

Conventional representation of machine components & materials

leaf spring, leaf spring with eyes, coil spring (tension and compression), disc spring, spiral spring, splined shaft, serrated shaft, square end of shaft, ball and roller bearing, spur gearing, bevel gearing, worm and worm wheel, straight knurling, diamond knurling, internal and external thread, method of designating and dimensioning metric thread & materials representation.

Elements of Production Drawing

Geometric tolerance, types of Geometric tolerance, terminology for Geometric tolerance, Representation of Geometric tolerance on drawing, Dimensional tolerance, Terminology of dimensional tolerance, selection of tolerance, representation of dimensional tolerance, Fits, Hole basis and shaft basis system, Representation of Holes, shafts and Fits, Surface roughness, Terminology of surface roughness, Representation of surface roughness on drawing, Conventional representation of machine parts.

UNIT-II

[08]

Screwed Threads & Fasteners

Introduction, Terminologies, All types of V& square threads, Conventional representation of threads, Multiple start thread, Right hand & left hand threads, Types of nut, bolt & washer, Forms of bolt, Set-screw, Drawing hexagonal nut and square nut, hexagonal headed bolt, square headed bolt and washer. Screw thread, Foundation of bolt, locking arrangement, stud, set screw, Spanner.

Key, cotter Joints, Pin Joints:

Keys Joints, Taper keys, Parallel keys, Spline shafts, Woodruff keys, Cone keys, Cotter Joints, Knuckle Joints.

UNIT-III

[08]

Riveted Joint

Introduction, Riveting, Form and properties of snap or cup head rivet, failure of riveted joint, caulking and fullering process, dimensions of rivet joint, Type of riveted joints, single riveted lap joint, double riveted (chain) lap joint, double riveted (zigzag) lap joint, single riveted (single strap) butt joint, single riveted (double straps) butt joint.

Welded joints

Introduction, Types of welding process, Types of welded and weld joints, representation of welded joint

UNIT-IV

[08]

Shaft coupling

Introduction, Rigid coupling, Muff coupling, Half lap coupling, Split muff coupling, Flange coupling, Protected type flange coupling, Solid flange coupling, Flexible coupling- hook's joint, Oldham's coupling

Pipe Joints

Socket & spigot joint, Types of coupler, Union Joint, Piping drawing

Method of delivery

Lectures -Online (Chalk & talk, PPT)
 Tutorials -Online (Chalk & talk, PPT)
 Video lectures for some relevant topics

Study time

2 hours for Lectures per week
 2 hours of Tutorial per week

CO-PO Mapping

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	3	1	1	-	-	-	-	-	-	-	-	1
CO2	3	2	3	1	3	-	-	-	-	-	-	-
CO3	3	2	2	2	3	-	-	-	-	-	-	-

Blooms Taxonomy and Knowledge retention



Figure 1: Blooms Taxonomy

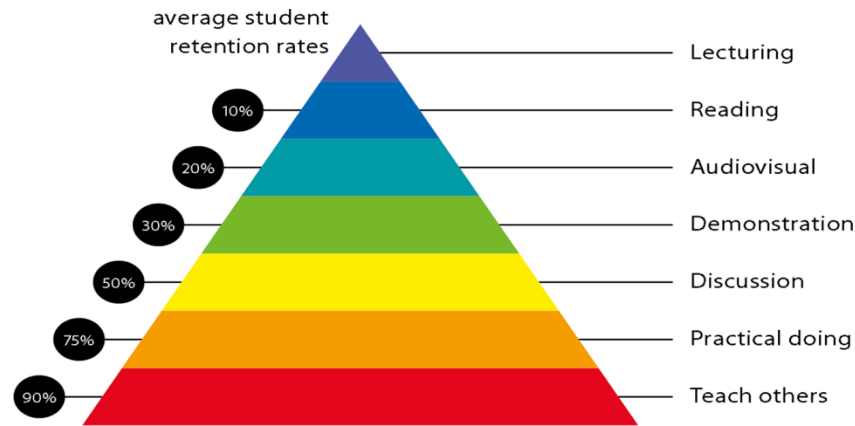


Figure 2: Knowledge retention

Graduate Qualities and Capabilities covered

(Qualities graduates harness crediting this Course)

General Graduate Qualities	Specific Department of _____ Graduate Capabilities
<p>Informed Have a sound knowledge of an area of study or profession and understand its current issues, locally and internationally. Know how to apply this knowledge. Understand how an area of study has developed and how it relates to other areas.</p>	<p>1 Professional knowledge, grounding & awareness</p>
<p>Independent learners Engage with new ideas and ways of thinking and critically analyze issues. Seek to extend knowledge through ongoing research, enquiry and reflection. Find and evaluate information, using a variety of sources and technologies. Acknowledge the work and ideas of others.</p>	<p>2 Information literacy, gathering & processing</p>
<p>Problem solvers Take on challenges and opportunities. Apply creative, logical and critical thinking skills to respond effectively. Make and implement decisions. Be flexible, thorough, innovative and aim for high standards.</p>	<p>4 Problem solving skills</p>
<p>Effective communicators Articulate ideas and convey them effectively using a range of media. Work collaboratively and engage with people in different settings.</p>	<p>5 Written communication</p>
	<p>6 Oral communication</p>
	<p>7 Teamwork</p>

Recognize how culture can shape communication.	
Responsible Understand how decisions can affect others and make ethically informed choices. Appreciate and respect diversity. Act with integrity as part of local, national, global and professional communities.	10 Sustainability, societal & environmental impact

Practical work:

NIL

Lecture/tutorial times

(Give lecture times in the format below)

<i>Example:</i>			
Lecture	Monday	9.00 – 9.55 am	LH-14
Tutorial	Wednesday	9.00 – 10.50 am	DH-4

Attendance Requirements

The University norms states that it is the responsibility of students to attend all lectures, tutorials, seminars and practical work as stipulated in the course outline. Minimum attendance requirement as per university norms is compulsory for being eligible for semester examinations.

Text books

1. Design of Machine Elements, V. B. Bhandari, Mc.Graw Hill, Third Edition.
2. Machine design, Dr. P C Sharma, Dr. D K Aggarwal, S K Kataria & Sons, Twelfth Edition.
3. Machine Design: Fundamental and application, P C Gope, PHI.

Additional Materials

1. Machine Design by Robert L Norton, Pearson Education
2. Machine Design by Dr. S.S. Wadhwa, Dhanpatrai & Co.
3. Mechanical engineering design by Joseph shigley, McGraw Hill Publishing Co.
4. Fundamentals of Machine component design by Juvinall & Marshek, Wiley India education
5. Design of Machine Elements, Farazdak Haideri, Nirali Prakashan.

ASSESSMENT GUIDELINES

Your final course mark will be calculated from the following:

(a) CIE 60 marks (40 marks mid semester examination + 20 marks internal evaluation)

Components of internal evaluation need to include

(05 marks as attendance bonus for all students having attendance > 80%) + (05 marks for presentation) + (10 marks for assignment or case studies, limited to minimum 02 assignments per course).

(b) End Semester 40 marks.

SUPPLEMENTARY ASSESSMENT

Students who receive an overall mark less than 40% in internal component or less than 40% in the end semester will be considered for supplementary assessment in the respective components (i.e internal component or end semester) of semester concerned. Students must make them available during the supplementary examination period to take up the respective components (internal component or end semester) and need to obtain the required minimum 40% marks to clear the concerned components.

Late Work

Late assignments will not be accepted without supporting documentation. Late submission of the reports will result in a deduction of -% of the maximum mark per calendar day

Format

All assignments must be presented in a neat, legible format with all information sources correctly referenced. **Assignment material handed in throughout the session that is not neat and legible will not be marked and will be returned to the student.**

Retention of Written Work

Written assessment work will be retained by the Course coordinator/lecturer for two weeks after marking to be collected by the students.

University and Faculty Policies

Students should make themselves aware of the University and/or Faculty Policies regarding plagiarism, special consideration, supplementary examinations and other educational issues and student matters.

Plagiarism - Plagiarism is not acceptable and may result in the imposition of severe penalties. Plagiarism is the use of another person's work, or idea, as if it is his or her own - if you have any doubts at all on what constitutes plagiarism, please consult your Course coordinator or lecturer. Plagiarism will be penalized severely.

Do not copy the work of other students.

Do not share your work with other students (except where required for a group activity or assessment)

Course schedule

Week #	Topic & contents	CO Addressed	Teaching Learning Activity (TLA)
Weeks 1	Conventional representation of machine components & materials leaf spring, leaf spring with eyes, coil spring (tension and compression), disc spring, spiral spring, splined shaft, serrated shaft, square end of shaft, ball and roller bearing, spur gearing, bevel gearing, worm and worm wheel	CO-1,2	online , PPT
Weeks 2	Straight knurling, diamond knurling, internal and external thread, Methods of designating and dimensioning metric thread & materials representation.	CO-2	Lecture & Tutorial
Week 3	Elements of Production Drawing Geometric tolerance, types of Geometric tolerance, terminology for Geometric tolerance,	CO-3,1	online, chalk and talk , PPT
Week 4	Representation of Geometric tolerance on drawing, Dimensional tolerance, Terminology of dimensional tolerance, selection of tolerance,	CO-1,3	online & Tutorial
Week 5	Representation of Holes, shafts and Fits, Surface roughness, Terminology of surface roughness, Representation of surface roughness on drawing, Conventional representation of machine parts. Class Test-1	CO-1,3	Lecture & Tutorial
Week 6	Screwed Threads & Fasteners Introduction, Terminologies, All types of V& square threads,	CO-1,2	Lecture , chalk and talk , PPT
Week 7	Conventional representation of threads, Multiple start thread, Right hand & left hand threads,	CO-1,3	Lecture & Tutorial
Week 8	Types of nut, bolt & washer, Forms of bolt, Set-screw,.	CO-1,3	Lecture , chalk and talk , PPT
Week 9	Drawing hexagonal nut and square nut, hexagonal headed bolt, square headed bolt and washer. Screw thread, Foundation of	CO-1,2	Lecture & Tutorial

		bolt, locking arrangement, stud, set screw, Spanner		
Week 10		Key, cotter Joints, Pin Joints: Keys Joints, Taper keys, Parallel keys, Spline shafts, Woodruff keys, Cone keys, Cotter Joints, Knuckle Joints	CO-1,2	Lecture & Tutorial
Week 11		Shaft coupling Introduction, Rigid coupling, Muff coupling, Half lap coupling, Split muff coupling, Flange coupling, Protected type flange coupling, Solid flange coupling, Flexible coupling- hook's joint, Oldham's coupling	CO-1,3	Lecture , chalk and talk , PPT
Week 12		Pipe Joints Socket & spigot joint, Types of coupler, Union Joint, Piping drawing Class Test-2	CO-1,3	Lecture & Tutorial

