

# SHRI VISHWAKARMA SKILL UNIVERSITY

(A STATE GOVT SKILL UNIVERSITY ESTABLISHED BY GOVT.OF HARYANA)

Name of the Skill Faculty: Skill Faculty of Engineering & Technology

Name of the Programme/Course: D. Voc. (Mechanical- Manufacturing)

Industry Partner: Roop Auto

Duration of the course: 6 Semesters/3 Years

As per the modality of the course, the students admitted in the course are divided in to two groups (i.e. Group- A and Group- B). One group join OJT and completes two MOOC course (on-line mode) while other group join SVSU to attend regular classes (full time) with the details as;

Semester	Group- A	Group- B	Session
1st	SVSU	OJT	Aug. 2020
2 <sup>nd</sup>	OJT	SVSU	Jan. 2021
3 <sup>rd</sup>	SVSU	OJT	Aug. 2021
4 <sup>th</sup>	OJT	SVSU	Jan. 2022
5 <sup>th</sup>	SVSU	OJT	Aug. 2022
6 <sup>th</sup>	OJT	SVSU	Jan. 2023

### Credit Allocation:

Type	No. of hrs.	Credit
Theory	15	1
Practical	30	1
On-the-Job Training (OJT)	45	1

Group-A: Scheme and Syllabus

Group-B: Scheme and Syllabus

# Scheme & Syllabus

(Session:2020-2023)

(Group-A)

TEACHING SCHEME FOR FIRST SEMESTER															
Category	Subject Code	Subject Name	Credits			Marks							Total hrs. per course		
						Theory			Practical			Total (T+P)			
			Th.	Pr.	To.	Int.	Ext.	To.	Int.	Ext.	To.		Th.	Pr.	To.
Skill Education Component (SEC)	ME-302L	Workshop Practice lab	-	4	4	-	-	-	70	30	100	100	-	120	120
	IMS-302 IMS-302L	Inspection & Quality Control	3	1	4	15	35	50	35	15	50	100	45	30	75
	*ME-301L	Engineering Graphics and Drawing	-	4	4	-	-	-	70	30	100	100	-	120	120
	<b>SEC Total</b>			<b>3</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>35</b>	<b>50</b>	<b>175</b>	<b>75</b>	<b>250</b>	<b>300</b>	<b>45</b>	<b>270</b>
General Education Component (GEC)	ENG-301 ENG-301L	Language (English)	3	1	4	15	35	50	35	15	50	100	45	30	75
	ME-303, ME-303L	Workshop Technology	4	-	4	30	70	100	-	-	-	100	60	-	60
	MTH-301	Applied Mathematics	4	-	4	30	70	100	-	-	-	100	60	-	60
	CSE-301 CSE-301L	Basics of Computer	3	1	4	15	35	50	35	15	50	100	45	30	75
	IMS-301 IMS-301L	Fundamental of Industrial Management	3	1	4	15	35	50	35	15	50	100	45	30	75
	<b>GEC Total</b>			<b>17</b>	<b>3</b>	<b>20</b>	<b>90</b>	<b>210</b>	<b>300</b>	<b>105</b>	<b>45</b>	<b>150</b>	<b>500</b>	<b>255</b>	<b>90</b>
<b>Grand Total</b>			<b>20</b>	<b>12</b>	<b>32</b>	<b>105</b>	<b>245</b>	<b>350</b>	<b>280</b>	<b>120</b>	<b>400</b>	<b>800</b>	<b>300</b>	<b>360</b>	<b>660</b>

\*Engineering Graphics & Drawing (ME-301L) will be treated as a special case of Practical. The sessional test will be conducted similar to theory subjects but external exam. will not be conducted (as it is practical).

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TEACHING SCHEME FOR SECOND SEMESTER															
Category	Subject Code	Subject Name	Credits			Marks							Hrs		
						Theory			Practical			Total			
			T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO
General Education Component	MC-301	*MOOC/ Online Course-I (Total Quality Management-I)	2	-	2	30	70	100	-	-	-	100	30	-	30
	EM-301	Entrepreneurship management (MOOC/ Online Course-II)	2	-	2	30	70	100	-	-	-	100	30	-	30
	<b>Total</b>		<b>4</b>	<b>-</b>	<b>4</b>	<b>60</b>	<b>140</b>	<b>200</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>200</b>	<b>60</b>	<b>-</b>	<b>60</b>
Skill Education Component	OJT-301	On Job Training (OJT)	-	24	24	-	-	-	245	105	350	350	-	1080	1080
	<b>Total</b>		<b>-</b>	<b>24</b>	<b>24</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>245</b>	<b>105</b>	<b>350</b>	<b>350</b>	<b>-</b>	<b>1080</b>	<b>1080</b>
<b>Grand Total</b>			<b>4</b>	<b>24</b>	<b>28</b>	<b>60</b>	<b>140</b>	<b>200</b>	<b>245</b>	<b>105</b>	<b>350</b>	<b>550</b>	<b>60</b>	<b>1080</b>	<b>1140</b>

**Job Role: Level-3 (After 1<sup>st</sup> Year of completion)**

Machining and quality Technician (ASC/Q3509)

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

TEACHING SCHEME FOR THIRD SEMESTER															
Category	Subject Code	Subject Name	Credits			Marks							Total hrs. per course		
						Theory			Practical			Total (T+P)			
			Th .	Pr .	To .	Int .	Ext .	To.	Int .	Ext .	To.		Th.	Pr.	To.
Skill Education Component (SEC)	ME-401L	CAD lab	-	4	4	-	-	-	70	30	100	100	-	120	120
	ME-404 ME-404L	CNC machines & Automation	4	-	4	30	70	100	-	-	-	100	60	-	60
	ME-502L	Fundamentals of CNC machines	-	4	4	-	-	-	70	30	100	100	-	120	120
	<b>SEC Total</b>			<b>4</b>	<b>8</b>	<b>12</b>	<b>30</b>	<b>70</b>	<b>100</b>	<b>140</b>	<b>60</b>	<b>200</b>	<b>300</b>	<b>60</b>	<b>240</b>
General Education Component (GEC)	EE-401 EE-401L	Basics of Electrical and Electronics Engg.	3	1	4	15	35	50	35	15	50	100	45	30	75
	PHY-401 PHY-401L	Applied Physics	3	1	4	15	35	50	35	15	50	100	45	30	75
	IMS-401	Estimating & Costing	4	-	4	30	70	100	-	-	-	100	60	-	60
	EVS-401	EVS	4	-	4	30	70	100	-	-	-	100	60	-	60
	ME-403 ME-403L	Applied Mechanics	3	1	4	15	35	50	35	15	50	100	45	30	75
	<b>GEC Total</b>			<b>17</b>	<b>3</b>	<b>20</b>	<b>105</b>	<b>245</b>	<b>350</b>	<b>105</b>	<b>45</b>	<b>150</b>	<b>500</b>	<b>255</b>	<b>90</b>
<b>Grand Total</b>			<b>21</b>	<b>11</b>	<b>32</b>	<b>135</b>	<b>315</b>	<b>450</b>	<b>245</b>	<b>105</b>	<b>350</b>	<b>800</b>	<b>315</b>	<b>330</b>	<b>645</b>

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

TEACHING SCHEME FOR FOURTH SEMESTER															
Category	Subject Code	Subject Name	Credits			Marks							Hrs		
						Theory			Practical			Total			
			T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO
General Education Component	MC-401	*MOOC/ Online Course-III/ Manufacturing Process Technology I and II	2	-	2	30	70	100	-	-	-	100	30	-	30
	MC-402	*MOOC/ Online Course-IV/Industrial best practices	2	-	2	30	70	100	-	-	-	100	30	-	30
	<b>Total</b>		<b>4</b>	<b>-</b>	<b>4</b>	<b>60</b>	<b>140</b>	<b>200</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>200</b>	<b>60</b>	<b>-</b>	<b>60</b>
Skill Education Component	OJT-401	On Job Training (OJT)	-	24	24	-	-	-	245	105	350	350	-	1080	1080
	<b>Total</b>		<b>-</b>	<b>24</b>	<b>24</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>245</b>	<b>105</b>	<b>350</b>	<b>350</b>	<b>-</b>	<b>1080</b>	<b>1080</b>
<b>Grand Total</b>			<b>4</b>	<b>24</b>	<b>28</b>	<b>60</b>	<b>140</b>	<b>200</b>	<b>245</b>	<b>105</b>	<b>350</b>	<b>550</b>	<b>60</b>	<b>1080</b>	<b>1140</b>

Note: \* Relevant MOOC/Online course will be offered as per the availability.

**Job Roles: Level-4 (After 2<sup>nd</sup> Year of completion)**

Machining Technician/ CNC Operator (ASC/Q3503)

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

TEACHING SCHEME FOR FIFTH SEMESTER															
Category	Subject Code	Subject Name	Credits			Marks							Total hrs. per course		
			Th	Pr	To	Theory			Practical			Total (T+P)	Th.	Pr.	To.
						Int	Ext	To.	Int	Ext	To.				
Skill Education Component (SEC)	ME-501L	CAD/ CAM	-	4	4	-	-	-	70	30	100	100	-	120	120
	ME-502	Introduction to Jigs & Fixtures	4	-	4	30	70	100	-	-	-	100	60	-	60
	ME-503L	CNC Programing lab	-	4	4	-	-	-	70	30	100	100	-	120	120
	<b>SEC Total</b>			<b>4</b>	<b>8</b>	<b>12</b>	<b>30</b>	<b>70</b>	<b>100</b>	<b>140</b>	<b>60</b>	<b>200</b>	<b>300</b>	<b>60</b>	<b>240</b>
General Education Component (GEC)	ME-504 ME-504L	Materials and Metallurgy	3	1	4	15	35	50	35	15	50	100	45	30	75
	ME-505 ME-505L	Hydraulics & Pneumatics	3	1	4	15	35	50	35	15	50	100	45	30	75
	ME-506	Plant Maintenance & Material Handling	4	-	4	30	70	100	-	-	-	100	60	-	60
	ME-507 ME-507L	Fabrication Processes	3	1	4	15	35	50	35	15	50	100	45	30	75
	ME-508 ME-508L	Strength of Materials	3	1	4	15	35	50	35	15	50	100	45	30	75
	<b>GEC Total</b>			<b>16</b>	<b>4</b>	<b>20</b>	<b>90</b>	<b>210</b>	<b>300</b>	<b>140</b>	<b>60</b>	<b>200</b>	<b>500</b>	<b>240</b>	<b>120</b>
<b>Grand Total</b>			<b>20</b>	<b>12</b>	<b>32</b>	<b>120</b>	<b>280</b>	<b>400</b>	<b>280</b>	<b>120</b>	<b>400</b>	<b>800</b>	<b>300</b>	<b>360</b>	<b>720</b>

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

TEACHING SCHEME FOR SIX SEMESTER													
Category	Subject Name	Credits			Marks						Hrs		
					Theory			Practical					
		T	P	TO	I	E	TO	I	E	TO	T	P	TO
General Education Component (GEC)	Project (Live) (PRO-501)	-	4	4	-	-	-	70	30	100	-	120	120
	<b>GEC Total</b>	-	<b>4</b>	<b>4</b>	-	-	-	<b>70</b>	<b>30</b>	<b>100</b>	-	<b>120</b>	<b>120</b>
Skill Education Component (SEC)	OJT (OJT-501)	-	24	24	-	-	-	245	105	350	-	1080	1080
	<b>SEC Total</b>	-	<b>24</b>	<b>24</b>	-	-	-	<b>245</b>	<b>105</b>	<b>350</b>	-	<b>1080</b>	<b>1080</b>
<b>Grand Total</b>		-	<b>28</b>	<b>28</b>	-	-	-	<b>315</b>	<b>135</b>	<b>450</b>	-	<b>1200</b>	<b>1200</b>

**Job Roles (After 3<sup>rd</sup> Year of completion):**

Machine Shop Supervisor (ASC/Q3505)

**Syllabus: D.Voc. (Mechanical-Manufacturing)**

**Industry Partner: Roop Auto Ltd.**

**Session: 2019-22 (Group-A)**



**Semester: First****Subject: Workshop Practice lab****Subject Code: ME-302L**

<b>Credit</b>	<b>Hours</b>	<b>Marks</b>		
4	120	I	E	To
		70	30	100

**List of experiments**

1. To find the least count of Vernier caliper, micrometer and dial indicator
2. To study height gauge and surface plate
3. To prepare a job on milling machine
4. To prepare a job in fitting shop
5. To prepare butt joint using electric arc welding
6. To prepare a job on lathe machine including turning, taper turning, facing, threading and knurling operations.
7. To prepare lap joint using electric arc welding
8. To prepare a joint using gas welding

**Subject: Inspection & Quality Control****Subject code: IMS-302**

Credit	Hours	Marks		
		I	E	To
3	45			
		15	35	50

**Unit-1: Inspection**

Introduction, units of measurement, standards for measurements and interchangeability, types of inspection, remedial, preventive and operative inspection, incoming, in-process and final inspection.

**Unit-2: Measurement**

Basics principles used in measurement and gauging, study of various measurement instruments- calipers, micrometers, dial indicators, surface plate, try square, protectors, sine bar, slip gauges, profile projector.

**Unit-3: Gauging**

Introduction, limit gauges-plug, ring, snap, taper, thread, height, depth, feeler, wire gauge and their applications for linear, angular, surface, thread and gear measurement.

**Unit-4: Statistical Quality Control**

Basics statistical concepts, empirical distribution and histograms, frequency, mean, mode, standard deviation, normal distribution, introduction to control charts-X, R, P and C charts and their applications.

**Unit-5: Sampling**

Introduction, sampling plans, collection of sample size, methods of taking samples, frequency of samples, inspection plan format and test reports.

**Recommended Books**

1. Statistical Quality Control by M. Mahajan; Dhanpat Rai and Sons, Delhi
2. Engineering Metrology by R. K. Jain
3. Engineering Metrology by R.K. Rajput, SK Kataria and Sons



**Subject: Inspection & Quality Control lab**

**Subject code: IMS-302 L**

<b>Credit</b>	<b>Hours</b>	<b>Marks</b>		
1	30	I	E	To
		35	15	50

**List of Experiments**

1. Use of dial indicator for measurement taper
2. Use of combination set, bevel protector and sine bar for measuring taper
3. With the help of given data, plot X, R, P and C Charts
4. Use of slip gauge in measurement of centre distance between two pins.

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: Engineering Graphics & Drawing****Subject code: ME-301 L**

Credit	Hours	Marks		
		I	E	To
4	120	70	30	100

**OBJECTIVES**

1. Understand and appreciate the importance of Engineering Graphics in Engineering
2. Understand the basic principles of Technical/Engineering Drawing
3. Understand the different steps in producing drawings according to BIS conventions

**OUTCOMES**

1. The student will become familiar with fundamentals of various science and technology subjects and thus acquire the capability to applying them
2. The graduates will become familiar with fundamentals of engineering design. Understanding the concept generation, design optimization and evaluation.
3. Students will be able to effectively design various engineering components and make process plan for the production.

**SKILL SET**

1. Projection of various components according to BIS specifications.
2. Assembly of data and information of various components in visualized way
3. Interpretation of technical graphics assemblies

**CONTENTS****2. Introduction to drawing, lines and lettering:**

- 1.1. Definition and classification of drawing
- 1.2. Drawing instruments such as; drawing board, drawing sheets, drafter.
- 1.3. Types of pencils, sheets, eraser etc.
- 1.4. Different types of lines (Straight line, inclined line and curved lines)
- 1.5. Practice engineering style for letters and numbers as BIS: SP:46-2003

**Hands on training:**

- Prepare drawing sheet by using different types of lines
- Prepare drawing sheet by Bisection of line, angle, arc.

**3. Dimensioning and scale:**

- 2.1. Importance of dimensioning
- 2.2. Types (i.e. chain, parallel and progressive etc.) and methods of placing dimensioning (i.e. aligned and unidirectional)
- 2.3. Principles of dimensioning and practice dimensioning technique as BIS: SP: 46-2003.

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2.4. Free hand sketching of straight lines, circle, square, Polygons

**Hands on training:**

- To divide line of length 120mm into 9 equal parts
- Divide a circle into 12 equal parts by using engineering compass

**4. Introduction to Projection:**

3.1. Introduction to first and third angle projection

3.2. Introduction to projection of point, line and plane

**Hands on training:**

- Practice for projection of point
- Practice for projection of line
- Practice for projection plane

**5. Isometric projection**

1.1 Isometric drawing of simple geometric solids

**Hands on training:**

- Prepare drawing sheet of isometric projection.

**6. Orthographic projection**

1.1 Orthographic projection of simple geometric solids.

**Hands on training:**

- Prepare drawing sheet of orthographic projection

**Hands on training:**

- Prepare drawing sheet of orthographic projection
- Prepare drawing sheet of isometric projection.

**Text Book**

1. Engineering Drawing Plane and Solid Geometry : N.D. Bhatt and V.M. Panchal, Forty-
2. Fourth Edition 2002, Charotar Publishing House.
3. Engineering Graphics and Drafting : P.S. Gill, Milenium Edition, S.K. Kataria and Sons.

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: Language (English)****Subject code: ENG-301**

Credit	Hours	Marks		
		I	E	To
3	45	15	35	50

**Objectives**

- Develop effective communication skills among the students for the business world.

**Learning Outcomes**

- Able to differentiate in the vowels and consonants that can help the students to pronounce words better and be able to learn phonetics.
- Learn the correct pronunciation of the words helping in the reduction of Mother Tongue Influence.  
Able to communicate effectively and will have improved verbal communication.
- Learn to frame the sentences properly with the correct formation. This will improve the written skills of the students.
- Able to write paragraphs on different topics with the correct usage of vocabulary and will improve the written as well as verbal communication.
- Learn the correct usage of the punctuation marks, will draft formal & informal emails and will comprehend the articles.
- Effectively use established communication systems and protocols in the workplace.

Unit	Topic	Key Learning
I	<b>Communication</b>	<ul style="list-style-type: none"> <li>• Meaning of Communication,</li> <li>• Importance of Communication,</li> <li>• Types of Communication, Process of Communication,</li> <li>• Communication network in an organization,</li> <li>• Barriers to Communication,</li> <li>• Essentials of good Communication.</li> </ul>
II	<b>Grammar and Usage</b>	<ul style="list-style-type: none"> <li>• Subject and verb agreement,</li> <li>• Tenses: simple past (negatives/interrogatives) present perfect,</li> <li>• past perfect continuous,</li> <li>• past perfect,</li> <li>• expressing future time (will and going to),</li> </ul>

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		<ul style="list-style-type: none"> <li>• Passive voice (perfect tenses and modals),</li> <li>• Modals (must, should, ought to, would),</li> <li>• Linking words (to like because although, instead of, if, as, since, who, which that, when however, in spite of),</li> <li>• Reported speech, statements, questions (yes/no).</li> </ul>
III	<b>Reading Skills</b>	<ul style="list-style-type: none"> <li>• Prose texts: The Gift of the Magi by O. Henry</li> <li>• Poems: 1. Death the Leveller by James Shirely</li> <li>• 2. Mending wall – Robert Frost</li> <li>• Drama: Refund by Fritz Karinthy</li> </ul>
IV	<b>Listening Skills</b>	<ul style="list-style-type: none"> <li>• The process of listening,</li> <li>• Types of listening,</li> <li>• Benefits of effective listening,</li> <li>• Barriers to listening.</li> </ul>
V	<b>Writing Skills</b>	<ul style="list-style-type: none"> <li>• Paragraph Writing:(Describing objects,describing people,Narrating events,stories)</li> <li>• Letter Writing: Application for leave Application for jobs, asking for information from various agencies (e.g. Last date for getting prospects; price of items before placing orders) Note making</li> <li>• Ending (punctuation, spelling, appropriate vocabulary, structures)</li> </ul>

**Suggested Readings:**

- Sethi, J & et al. A Practice Course in English Pronunciation, Prentice Hall of India, New Delhi.
- Sen, Leena. Communication Skills, Prentice Hall of India, New Delhi.
- Prasad, P. Communication Skills, S.K. Kataria & Sons.
- Bansal, R.K. and J.B. Harrison. Spoken English, Orient Language.
- Roach Peter. English Phonetics and Phonology.
- A.S. Hornby's. Oxford Advanced Learners Dictionary of Current English, 7th Edition.
- Prasad, P. The Functional Aspects of Communication Skills, Delhi.
- McCarthy, Michael. English Vocabulary in Use, Cambridge University Press.
- Rajinder Pal and PremLata. English Grammar and Composition, Sultan Chand Publication.
- Idioms & Phrases (English-Hindi), Arihant Publication (India) Pvt. Ltd.



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- One Word Substitution, Dr. Ashok Kumar Singh, Arihant Publications (India) Pvt,Ltd

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**Subject: Language English Lab****Subject code: ENG-301 L**

Credit	Hours	Marks		
1	30	I	E	To
		35	15	50

**Objectives:** Develop effective communication skills among the students for the business world

**Learning Outcomes**

- Able to differentiate in the vowels and consonants that can help the students to pronounce words better and be able to learn phonetics.
- Learn the correct pronunciation of the words helping in the reduction of Mother Tongue Influence.  
Able to communicate effectively and will have improved verbal communication.
- Learn to frame the sentences properly with the correct formation. This will improve the written skills of the students.
- Able to write paragraphs on different topics with the correct usage of vocabulary and will improve the written as well as verbal communication

**List of Practical's**

1. Greetings and starting a conversation.
2. Non Verbal Communication Techniques during conversation.
3. Verbal Communication Techniques during Conversation.
4. PPT presentation.
5. Debate.
6. Situational dialogues / Role play.
7. Telephonic skills.
8. Group Discussions

**Subject: Workshop Technology**

**Subject code: ME-303**

Credit	Hours	Marks		
4	60	I	E	To
		30	70	100

### **Unit-1: Metal Cutting**

Introduction and definition, various types of single point cutting tools and their uses, Single point cutting tool geometry, Tool signature and its effect, Heat produced during cutting and its effect, cutting speed, feed and depth of cut and their effect.

### **Unit-2: Lathe, drilling and boring operations**

Introduction, function of various parts of a lathe, classification and specifications of various types of lathe, Lathe operations- plain and step turning, facing, parting off, taper turning, drilling, reaming, threading and knurling. Lathe accessories-centres, dogs, types of chucks, face plate, angle plate, mandrel, steady rest. Work holding devices.

Working principle of drilling, its classification, various operations performed on drilling machine-drilling, spot facing, reaming, boring, counter boring, counter sinking, tapping, nomenclature of a drill, types of drills

Working principle of boring, classification of boring machines, boring tools, boring bars and boring heads.

### **Unit-3: Milling and Grinding operations**

Introduction, working principle of milling machine, classification, brief description and applications of milling machine, Main parts of column and Knee type milling machine, Milling methods-up milling and down milling, Milling operation-face milling, angular milling, form milling and gange milling, working holding devices.

Purpose of grinding, various elements of grinding wheel-Abrasive, Grade, Structure, Bond. Common wheel shapes and types of wheels- built up wheels, mounted wheels and diamond wheels, specification of grinding wheels as per BIS, Truing, dressing, balancing and mounting

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of wheel, Grinding methods-Surface grinding, cylindrical grinding and centreless grinding, Grinding machine-Cylindrical grinder, surface grinder, internal grinder

**Unit-4: Welding**

Principle of welding, classification of welding processes, Advantages and limitations of welding, Industrial applications of welding, welding positions and techniques, symbols, Gas welding-Principle of operation, types of gas welding flames and their applications, Gas welding equipment, Gas welding torch. Arc. Welding-Principle of operation, Arc welding machines and equipment, A.C. and D.C. arc welding, effect of polarity, current and voltage regulations. Welding defects-types of welding defects, their causes and remedies

**Unit-5: Cutting Tool Materials**

Introduction, properties of cutting tool materials, study of cutting tool materials- High speed steel, Tungsten Carbide, Cobalt steel cemented carbides, stellite, ceramics and diamond.

**Recommended Books**

1. Manufacturing Technology by Rao: Tata McGraw Hill Publications, New Delhi
2. A Text Book of Production Engineering by P.C. Sharma: S. Chand and Company Ltd., New Delhi.

**Subject: Applied Mathematics**

**Subject code: MTH-301**

Credit	Hours	Marks		
		I	E	To
4	60			
		30	70	100

### Objectives

- Develop the knowledge in the area of algebraic functions to solve engineering problems.

### Learning Outcomes

- Learn the applications of Sets, Relations and Functions.
- Learn to solve special series and sequences
- Understand basic arithmetic and calculation methods.
- Learn co-ordinate Geometry.
- Learn to solve Statistics and Probability related problems.

Unit	Topic	Key Learning
I	<b>Sets, Relations and Functions</b>	<ul style="list-style-type: none"> <li>• Theory of Sets,</li> <li>• Relations,</li> <li>• Functions,</li> <li>• Polynomials and Graphical Representation</li> </ul>
II	<b>Sequence and Series</b>	<ul style="list-style-type: none"> <li>• Introduction to Sequence and Series,</li> <li>• Arithmetic Progression (A.P.),</li> <li>• Geometric Progression (G.P.),</li> <li>• Harmonic Progression (H.P.)</li> </ul>
III	<b>Algebra-I</b>	<ul style="list-style-type: none"> <li>• Partial Fraction,</li> <li>• Permutation,</li> <li>• Combination,</li> <li>• Binomial Theorem</li> </ul>
IV	<b>Trigonometry</b>	<ul style="list-style-type: none"> <li>• Trigonometric Ratio,</li> <li>• Compound Angles,</li> <li>• Multiple and sub multiple angles,</li> <li>• Transformations of products into sums or differences and vice versa</li> </ul>
V	<b>Straight Lines</b>	<ul style="list-style-type: none"> <li>• Cartesian and Polar Coordinate,</li> <li>• Different Forms of a Straight Line,</li> <li>• General Equation of a Line,</li> <li>• Distance of a Point from a Line</li> </ul>

### Suggested Readings:

- Mathematics for class XI Part I and II NCERT.

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- Mathematics for class XII Part I and II NCERT.

**Subject: Basics of Computer****Subject code: CSE-301****Objectives**

- Build basic technical skills and develop any kind of computer application.

Credit	Hours	Marks		
		I	E	To
3	45	15	35	50

**Learning Outcomes**

- State the applications of Computers and understand the basic components of computer.
- Identify & describe various parts of computers like CPU, keyboard, monitor, etc.
- View files, work with files and customize window.
- Able to Differentiate in various operating system.
- Apply the office Applications for the task assigned by the authorities.
- Outline the basics of Networking.
- Make use of Internet and its applications when required.

Unit	Topic	Key Learning
I	<b>Introduction to Computer system</b>	<ul style="list-style-type: none"> <li>• Basic Applications of Computer;</li> <li>• Block Diagram of Computer System, Input / Output Devices,</li> <li>• Computer Memory,</li> <li>• Concepts of Hardware and Software;</li> <li>• Computer Virus: Definition,</li> <li>• Types of viruses, Characteristics of viruses, Anti-virus software.</li> </ul>
II	<b>Operating System</b>	<ul style="list-style-type: none"> <li>• Overview of operating system:</li> <li>• Definition,</li> <li>• Functions of operating system,</li> <li>• Need and its services,</li> <li>• Types of operating system,</li> <li>• Batch Processing,</li> <li>• Spooling, Multiprocessing, Multiprogramming, Time-Sharing,</li> <li>• Comparison between DOS and windows,</li> <li>• Comparison between Unix and Windows.</li> </ul>
III	<b>Office Applications</b>	<ul style="list-style-type: none"> <li>• Introduction to MS Word, Introduction to MS Excel,</li> <li>• Introduction to MS PowerPoint,</li> <li>• Menus,</li> <li>• Shortcuts,</li> <li>• Document types,</li> </ul>

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		<ul style="list-style-type: none"> <li>• Formatting documents,</li> <li>• spread sheet and presentations,</li> <li>• Working with Spreadsheets,</li> <li>• Different templates.</li> </ul>
IV	<b>Networking</b>	<ul style="list-style-type: none"> <li>• Network Technologies,</li> <li>• Introduction to Internet: Network connecting devices,</li> <li>• Topologies,</li> <li>• HTTP,</li> <li>• HTTPS DNS,</li> <li>• Hub,</li> <li>• Switches,</li> <li>• Router,</li> <li>• Repeater, Firewalls</li> </ul>
V	<b>World Wide Web</b>	<ul style="list-style-type: none"> <li>• WWW and Web Browsers Introduction,</li> <li>• Objectives,</li> <li>• Concept of internet,</li> <li>• Overview of search engines,</li> <li>• Popular search engines in use,</li> <li>• Surfing the web and websites.</li> </ul>

**Suggested Readings:**

- Computers and Beginners by Jain, V.K.;
- Computer Fundamentals by Anita Goel, Pearson.

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**Subject: Basics of Computer lab****Subject Code: CSE-301L****Objectives:** Build basic technical skills and develop any kind of computer application.

Credit	Hours	Marks		
1	30	I	E	To
		35	15	50

**Learning Outcomes**

- State the applications of Computers and understand the basic components of computer.
- Identify & describe various parts of computers like CPU, keyboard, monitor, etc.
- View files, work with files and customize window.
- Able to Differentiate in various operating system.
- Apply the office Applications for the task assigned by the authorities.
- Outline the basics of Networking.
- Make use of Internet and its applications when required.

**List of Practical's**

1. Troubleshooting
2. Practical based on to be exposed/shown various components and supposed how to switch on a computer.
3. Handling Boot Setup, Installation of Operating System
4. WordPad, Notepad, Sticky Note, Snipping tool, Paint
5. Ms Word
6. MS-Excel- Creating charts, Creating tables
7. MS-PowerPoint
8. Case study on Operating systems (Windows/ Ubuntu/ Android/iOS)
9. Networking
10. Sending E-mails

**Suggested Readings:**

1. Introduction to Information Technology, Leon Tech World by Leon and Leon
2. Foundations of Computing, BPB Publication by Sinha, Kr. Pradeep and Preeti Sinha;
3. Word Processing and Typing by Sharon Spencer, Heinemann.
4. MS Office by S.S. Srivastava, Firewall Media.
5. Microsoft Office 2010 by Bittu Kumar, V & S Publications
6. Data Communication and Networking by Behrouz.A. Forouzan, McGraw Hill



## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: Fundamental of Industrial Management****Subject code: IMS-301**

Credit	Hours	Marks		
		I	E	To
3	45	15	35	50

**Course Objectives:**

- Understanding the knowledge of Quality Control, inspection and quality assurance management used in the organization.
- Develop the skill for using tool and techniques for quality in Industry
- Apply elementary knowledge of quality concepts for quality assurance.

**Learning Outcome:**

- Students will be able to understand the daily management system related to Quality in the shop floor.
- Student will able to solve different type of problems in their manufacturing processes.
- Ensure implementation of 5S activities at the shop floor/ office area.
- Students will able to apply 5S and safety in their work place.

**Unit-1****Concept of Quality:**

1.1 Quality: Definition, History, Importance

1.2 Introduction to Quality Control.

**Unit-II****Organizational Aspects of Quality Assurance:**

2.1 Quality Assurance (QA): Introduction, Definition, QA in different stages, Quality Planning.

2.2 ISO: Introduction, Benefits of ISO.

2.3 ISO 9001, Benefits of ISO 9001.

**Unit-III****Problem solving tools and techniques:**

3.1 Definition of a problem

3.2 Type of problems, classification of problems

3.3 Problem solving tools: Introduction to Cause and effect diagram, Histogram, Pareto charts,

**Unit-IV**

**Total Quality Management:**

- 4.1 Basic concept of TQM, features of TQM
- 4.2 principles of TQM
- 4.3 Concept of TPM
- 4.4 Quality allied concept: KAIZEN, Poke yoke

**Unit-V**

**5 S and Safety:**

- 5.1 Detailed concept of 5S and safety used in Industries
- 5.2 Integrated Management system

**Suggested Readings:**

1. Total quality Management by L.Sganthi & Anand A. Samuel, PHI Publication.
2. Total quality Management by Poornima M Charantimath, Pearson Publication.

**Subject: Fundamentals of Industrial Management lab**

**Subject code: IMS-301 L**

<b>Credit</b>	<b>Hours</b>	<b>Marks</b>		
1	30	I	E	To
		35	15	50

**List of Experiments**

1. Draw and Demonstrate the process flow diagram
2. Draw and demonstrate Pareto diagram
3. Draw and Demonstrate cause and effect diagram

**Semester: Second****Subject: MOOC Course (Total Quality Management-1)****Subject Code: MC-301**

Credit	Hours	Marks		
		I	E	To
2	30	30	70	100

**Unit-1: Introduction to Quality Management System**

Concept of quality, dimension of Quality, Definition of quality, producer and consumer perspective of quality, variability, quality improvements and quality characteristics, basic terminologies relating to Quality.

**Unit-2: Introduction to Total Quality Management**

Management Aspects of Quality, Edward Deming's Framework for Quality and Productivity Improvement Management, Shewhart Cycle, Juran's Management Philosophy, Feigenbaum's concept of Companywide Quality Control, Quality Circle and Historical reasons for limited Success of TQM.

**Unit-3: Introduction to Concept of Probability**

Basic Concepts of Probability Distribution and Normal Distribution, Overview of Six Sigma, Introduction to DMAIC, Overview of Steps in DMAIC, Overview of steps of DMADV, Generations of Six Sigma, Overview of Toyota Production System, Kaizen

**Unit-4: Tools for Quality Assurance**

Histogram, Check Sheet, Pareto Chart, Cause and Effect Diagram, Defect Concentration Diagram, Scatter Diagram, Affinity Diagram, Relations Diagram, Tree Diagram, Matrix Diagram.

**Unit-5: Control Charts**

Samples and Distribution, Normal Distribution, Basics of X bar and R chart, Estimating Mean and Standard Deviation, Phase 1 of Control Chart Usage, Example of X bar and R chart, Process Capability, Effects of Variable Sample Size.

**Recommended Books**

1. Statistical Quality Control by M. Mahajan; Dhanpat Rai and Sons, Delhi
2. Engineering Metrology by R. K. Jain

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3. Engineering Metrology by R.K. Rajput, SK Kataria and Sons

**Subject: MOOC Course (Entrepreneurship Management)**

**Subject Code: EM-301**

Credit	Hours	Marks		
		I	E	To
2	30	30	70	100

UNIT	KEY LEARNING
<b>UNIT I Entrepreneurship</b>	Meaning, Nature and Scope Characteristics and Qualities of a Successful Entrepreneur Relationship between Entrepreneurship Development and Economic Development
<b>UNIT-II Entrepreneurship and Society</b>	Entrepreneurship and Society New Venture Development- Meaning and Stages Sources of Financing Entrepreneurship Managerial Vs Entrepreneurial Approach.
<b>UNIT-III EDP Programs</b>	EDP Programs Concept of Economic Freedom Financial Markets and Entrepreneurship Venture Capital; Angel Capital
<b>UNIT-IV Entrepreneurial Strategies and Business Plan:</b>	Entrepreneurial Strategies and Business Plan Presenting Business Plans to the Investors Future of Entrepreneurship in India
<b>UNIT-V Women Entrepreneurship</b>	Concept Factors governing women entrepreneurship Schemes for women entrepreneurship Rural Entrepreneurship, Concept, advantage and challenges.

**Text/ Reference Books**

- Dollinger, MJ, Entrepreneurship- Strategies and Resources, Pearson Education.
- Desai, Vasant, Entrepreneurship Development, Himalaya Publishing House.
- Gupta, C.B. and Srinivasan, P., Entrepreneurship Development, Sultan Chand & Sons.
- Charanthimath, P.M., Entrepreneurship Development and Small Business Enterprise, Pearson Education.

**SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL**

- Havinal, Veerbhadrappa, Management and Entrepreneurship, 1st Edition, New Age International Publishers, 2008.

**Semester: Third****Subject: CAD lab****Subject Code: ME-401L**

Credit	Hours	Marks		
		I	E	To
4	120			
		70	30	100

**List of Experiments**

1. Introduction to Computer Aided Drafting (2D) commands of any one software (Auto CAD, Solid works, Unigraphics etc.).
  - 1.1 Concept of Auto CAD, Tools bars in CAD software, coordinate system, snap, grid and ortho mode (Absolute, Relative and Polar), setting of units and layout.
  - 1.2 Drawing commands-point, line, arc, circle, ellipse
  - 1.3 Editing commands-scale, erase, copy, stretch, lengthen and explode
  - 1.4 Dimensioning and placing text in drawing area
  - 1.5 Sectioning and hatching
  - 1.6 Inquiry for different parameters of drawing entity
  - 1.7 Create layers within a drawing
  - 1.8 Specifying geometrical dimensioning & tolerancing (GD & T) parameters in drawing
2. Details and assembly drawing of the following using drafting software (2D)
  - 2.1 Stepped pulley, V-belt pulley
  - 2.2 Flanged coupling
  - 2.3 Machine tool holder
3. Isometric Drawing by using CAD using any part modelling software (3D)  
Drawing of the following on computer
  - (a) Cone
  - (b) Cylinder
  - (c) Cube
  - (d) Spring
  - (e) Isometric view of objects
4. Introduction to any part modelling software (Pro-E, Solid works, Auto CAD, Unigraphics, Catia etc.)  
Introduction to Sketcher, Sketch entities, sketch tools, blocks, dimensioning
  - 4.1 part modelling tools:

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- 4.1.1 Creating loft features
- 4.1.2 Creating extrude features creating revolve creating swept
- 4.1.3 Creating reference- points, axis, coordinates
- 4.1.4 Creating curves
- 4.1.5 Creating fillet features
- 4.1.6 Inserting Hole types
- 4.1.7 Creating Chamfer
- 4.1.8 Creating Shell
- 4.1.9 Creating Rib
- 4.1.10 Environment & utilities- Working with views and manipulating views
- 4.1.11 Create parts e.g. Piston, pin, bolts and nuts, fixture, jig parts, washer, rings, gaskets etc.

**List of books**

1. Auto CAD 2000 by Ajit Singh, TMH, New Delhi
2. Engineering drawing with AutoCAD by T.Jeyapooran; Vikas publishing house, Delhi



## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: CNC machines & Automation****Subject Code: ME-404**

Credit	Hours	Marks		
		I	E	To
4	60	30	70	100

**Unit-1: Introduction**

Introduction to NC, basic components of NC, MCU, input devices, advantages/ disadvantages of NC machine over conventional machines, CNC & DNC, their types, their advantages, disadvantages and applications, selection of parts to be machined on CNC machines, problems with conventional NC.

**Unit-2: System Devices**

Control system, feedback control classification (open & close loop), Actuators, transducers and sensors, characteristics of sensors, techpmeter, LVDT, opto-interrupters, potentiometers for linear and angular position, encoder and decoder, axis drive, other classification of CNC machines-feedback, motion, positioning.

**Unit-3: Problems in CNC machines**

Common problems in mechanical, electrical, pneumatic, electronic and PC components of CNC machines, diagnostic study of common problems and remedies, use of on-line fault finding diagnosis tools in CNC machines, methods of using discussion forums, environmental problems.

**Unit-4: Automation and NC system**

Automation, suitability of production system to automation, types, emerging trends in automation, automatic assembly, manufacture of printed circuit boards, manufacture of integrated circuits, overview of FMS, AGV, ASRS, group Technology, CAD/CAM and CIM, Automated identification system, concept of AI, Robotics, nomenclature of joints, motion.

**Unit-5: Part programming**

Part programming and basic procedure of part programming, NC blocks, part programming formats, simple programming for rational components (point to point, straight line, curved surface), tool off sets, cutter radius compensation and wear compensation.

**Text Book:-**

1. CNC Machines by By B. S. Pabla, M. Adithan( First Edition), New Age International (P) Ltd.
2. CNC Machines and Automation Paperback – 2014, by Khushdeep Goyal, Katson Books
3. CNC Machines by Sandeep Bajaj, Ishan Publication

**Reference Book:-**

CNC Technology & Programming by Tilak Raj, DhanpatRai Publication

**Subject: Fundamentals of CNC Machines Lab**

Subject Code: ME-502L

Credit	Hours	Marks		
		I	E	To
4	120	70	30	100

**Objectives**

To make students in depth knowledge about CNC Machines, Machine setting , Tools used , tool offset and setting of CNC Machines.

**Learning Outcomes**

- 1.To be able to differentiate between conventional & CNC Machine in respect to working, components, operation.
2. To understand setting up of tooling for CNC. One should have knowledge of types of cutting tools & tool material used.
3. To understand tool & work holding devices used & locating principle
4. To take tool offsets and work-offset on CNC machine.

**List of Experiments**

1. Introduction to CNC and Understanding of Panel board.
2. Types of programs like Fanuc, Siemens, Mitsubishi, Allen Bradley etc.
3. Movement of Axis, tool change, use of hands wheel, Jog and manual data input.
4. Study of ATC with demonstration and Setting and adding new tool in ATC.
5. Practically finding out tool parameters on tool presetter machine.
6. Finding out coordinates for work and tool.
7. Performing tool offset for milling machine.
8. Performing Work offset for milling machine
9. Performing tool offset for Lathe machine.
10. Performing Work offset for Lathe machine.

**Process**

1. Interpretation and understanding of the component Drawing
2. To conceptualize the process based on location points, resting points and clamping points.  
Which surfaces and operations (drilling, milling, tapping, boring, reaming, to be done.

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3. Writing down detail process operation by operation using different jigs and fixtures as conceptualized.

4. Organising fixtures tools, toolings, material for machining the component.

**Preparing machine for production**

1. Select or write the program for machining the component.

2. Arranging the tools and setting them on presenters.

3. Loading the tools on Auto tool changer as per the program

4. Load the fixture



**Subject: Basics of Electrical and Electronics Engineering****Subject Code: EE-401**

Credit	Hours	Marks		
		I	E	To
3	45	15	35	50

**Objectives**

- Provide quality electrical engineering knowledge with extensive hands-on and laboratory experience.

**Learning Outcomes**

- Outline various electrical quantities and their units.
- Able to derive Ohm's Law and make use of its applications.
- Able to understand the concept of AC circuits
- Able to understand the basic concept of semiconductor materials.
- Outline the various concepts of SMPS, inverter & UPS.

Unit	Topic	Key Learning
I	<b>Basic Electrical Quantities</b>	<ul style="list-style-type: none"> <li>• Basic concept of charge,</li> <li>• current,</li> <li>• voltage,</li> <li>• resistance,</li> <li>• power,</li> <li>• energy and their units,</li> <li>• Conversion of units of work,</li> <li>• power and energy from one form to another</li> </ul>
II	<b>DC Circuits</b>	<ul style="list-style-type: none"> <li>• Ohm's Law, Series – parallel resistance circuits,</li> <li>• calculation of equivalent resistance,</li> <li>• Kirchoff's Laws and their applications</li> </ul>
III	<b>AC Circuits</b>	<ul style="list-style-type: none"> <li>• Concept of AC Generation,</li> <li>• Difference between AC and DC,</li> </ul>

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		<ul style="list-style-type: none"> <li>• Concept of alternating current and voltage,</li> <li>• equation of instantaneous values,</li> <li>• average value, r.m.s value, form factor, power factor etc.,</li> <li>• A.C. Series Circuits with (i) resistance and inductance (ii) resistance and capacitance and (iii) resistance inductance and capacitance</li> <li>•</li> </ul>
IV	<b>Basics of Semiconductor</b>	<ul style="list-style-type: none"> <li>• Semiconductor materials,</li> <li>• Metals and Semiconductors and Photo-electric emission. N-type and P-type semiconductor,</li> <li>• PN junction diode,</li> <li>• Forward &amp; Reverse bias, Zener diode.</li> </ul>
V	<b>Power supply</b>	<ul style="list-style-type: none"> <li>• Introduction and Working of Switched Mode Power Supply (SMPS),</li> <li>• Voltage Regulator, Introduction to Inverters and UPS.</li> </ul>

**Suggested Readings:**

- Electrical Technology by BL Theraja, S Chand and Co, New Delhi.
- Basic Electrical and Electronics Engineering by SK Sahdev; Dhanpat Rai and Sons, New Delhi.
- Experiments in Basic Electrical Engineering by SK Bhattacharya, KM Rastogi; New Age International (P) Ltd.; Publishers New Delhi.

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**Subject: Basics of Electrical and Electronics Engineering lab****Subject Code: EE-401L**

Credit	Hours	Marks		
		I	E	To
1	30	35	15	100

**Objectives:** Provide quality electrical engineering knowledge with extensive hands-on and laboratory experience.

**Learning Outcomes**

- Outline various electrical quantities and their units.
- Able to derive Ohm's Law and make use of its applications.
- Make use of the capacitors and use them in series and parallel connection.
- Able to understand the electromagnetic effects and its laws.
- Outline the various concepts of AC Circuits and its connection with resistance, inductance and capacitance.

**List of Experiments**

1. Verify that resistance of conductor is directly proportional to resistivity and length and inversely proportional to cross-sectional area of the conductor
2. Verification of Ohm's Law
3. Study of series resistive circuits
4. Study of parallel resistive circuits.
5. Verification of Kirchhoff's current and voltage laws applied to DC circuits
6. Study of current, voltage and resistance measurement using of Multi-meter
7. Verification of Faraday's Laws of electromagnetic induction.
8. Study of SMPS Circuit.
9. Study of V-I Characteristic of Diode

**Suggested Readings:**

- Electrical Technology by BL Theraja, S Chand and Co, New Delhi.
- Basic Electrical and Electronics Engineering by SK Sahdev; Dhanpat Rai and Sons, New Delhi.



## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

- Experiments in Basic Electrical Engineering by SK Bhattacharya, KM Rastogi; New Age International (P) Ltd.; Publishers New Delhi.

**Subject: Applied Physics**

**Subject Code: PHY-401**

Credit	Hours	Marks		
		I	E	To
3	45	15	35	50

**Learning Outcomes:**

- To impart fundamental knowledge in the areas of scalar and vector quantities, basic laws of science, magnetism and electrical concepts.
- To apply fundamental knowledge in the area of Magneto-static and electro-magnetism.
- At the end of the course the students are familiar with the basic principles and applications of physics in various fields

Unit Number	Key Learning
<b>Unit-I Physical quantities, Units and Dimensions, Vectors and scalars:</b>	Physical quantities, units, systems of units – CGS, MKS and SI, dimensions and dimensional formula, Principle of Homogeneity, Checking the correctness of physical equations, Vectors and scalars, representation of a vector, Resolution of vectors, Rectangular components of vectors, Dot Product and Cross Product of vectors, Simple numerical
<b>Unit-II Newton's Laws of Motion,:</b>	Motion along a Straight Line, Distance and displacement, Speed and velocity, average velocity, acceleration, Introduction of force
<b>Unit-III Work, Energy and Power</b>	Laws of motion, momentum, conservation of momentum, Work done by force, negative work and positive work, Energy, Power, Kinetic and potential energy, Laws of conservation of energy, Work energy theorem.
<b>Unit-IV Gravitation</b>	Keplar's laws of planetary motion.The universal law of gravitation, Acceleration due to gravity and its variation with altitude and depth.Gravitational potential energy and gravitational potential. Escape velocity. Orbital velocity of a satellite. Geo-stationary satellites.
<b>Unit-V Thermodynamics</b>	Thermal equilibrium and definition of temperature (zeroth law of thermodynamics).Heat, work and internal energy. First law of thermodynamics. Isothermal and adiabatic processes, Second law of thermodynamics: reversible and irreversible processes. Heat engine and refrigerator

**Recommended Books:-**

- Halliday and Resnick (2013), 'Fundamentals of Physics', Wiley Eastern Limited, 10th Edition

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2. 'Modern Engineering Physics', S. Chand Publications

**Subject: Applied Physics Lab**

**Subject Code: PHY-401L**

Credit	Hours	Marks		
1	30	I	E	To
		35	15	50

**List of Experiments**

1. Measurement of volume of a solid/hollow cylinder by Vernier Caliper.
2. Measurement of cross-sectional area of a wire by Screw Gauge.
3. Measurement of radius of curvature of a spherical surface by a Spherometer.
4. Calibration of a meter scale by using travelling microscope.
5. Determination of co-efficient of Friction by inclined Plane Method.
6. Determination of g by simple pendulum.
7. Determination of Moment of Inertia using a fly wheel.
8. Tracing of Lines of force due to a bar magnet with N-pole pointing North & N-pole pointing South and locate the neutral points.
9. Verification the laws of resistance by connecting two given standard resistances in series & in parallel using Ohm's Law.

**Subject: Estimating & Costing****Subject Code: IMS-401**

Credit	Hours	Marks		
		I	E	To
4	60			
		30	70	100

**Unit-1: Introduction**

definition of estimation, importance, aims and functions of estimating- cost accounting, purposes of cost accounting, comparison of estimating and costing, estimating procedure, cost estimators and their qualifications, types of estimates, constituents of job estimates, cost of production, selling price, capital investment, rate of return (ROR) on investment.

**Unit-2: Elements of costing**

Definitions, objectives, elements of cost, components of costs, overhead expenses-factory expenses, depreciation causes, methods of calculation of depreciation cost, selling and distributions overheads and methods of allocation of overhead charges, procedure for costing.

**Unit-3: Fundamentals of estimating**

Objectives of cost estimating, functions of cost estimating, organization of estimating department, principal factors in estimating, miscellaneous allowances, estimating procedures, qualities of estimator.

**Unit-4: Estimation of material cost**

Estimation of volumes, weights and cost of material for items like pulleys, spindle, lathe centre, fly wheel, crank shaft and similar items

**Unit-5: Estimation of machine shop**

Set up time, operation time, handling time, machining time, tear down time, allowances, personal, fatigue, tool checking/sharpening /changing, unit operation time, operations for different tools materials and product materials, estimation of time for various operations machining operations-turning, drilling, boring, tapping, shaping, planing, milling and grinding.

**List of suggested books**

1. Mechanical estimating and costing by TTTI madras, TMH
2. Mechanical estimating and costing by BP Sinha, TMH

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3. Production and costing by GBS, Narang and V. Kumar, Khanna publishers, New Delhi

**Subject: EVS**

**Subject Code: EVS-401**

Credit	Hours	Marks		
		I	E	To
4	60	30	70	100

**Objectives:**

Create awareness between the students about our ecosystem, related problems and our role in that.

**Learning Outcomes:**

- Encourage to solve the environment related problems and Make other people aware about environment problems
- Comply with the safety policies of ecosystem and environment
- Identify and recommend the opportunity for improving the environment hazards to the organization and society
- Report the polices and procedure need to adapt for environmental safety
- Create awareness among the employees and the society regarding the hazards of environmental pollution.

Unit	KEY LEARNING
<b>Unit-I</b> <b>Understanding our Environment</b>	Definition, Scope and Importance, Natural Resources, Forest Resources, Water Resources, Mineral Resources, Energy Resources, Food Resources, Land Resources.
<b>Unit-II</b> <b>Living things in Ecosystem</b>	What is Ecosystem, Habitat and ecological niche, interaction of species with each other, adapting to environment, bio geographic zones of India, Energy flow in ecosystem, cycling of materials, Kinds of ecosystem.
<b>Unit-III</b> <b>Atmosphere and Climate</b>	The atmosphere, layers of the atmosphere, climate, greenhouse effect, theOzone layer, deforestation, soil erosion
<b>Unit-IV</b> <b>Urbanisation</b>	Causes of urbanisation, Manifestations of Urbanisation, social economic and environmental problems in urbanisation, Agriculture, unsustainable

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	patterns of modern industrialised agriculture, green revolution.
<b>Unit-V Environmental Pollution</b>	Causes of Air pollution, major air pollutants, classification of air pollutants, thermal inversions, photochemical smog, acid preparation in air, impact of Air Pollution.

**Field work**

- Visit to a local area to document environmental assets river/forest/grassland/hill/mountain
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc.

**Recommended Books****Text Books**

E- book:<https://ugc.ac.in/oldpdf/modelcurriculum/env.pdf>

**Reference Books**

1. Industrial Safety and Health management” Pearson Prentice Hall,2003 by C.RayAsfahl
2. National Safety Council, “Accident Prevention Manual for Industrial Operations”, N. S. C. Chicago, 1988.
3. Industrial Accident Prevention” McGraw-Hill Company, New York,1980 by Heinrich H.W.

**Subject: Applied Mechanics**

**Subject Code: ME-403**

Credit	Hours	Marks		
		I	E	To
3	45			
		15	35	50

### **Unit-1: Introduction**

Concept and definition of engineering mechanics, statics, dynamics, application of engineering mechanics in practical fields, different systems of units (FPS, MKA and SI) and their conversions from one form to another forms e.g. density, force, pressure, work, power, velocity, acceleration (simple numericals), fundamentals and derived units.

### **Unit-2: Laws of forces**

Definition and types of forces, point/concentrated force, uniform distributed force, effect of force, characteristics of force, different force systems, principle of transmissibility of forces, law of super-position

Composition and resolution of coplanar concurrent forces, resultant force, method of composition of forces, laws of forces, triangle law of forces, polygon law of forces, free body diagram, Equilibrium force and its determination, Lami's theorem.

### **Unit-3: Friction**

Definition and concept of friction, coefficient of friction, angle of friction, angle of repose, equilibrium of a body lying on a horizontal plane, equilibrium of a body lying on a rough inclined plane.

### **Unit-4: Simple Machines**

Definition of simple and compound machine, definition of load, effort, velocity ratio, mechanical advantage and efficiency of a machine and their relationship, laws of machines, Definition of ideal machine, reversible and self locking machine, determination of maximum mechanical advantage and maximum efficiency, system of pulleys (first, second, third system of pulleys), determination of velocity ratio, mechanical advantage and efficiency, working principle and application of wheel and axle, simple screw jack and worm and worm wheel, expression for their velocity ratio and field of their application.

**Unit-5: Moment**

Concept of moment, moment of force and units of moment, principle of moment and its applications (lever-simple and compound), parallel forces (like and unlike parallel forces), calculating their resultant, concept of couple, its properties and effects, general conditions of equilibrium of bodies under coplanar forces.

**Suggested Book**

1. Engineering Mechanics by V. Jayakumar and M. Kumar, PHI
2. Engineering Mechanics”, D. P. Sharma, PHI
3. Engineering Mechanics”, M. V. Sheshagiri Rao, and D. Rama Durgaiah, University Press

**Subject: Applied Mechanics lab**

**Subject Code: ME-403L**

<b>Credit</b>	<b>Hours</b>	<b>Marks</b>		
1	30	I	E	To
		35	15	50

**List of experiments**

1. To verify the forces in different members of jib crane
2. To find the mechanical advantage, velocity ratio, and efficiency in case of an inclined plane.
3. To verify the reaction at the supports of a simple supported beam
4. To find the mechanical advantage, velocity ratio, and efficiency of a screw jack.
5. To determine the coefficient of friction between three pairs of given surface.



## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

## Semester: Fourth

**SUBJECT: MOOC Course (Manufacturing Process Technology I and II)**

CODE: MC-401

CATEGORY: General Education Component

Credit	Hours	Marks		
		I	E	To
2	30	30	70	100

Unit	Topic	Key Learning
I	<b>Basics of Manufacturing Processes</b>	<ul style="list-style-type: none"> <li>Introduction, History of Manufacturing Process, broad classification, Introduction to non-conventional processes, Stress- strain diagram for different types of materials, basic material properties,</li> </ul>
II	<b>Introduction to Casting Process</b>	<ul style="list-style-type: none"> <li>Introduction to casting, types of pattern and moulds, pattern allowances, mould making procedure, introduction to gating system.</li> </ul>
III	<b>Machining Processes</b>	<ul style="list-style-type: none"> <li>Introduction, basic machining processes- turning, milling, drilling, mechanism of chip formation, types of chip produced in metal cutting, tool life: wear and failure, Taylor's tool life equation.</li> </ul>
IV	<b>Advanced Machining Processes</b>	<ul style="list-style-type: none"> <li>Introduction and Classification, Introduction to- Abrasive Jet machining process, Ultrasonic machining process, Electrochemical machining process, Electric Discharge Machining.</li> </ul>
V	<b>Metal forming processes</b>	<ul style="list-style-type: none"> <li>Introduction, Metal forming processes-rolling, forging, extrusion and drawing. Sheet metal working processes.</li> </ul>

**Text Book:**

- Fundamentals of Modern Manufacturing: Materials, Processes, and Systems by Mikell P. Groover

**Reference Books**

- Manufacturing Engineering and Technology, 4e by Kalpakjian
- Manufacturing Science by Amitabha Ghosh and Mallick

**SUBJECT: MOOC Course (Industrial Best Practices)**

CODE: MC-402

CATEGORY: General Education Component

Credit	Hours	Marks		
		I	E	To
2	30	30	70	100

### **Unit-1: Types of Maintenance**

Planned & unplanned maintenance, Break down maintenance, Corrective maintenance, Routine maintenance, Preventive maintenance, Predictive maintenance, condition based maintenance system & Design-out maintenance.

### **Unit-2: Condition Monitoring**

Primary & Secondary signals, on-line & Off-line monitoring, Visual & Temperature monitoring, leakage monitoring, lubricant monitoring, corrosion monitoring, noise/ sound monitoring. Smell/ odour monitoring.

### **Unit-3: Lean Manufacturing**

Objectives of lean manufacturing-key principles and implications of lean manufacturing  
Traditional Vs lean manufacturing, Lean benefits ,Value creation and waste elimination.

### **Unit-4: Agile manufacturing**

Types of Production, The Agile Production Paradigm, History of Agile Manufacturing, Agile Manufacturing Vs Mass Manufacturing, Agile Manufacturing Vs Mass Customization.

### **Unit-5: Supply chain management**

Concept of supply management and SCM, Importance of supply chain flows, Value chain, Elements of supply chain efficiency, Key issues in SCM, Decision phases, Supply chain integration, Uncertainties in supply chain

**Text Book**

1. Industrial maintenance management by S.K. Srivastava, S. Chand & Company, New Delhi-55

**Reference Books**

1. Supply Chain Management: Strategy, Planning & Operations, Chopra, S. and Meindl, P. Second Edition, Pearson Education (Singapore) Pte. Ltd. 2004.
2. Goldman S L, Nagal R N and Preiss K, “Agile Competitors and Virtual Organizations”, Van Nostrand Reinhold, 1995.
3. Brian H Maskell, “Software and the Agile Manufacturer, Computer Systems and World Class Manufacturing, Productivity Press, 1993

**Semester: 5<sup>th</sup>****Subject: CAD/ CAM lab****Subject Code: ME-501L**

Credit	Hours	Marks		
4	120	I	E	To
		70	30	100

**List of Experiments**

- (a) Introduction to NX7: Introduction to Nx7, use interface overview, file operations, sketcher task environment, WCS, creating a sketch.
- (b) Constraining sketches: Sketch options, geometric constrains, dimensional constraints
- (c) Solid Modeling I : Sketch operations, Editing sketches, extrude, revolve, hide/show
- (d) Datums : Datum planes, datum axes, datum coordinate systems
- (e) Solid Modeling II: Holes Pre-NXS, holes the new way, grooves, slots, chamfers, edge blends
- (f) Object Replication: Instance features, mirror features, mirror body, sweep along guide, tube, threads
- (g) Swept features: Swept features, helical gear project, mouse cover project, gasket project
- (h) Solid Modeling III: Editing features, editing position, boss, pocket, pad, draft

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: Introduction to Jigs & Fixtures****Subject Code: ME502**

Credit	Hours	Marks		
		I	E	To
4	60	30	70	100

**Unit-1: Jigs and Fixtures**

Concept of jigs and fixtures, need and advantages, concept of interchangeability, classification of jigs and fixtures

**Unit-2: Location and Clamping devices**

Basic principles of location, 3-2-1 principle of location, location for various services, location methods and devices, concept of clamping and various clamping devices

**Unit-3: Drilling jigs**

Definition of drilling jigs, Drilling jigs, Drilling bushes & their function, types of drilling jigs such as box type, channel jig, latch jig, indexing jig.

**Unit-4: Fixtures**

Introduction to fixtures, types of fixtures such as milling fixtures ( single piece, gang milling), lathe and boring fixtures, grinding and welding fixtures, application of pneumatic in jigs and fixtures

**Unit-5: Limit Gauges**

Introduction to plain limit gauges, classification of limit gauges such as plug, ring & snap gauges, brief description of thread gauges, material selection, Taylor`s principle of maximum and minimum material condition, Go and Not go ends of gauges and selection of gauges for inspection.

**List of books**

1. Prakash H Joshi, Press tools design & construction, wheeler publisher
2. Fundamentals of tool design by Donaldson
3. Production Engineering & Design by Surender Kr & Umesh Chandra, Satya Parkashan, New Delhi

**Subject: CNC Programming lab**

Credit	Hours	Marks
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**Subject Code: ME-503L**

4	120	I	E	To
		30	70	100

**List of Experiments**

1. Write the NC program for 4 holes to be drilled on 10mm thick plate in symmetry using CNC milling
2. Write NC program with subroutines, Do- loops for component to be machined.
3. Use of software for turning operations on CNC turning center.
4. Use of software for milling operations on machine centres.

**Subject: Materials and Metallurgy**

**Subject Code: ME-504**

Credit	Hours	Marks		
		I	E	To
3	45			
		15	35	50

### **Unit-1: Introduction**

Overview of various engineering materials and applications, importance, classification of materials, difference between metals and non-metals, physical and mechanical properties of various materials, present and future needs of materials.

### **Unit-2: Crystallography**

Fundamentals, crystalline solid and amorphous solid, unit cell, space lattice, arrangement of atoms in SCC, BCC, FCC and HCP crystals, number of atoms per unit cell, atomic packing factor, coordination number.

Deformation- Overview of deformation behaviour and its mechanisms, elastic and plastic deformation, behaviour of materials under load and stress-strain curve, failure mechanism- Overview of failure modes, fracture, fatigue and creep

### **Unit-3: Metallurgy**

Introduction, cooling curves of pure metals, dendritic solidification of metals, effect of grain size on mechanical properties, binary alloys, thermal equilibrium diagrams, lever rule, solid solution alloys

### **Unit-4: Metals and Alloys**

Ferrous metals: Different iron ores, flow diagram for production of iron and steel, allotropic forms of iron, Alpha, Delta, Gamma, basic process of manufacturing of pig iron and steel making.

Cast Iron; properties, types of cast iron, manufacturing and their use.

Steels: plain carbon steels and alloy steel, classification of plain carbon steels, properties and application of different types of plain carbon steel, effect of various alloying elements on properties of steel, uses of alloy steels (high speed steel, stainless steel, silicon steel, spring steel).

Non-ferrous materials; properties and uses of Copper, Aluminium and their alloys

### **Unit-5: Heat Treatment**

Definition and objectives of heat treatment, iron carbon equilibrium diagram, different microstructures of iron and steel, formation and decomposition of Austenite, Martensitic transformation. Various heat treatment processes-hardening, tempering, annealing, normalizing, surface hardening, carburising, nitriding, cyaniding, hardenability of steels, types of heat treatment furnaces (only basic idea), measurement of temperature of furnaces.

**List of suggested books**

1. Text book of material science by RK Rajput, Katsons pub., Kudhiana
2. Text book of materials science by VK manchanda and GBS Narang, z\Khanna publishers, New Delhi



**Subject: Materials and Metallurgy lab****Subject Code: ME-504 L**

Credit	Hours	Marks		
1	30	I	E	To
		35	15	50

**List of experiments**

1. Classification of about 25 specimens of materials/machine parts in to
  - (i) Metals and non-metals
  - (ii) Metals and alloys
  - (iii) Ferrous and non-ferrous metals
  - (iv) Ferrous and non-ferrous alloys
2. Study of a metallurgical microscope and a specimen polishing machine
3. To anneal a given specimen and find out difference in hardness as a result of annealing.
4. To normalize a given specimen and to find out the difference in hardness as a result of normalizing.
5. To harden and temper a specimen and to find out the difference in hardness due to tempering.

**Subject: Hydraulics & Pneumatics**

**Subject Code: ME-505**

Credit	Hours	Marks		
		I	E	To
3	45			
		15	35	50

### **Unit-1: Introduction**

Introduction to hydraulics and pneumatics, fluid, types of fluid, properties of fluid-mass density, weight density (specific weight), specific volume, capillarity, specific gravity, viscosity, compressibility, surface tension, kinematic viscosity and dynamic viscosity and their units

### **Unit-2: Pressure and Measurement**

Concept of pressure, intensity of pressure, static pressure and pressure head, types of pressure (atm. Pressure, gauge pressure, absolute pressure)

Pressure measuring devices-Manometers and Mechanical Gauges, Manometers- Piezometers, simple U-tube manometer, Inverted U-tube manometers, construction, working and application, Mechanical Gauges- Bourdon tube pressure gauge, diaphragm pressure gauge, dead weight pressure gauge, construction, working and applications, statement of Pascal's law and its applications.

### **Unit-3: Flow of fluids**

Types of fluid flow- steady and unsteady, uniform and non-uniform, laminar and turbulent, rate of flow and its units, continuity equation of flow, hydraulic energy of a flowing fluid, total head, Bernoulli's theorem statement (without proof), and its applications, discharge measurement with the help of Venturimeter, Orifice meter, Pitot tube, limitations of Bernoulli's theorem

Pipe and pipe flow- loss of head due to friction- Chezy's equation and Darcy's equation of head loss (without proof), Reynold's number and its effect on pipe friction.

### **Unit-4: Hydraulic machines**

Description, operation and application of- hydraulic press, hydraulic jack, hydraulic brake, hydraulic door closer

### **Unit-5: Oil power hydraulic and pneumatic system**

Introduction to oil power hydraulic and pneumatic system, relative merits and demerits as oil power hydraulic and pneumatic system, industrial applications of oil power hydraulic and pneumatic system, basic components of hydraulic system, definition and functions of each component in a hydraulic circuit, hydraulic oils-classification and their properties, seals and packing-classification of seals, sealing materials, maintenance of hydraulic system-common faults in hydraulic system, simple visual checks of oil, causes of contamination, preventive measures

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Basic components of pneumatic systems, definition and functions of each component in a pneumatic circuit necessity of filter, regulator and regulators (FLR)

Common problems in pneumatic systems, maintenance schedule of pneumatic systems.

**List of suggested books**

1. Fluid mechanics by K.L. Kumar, S. Chand and Co. Ltd., New Delhi
2. Hydraulics and Fluid Mechanics by R.S. Khurmi, S. Chand & Co. Ltd., New Delhi
3. Fluid Mechancs by Dr. A.K. Jain, Khanna Publisher

**Subject: Hydraulics & Pneumatics lab**

**Subject Code: ME-505L**

Credit	Hours	Marks		
		I	E	To
1	30	35	15	50

**List of practical**

1. Measurement of pressure head by using
  - (i) Piezometer tube
  - (ii) Simple U-tube manometer
2. Verification of Bernoulli's theorem
3. Measurement of flow by using venturimeter
4. To find the value of coefficient of discharge for a venturimeter
5. To find the value of coefficient of friction for a pipe
6. Study of hydraulic circuit of any available machine or working model
7. Study of pneumatic circuit of any available machine or working model

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**Subject: Plant maintenance and material handling****Subject Code: ME-506**

Credit	Hours	Marks		
4	60	I	E	To
		30	70	100

**Unit-1: Introduction**

Necessity and advantages of testing, repair and maintenance, common instruments required for testing, significance of B-T curve in the life span of machine tool, acceptance test for machine tools, economic aspects, manpower planning and materials management, Fits and Tolerances-common fits and tolerances used for various machine parts.

**Unit-2: Testing of machines**

Testing equipment, dial gauge, mandrel, spirit level, straight edge, auto collimator, recalibration of measuring instruments like Vernier calliper, testing methods-geometrical/alignment test, performance test, testing under load, run test, vibrations, noise.

**Unit-3: Repairing**

Common parts which are prone to failure, reasons of failure, repair schedule, parts that commonly need repair such as belts, couplings, nuts and bolts repairing the engines, compressors and boilers

**Unit-4: Lubrication system**

Lubrication methods and periodical lubrication chart for various machines (daily, weekly, monthly), handling and storage of lubricants, lubricants conditioning and disposal, lubricant and their grades needed for specific components such as gears, bearings and chains, purpose and procedures of changing oil periodically (like gear box oil)

**Unit-5: material handling systems**

Basic principles of material handling, basic types of material handling equipments and its characteristics, uses and limitations, forklift trucks, selection of material handling equipment, unit load-pallet sizing and loading, conveyor models, AGV systems, Automated storage & retrieval system(ASRS)

**List of books**

1. Industrial maintenance by HP Harg, S. Chand and company, Delhi

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2. Installation, testing and maintenance by JS Narang, Dhanpat Rai & Sons, New Delhi
3. Plant maintenance Engineering by RK Jain, Khanna Publisher, Delhi

**Subject: Fabrication processes**

**Subject Code: ME-507**

Credit	Hours	Marks		
		I	E	To
3	45	15	35	50

**Unit-1: Welding consumables**

Classification of electrodes, functions of electrodes coating, types of coating, classification and coding of heavy coated electrodes, welding fluxes, functions of fluxes, roles of flux in gradients, basicity index, classification of fluxes, characteristics of inert gases used in welding.

**Unit-2: Weldability**

Definition of weldability, different aspects of welding, weldability tests, weldability of carbon steel, stainless steel and aluminium.

**Unit-3: Welding inspection**

Visual inspection, tensile and bend test of a weldment as per standard practice, principle and procedure of dye penetrant, magnetic particle, ultrasonic and X-ray inspection.

**Unit-4: Distortion and residual stresses**

Causes of the development of distortion and residual stresses, different methods to control distortion and residual stresses in the weldment.

**Unit-5: Safety codes and practices related to welding**

Effect and protection from fumes and gases, chromium and Nickel in welding fumes, Radiation, noise shocks, safe storage, handling and use of gas cylinders, eye and face protection for welding and cutting operations.

**List of books**

1. Welding Engineering by Dr. RS parmar, Khanna Publisher, Delhi
2. Welding Technology by OP Khanna, Dhanpat Rai & Sons, Delhi

**Subject: Fabrication Processes lab**

**Subject Code: ME-57L**

<b>Credit</b>	<b>Hours</b>	<b>Marks</b>		
1	30	I	E	To
		35	15	50

**List of Experiments**

4. To prepare a joint by using the spot welding machine
2. To analyse the effect of welding parameters (voltage, welding speed, current etc.) on the weld bead geometry (penetration, bead width etc.)
3. To prepare a weldment and perform the tensile and band tes of the same as per standard practice.
4. To inspect a given weld joint by using penetrant test.

**Subject: Strength of Materials****Subject Code: ME-508**

Credit	Hours	Marks		
3	45	I	E	To
		15	35	50

**Unit-1: Stresses and Strains**

Concept of stress and strain, concept of load, stresses and strain, tensile, compressive and shear stresses and strains, concept of Elasticity, Elastic limit and limit of proportionality, Hook's law, Poisson ratio, longitudinal and circumferential stresses in seamless thin walled cylindrical shells (derivation not required)

**Unit-2: Bending stresses**

Concept of bending stress, theory of simple bending, use of equation  $f/y=M/I=E/R$ , concept of moment of resistance, bending stress diagram, calculation of maximum bending stress in beams of rectangular, circular, and T-section.

**Unit-3: Columns**

Concept of column, modes of failure, types of columns, buckling load, crushing load, slenderness ratio, factors effecting strength of a column, end restraints, effective length, strength of column by Euler formula without derivation, simple numerical problems

**Unit-4: Torsion**

Concept of torsion difference between torque and torsion, use of torque equation for circular shaft, comparison between solid and hollow shaft with regard to their strength and weight, power transmitted by shaft, simple numerical problems

**Unit-5: Springs**

Closed coil helical springs subjected to axial load and impact load, stress deformation, stiffness and angle of twist and strain energy, proof resilience, laminated spring (semi elliptical type only), determination, simple numerical problems.

**List of Books**

3. SOM by RS Khurmi, S. Chand & Co., New Delhi



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4. SOM by Birinder Singh, katson publishing house, New Delhi

**Subject: Strength of materials lab**

**Subject Code: ME-508L**

<b>Credit</b>	<b>Hours</b>	<b>Marks</b>		
1	30	I	E	To
		35	15	50

**List of Experiments**

1. Tensile test on bars of mild steel
2. Bending tests on a steel bar
3. Impact test on metals (a) Izod test (b) Charpy test
4. Torsion test on specimens of different metals for determining modulus of rigidity
5. To determine the stiffness of helical spring and to plot a graph between load and extension
6. Hardness test on different metals

**Semester: Six**

**Subject: Project (Live)**

**Subject code: PRO-501**

Some of the suggested project activities are given below;

1. Projects connected with repair and maintenance of machines
2. Estimating and costing of projects
3. Design of jigs/ fixtures
4. Projects related to quality control
5. Projects work related to increasing productivity
6. Projects related to installation, calibration and testing of machines
7. Projects related to wastage reduction
8. Projects related to fabrication
9. Energy efficiency related projects
10. Projects related to improving an existing system

Note: Each student has to take one project individually and one to be shared with a group of four-five students depending upon cost and time involved. There is no binding to take up the above projects as it is only a suggestive list of projects.

# Scheme & Syllabus

(Session:2020-2023)

(Group-B)

<b>TEACHING SCHEME FOR FIRST SEMESTER</b>															
Category	Subject Code	Subject Name	Credits			Marks							Hrs		
						Theory			Practical			Total			
			T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO
General Education Component	MC-301	*MOOC/ Online Course-I (Total Quality Management-1)	2	-	2	30	70	100	-	-	-	100	30	-	30
	EM-301	Entrepreneurship management (MOOC/ Online Course-II)	2	-	2	30	70	100	-	-	-	100	30	-	30
	<b>Total</b>			<b>4</b>	<b>-</b>	<b>4</b>	<b>60</b>	<b>140</b>	<b>200</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>200</b>	<b>60</b>	<b>-</b>
Skill Education Component	OJT-301	On Job Training (OJT)	-	24	24	-	-	-	245	105	350	350	-	1080	1080
	<b>Total</b>			<b>-</b>	<b>24</b>	<b>24</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>245</b>	<b>105</b>	<b>350</b>	<b>350</b>	<b>-</b>	<b>1080</b>
<b>Grand Total</b>			<b>4</b>	<b>24</b>	<b>28</b>	<b>60</b>	<b>140</b>	<b>200</b>	<b>245</b>	<b>105</b>	<b>350</b>	<b>550</b>	<b>60</b>	<b>1080</b>	<b>1140</b>

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TEACHING SCHEME FOR SECOND SEMESTER															
Category	Subject Code	Subject Name	Credits			Marks							Total hrs. per course		
						Theory			Practical			Total (T+P)			
			Th .	Pr .	To .	Int .	Ext .	To.	Int .	Ext .	To.		Th.	Pr.	To.
Skill Education Component (SEC)	ME-302L	Workshop Practice lab	-	4	4	-	-	-	70	30	100	100	-	120	120
	IMS-302 IMS-302L	Inspection & Quality Control	3	1	4	15	35	50	35	15	50	100	45	30	75
	*ME-301L	Engineering Graphics and Drawing	-	4	4	-	-	-	70	30	100	100	-	120	120
	<b>SEC Total</b>			<b>3</b>	<b>9</b>	<b>12</b>	<b>15</b>	<b>35</b>	<b>50</b>	<b>175</b>	<b>75</b>	<b>250</b>	<b>300</b>	<b>45</b>	<b>270</b>
General Education Component (GEC)	ENG-301 ENG-301L	Language (English)	3	1	4	15	35	50	35	15	50	100	45	30	75
	ME-303, ME-303L	Workshop Technology	4	-	4	30	70	100	-	-	-	100	60	-	60
	MTH-301	Applied Mathematics	4	-	4	30	70	100	-	-	-	100	60	-	60
	CSE-301 CSE-301L	Basics of Computer	3	1	4	15	35	50	35	15	50	100	45	30	75
	IMS-301 IMS-301L	Fundamental of Industrial Management	3	1	4	15	35	50	35	15	50	100	45	30	75
	<b>GEC Total</b>			<b>17</b>	<b>3</b>	<b>20</b>	<b>90</b>	<b>210</b>	<b>300</b>	<b>105</b>	<b>45</b>	<b>150</b>	<b>500</b>	<b>255</b>	<b>90</b>
<b>Grand Total</b>			<b>20</b>	<b>12</b>	<b>32</b>	<b>105</b>	<b>245</b>	<b>350</b>	<b>280</b>	<b>120</b>	<b>400</b>	<b>800</b>	<b>300</b>	<b>360</b>	<b>660</b>

\*Engineering Graphics & Drawing (ME-301L) will be treated as a special case of Practical. The sessional test will be conducted similar to theory subjects but external exam. will not be conducted (as it is practical).

**Job Role: Level-3 (After 1<sup>st</sup> Year of completion)**

Machining and quality Technician (ASC/Q3509)

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

TEACHING SCHEME FOR THIRD SEMESTER															
Category	Subject Code	Subject Name	Credits			Marks							Hrs		
						Theory			Practical			Total			
			T	P	TO	I	E	TO	I	E	TO	(T+P)	T	P	TO
General Education Component	MC-401	*MOOC/ Online Course-III/ Manufacturing Process Technology I and II	2	-	2	30	70	100	-	-	-	100	30	-	30
	MC-402	*MOOC/ Online Course-IV/Industrial best practices	2	-	2	30	70	100	-	-	-	100	30	-	30
	<b>Total</b>		<b>4</b>	<b>-</b>	<b>4</b>	<b>60</b>	<b>140</b>	<b>200</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>200</b>	<b>60</b>	<b>-</b>	<b>60</b>
Skill Education Component	OJT-401	On Job Training (OJT)	-	24	24	-	-	-	245	105	350	350	-	1080	1080
	<b>Total</b>		<b>-</b>	<b>24</b>	<b>24</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>245</b>	<b>105</b>	<b>350</b>	<b>350</b>	<b>-</b>	<b>1080</b>	<b>1080</b>
<b>Grand Total</b>			<b>4</b>	<b>24</b>	<b>28</b>	<b>60</b>	<b>140</b>	<b>200</b>	<b>245</b>	<b>105</b>	<b>350</b>	<b>550</b>	<b>60</b>	<b>1080</b>	<b>1140</b>

Note: \* Relevant MOOC/Online course will be offered as per the availability.

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

TEACHING SCHEME FOR FOURTH SEMESTER															
Category	Subject Code	Subject Name	Credits			Marks							Total hrs. per course		
						Theory			Practical			Total (T+P)			
			Th	Pr	To	Int	Ext	To.	Int	Ext	To.		Th.	Pr.	To.
Skill Education Component (SEC)	ME-401L	CAD lab	-	4	4	-	-	-	70	30	100	100	-	120	120
	ME-404 ME-404L	CNC machines & Automation	4	-	4	30	70	100	-	-	-	100	60	-	60
	ME-502L	Fundamentals of CNC machines	-	4	4	-	-	-	70	30	100	100	-	120	120
	<b>SEC Total</b>			<b>4</b>	<b>8</b>	<b>12</b>	<b>30</b>	<b>70</b>	<b>100</b>	<b>140</b>	<b>60</b>	<b>200</b>	<b>300</b>	<b>60</b>	<b>240</b>
General Education Component (GEC)	EE-401 EE-401L	Basics of Electrical and Electronics Engg.	3	1	4	15	35	50	35	15	50	100	45	30	75
	PHY-401 PHY-401L	Applied Physics	3	1	4	15	35	50	35	15	50	100	45	30	75
	IMS-401	Estimating & Costing	4	-	4	30	70	100	-	-	-	100	60	-	60
	EVS-401	EVS	4	-	4	30	70	100	-	-	-	100	60	-	60
	ME-403 ME-403L	Applied Mechanics	3	1	4	15	35	50	35	15	50	100	45	30	75
	<b>GEC Total</b>			<b>17</b>	<b>3</b>	<b>20</b>	<b>105</b>	<b>245</b>	<b>350</b>	<b>105</b>	<b>45</b>	<b>150</b>	<b>500</b>	<b>255</b>	<b>90</b>
<b>Grand Total</b>			<b>21</b>	<b>11</b>	<b>32</b>	<b>135</b>	<b>315</b>	<b>450</b>	<b>245</b>	<b>105</b>	<b>350</b>	<b>800</b>	<b>315</b>	<b>330</b>	<b>645</b>

**Job Roles: Level-4 (After 2<sup>nd</sup> Year of completion)**

Machining Technician/ CNC Operator (ASC/Q3503)

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

TEACHING SCHEME FOR FIFTH SEMESTER													
Category	Subject Name	Credits			Marks						Hrs		
					Theory			Practical					
		T	P	TO	I	E	TO	I	E	TO	T	P	TO
General Education Component (GEC)	Project (Live) (PRO-501)	-	4	4	-	-	-	70	30	100	-	120	120
	<b>GEC Total</b>	-	<b>4</b>	<b>4</b>	-	-	-	<b>70</b>	<b>30</b>	<b>100</b>	-	<b>120</b>	<b>120</b>
Skill Education Component (SEC)	OJT (OJT-501)	-	24	24	-	-	-	245	105	350	-	1080	1080
	<b>SEC Total</b>	-	<b>24</b>	<b>24</b>	-	-	-	<b>245</b>	<b>105</b>	<b>350</b>	-	<b>1080</b>	<b>1080</b>
<b>Grand Total</b>		-	<b>28</b>	<b>28</b>	-	-	-	<b>315</b>	<b>135</b>	<b>450</b>	-	<b>1200</b>	<b>1200</b>



## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

TEACHING SCHEME FOR SIXTH SEMESTER															
Category	Subject Code	Subject Name	Credits			Marks							Total hrs. per course		
			Th	Pr	To	Theory			Practical			Total (T+P)	Th.	Pr.	To.
						Int	Ext	To.	Int	Ext	To.				
Skill Education Component (SEC)	ME-501L	CAD/ CAM	-	4	4	-	-	-	70	30	100	100	-	120	120
	ME-502	Introduction to Jigs & Fixtures	4	-	4	30	70	100	-	-	-	100	60	-	60
	ME-503L	CNC Programing lab	-	4	4	-	-	-	70	30	100	100	-	120	120
	<b>SEC Total</b>			<b>4</b>	<b>8</b>	<b>12</b>	<b>30</b>	<b>70</b>	<b>100</b>	<b>140</b>	<b>60</b>	<b>200</b>	<b>300</b>	<b>60</b>	<b>240</b>
General Education Component (GEC)	ME-504 ME-504L	Materials and Metallurgy	3	1	4	15	35	50	35	15	50	100	45	30	75
	ME-505 ME-505L	Hydraulics & Pneumatics	3	1	4	15	35	50	35	15	50	100	45	30	75
	ME-506	Plant Maintenance & Material Handling	4	-	4	30	70	100	-	-	-	100	60	-	60
	ME-507 ME-507L	Fabrication Processes	3	1	4	15	35	50	35	15	50	100	45	30	75
	ME-508 ME-508L	Strength of Materials	3	1	4	15	35	50	35	15	50	100	45	30	75
	<b>GEC Total</b>			<b>16</b>	<b>4</b>	<b>20</b>	<b>90</b>	<b>210</b>	<b>300</b>	<b>140</b>	<b>60</b>	<b>200</b>	<b>500</b>	<b>240</b>	<b>120</b>
<b>Grand Total</b>			<b>20</b>	<b>12</b>	<b>32</b>	<b>120</b>	<b>280</b>	<b>400</b>	<b>280</b>	<b>120</b>	<b>400</b>	<b>800</b>	<b>300</b>	<b>360</b>	<b>720</b>

**Job Roles (After 3<sup>rd</sup> Year of completion):**

Machine Shop Supervisor (ASC/Q3505)



**Syllabus: D.Voc. (Mechanical-Manufacturing)**

**Industry Partner: Roop Auto Ltd.**

**Session: 2020-23 (Group-B)**

**Semester: First****Subject: MOOC Course (Total Quality Management-1)****Subject Code: MC-301**

Credit	Hours	Marks		
		I	E	To
2	30			
		30	70	100

**Unit-1: Introduction to Quality Management System**

Concept of quality, dimension of Quality, Definition of quality, producer and consumer perspective of quality, variability, quality improvements and quality characteristics, basic terminologies relating to Quality.

**Unit-2: Introduction to Total Quality Management**

Management Aspects of Quality, Edward Deming's Framework for Quality and Productivity Improvement Management, Shewhart Cycle, Juran's Management Philosophy, Feigenbaum's concept of Companywide Quality Control, Quality Circle and Historical reasons for limited Success of TQM.

**Unit-3: Introduction to Concept of Probability**

Basic Concepts of Probability Distribution and Normal Distribution, Overview of Six Sigma, Introduction to DMAIC, Overview of Steps in DMAIC, Overview of steps of DMADV, Generations of Six Sigma, Overview of Toyota Production System, Kaizen

**Unit-4: Tools for Quality Assurance**

Histogram, Check Sheet, Pareto Chart, Cause and Effect Diagram, Defect Concentration Diagram, Scatter Diagram, Affinity Diagram, Relations Diagram, Tree Diagram, Matrix Diagram.

**Unit-5: Control Charts**

Samples and Distribution, Normal Distribution, Basics of X bar and R chart, Estimating Mean and Standard Deviation, Phase 1 of Control Chart Usage, Example of X bar and R chart, Process Capability, Effects of Variable Sample Size.

**Recommended Books**

4. Statistical Quality Control by M. Mahajan; Dhanpat Rai and Sons, Delhi
5. Engineering Metrology by R. K. Jain
6. Engineering Metrology by R.K. Rajput, SK Kataria and Sons

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: MOOC Course (Entrepreneurship Management)**

**Subject Code: EM-301**

Credit	Hours	Marks		
		I	E	To
2	30	30	70	100

UNIT	KEY LEARNING
<b>UNIT I Entrepreneurship</b>	Meaning, Nature and Scope Characteristics and Qualities of a Successful Entrepreneur Relationship between Entrepreneurship Development and Economic Development
<b>UNIT-II Entrepreneurship and Society</b>	Entrepreneurship and Society New Venture Development- Meaning and Stages Sources of Financing Entrepreneurship Managerial Vs Entrepreneurial Approach.
<b>UNIT-III EDP Programs</b>	EDP Programs Concept of Economic Freedom Financial Markets and Entrepreneurship Venture Capital; Angel Capital
<b>UNIT-IV Entrepreneurial Strategies and Business Plan:</b>	Entrepreneurial Strategies and Business Plan Presenting Business Plans to the Investors Future of Entrepreneurship in India
<b>UNIT-V Women Entrepreneurship</b>	Concept Factors governing women entrepreneurship Schemes for women entrepreneurship Rural Entrepreneurship, Concept, advantage and challenges.

**Text/ Reference Books**

- Dollinger, MJ, Entrepreneurship- Strategies and Resources, Pearson Education.
- Desai, Vasant, Entrepreneurship Development, Himalaya Publishing House.
- Gupta, C.B. and Srinivasan, P., Entrepreneurship Development, Sultan Chand & Sons.
- Charanthimath, P.M., Entrepreneurship Development and Small Business Enterprise, Pearson Education.

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- Havinal, Veerbhadrappa, Management and Entrepreneurship, 1st Edition, New Age International Publishers, 2008.

**Semester: Second****Subject: Workshop Practice lab****Subject Code: ME-302L**

Credit	Hours	Marks		
		I	E	To
4	120	70	30	100

**List of experiments**

2. To find the least count of Vernier caliper, micrometer and dial indicator
3. To study height gauge and surface plate
4. To prepare a job on milling machine
5. To prepare a job in fitting shop
6. To prepare butt joint using electric arc welding
6. To prepare a job on lathe machine including turning, taper turning, facing, threading and knurling operations.
7. To prepare lap joint using electric arc welding
8. To prepare a joint using gas welding

**Subject: Inspection & Quality Control****Subject code: IMS-302**

Credit	Hours	Marks		
		I	E	To
3	45			
		15	35	50

**Unit-1: Inspection**

Introduction, units of measurement, standards for measurements and interchangeability, types of inspection, remedial, preventive and operative inspection, incoming, in-process and final inspection.

**Unit-2: Measurement**

Basics principles used in measurement and gauging, study of various measurement instruments- calipers, micrometers, dial indicators, surface plate, try square, protectors, sine bar, slip gauges, profile projector.

**Unit-3: Gauging**

Introduction, limit gauges-plug, ring, snap, taper, thread, height, depth, feeler, wire gauge and their applications for linear, angular, surface, thread and gear measurement.

**Unit-4: Statistical Quality Control**

Basics statistical concepts, empirical distribution and histograms, frequency, mean, mode, standard deviation, normal distribution, introduction to control charts-X, R, P and C charts and their applications.

**Unit-5: Sampling**

Introduction, sampling plans, collection of sample size, methods of taking samples, frequency of samples, inspection plan format and test reports.

**Recommended Books**

4. Statistical Quality Control by M. Mahajan; Dhanpat Rai and Sons, Delhi
5. Engineering Metrology by R. K. Jain
6. Engineering Metrology by R.K. Rajput, SK Kataria and Sons





**Subject: Inspection & Quality Control lab**

**Subject code: IMS-302 L**

<b>Credit</b>	<b>Hours</b>	<b>Marks</b>		
1	30	I	E	To
		35	15	50

**List of Experiments**

5. Use of dial indicator for measurement taper
6. Use of combination set, bevel protector and sine bar for measuring taper
7. With the help of given data, plot X, R, P and C Charts
8. Use of slip gauge in measurement of centre distance between two pins.

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: Engineering Graphics & Drawing****Subject code: ME-301 L**

Credit	Hours	Marks		
		I	E	To
4	120	70	30	100

**OBJECTIVES**

4. Understand and appreciate the importance of Engineering Graphics in Engineering
5. Understand the basic principles of Technical/Engineering Drawing
6. Understand the different steps in producing drawings according to BIS conventions

**OUTCOMES**

4. The student will become familiar with fundamentals of various science and technology subjects and thus acquire the capability to applying them
5. The graduates will become familiar with fundamentals of engineering design. Understanding the concept generation, design optimization and evaluation.
6. Students will be able to effectively design various engineering components and make process plan for the production.

**SKILL SET**

4. Projection of various components according to BIS specifications.
5. Assembly of data and information of various components in visualized way
6. Interpretation of technical graphics assemblies

**CONTENTS****7. Introduction to drawing, lines and lettering:**

- 1.6. Definition and classification of drawing
- 1.7. Drawing instruments such as; drawing board, drawing sheets, drafter.
- 1.8. Types of pencils, sheets, eraser etc.
- 1.9. Different types of lines( Straight line, inclined line and curved lines)
- 1.10. Practice engineering style for letters and numbers as BIS: SP:46-2003

**Hands on training:**

- Prepare drawing sheet by using different types of lines
- Prepare drawing sheet by Bisection of line, angle, arc.

**8. Dimensioning and scale:**

- 2.5. Importance of dimensioning
- 2.6. Types (i.e. chain, parallel and progressive etc.) and methods of placing dimensioning (i.e. aligned and unidirectional)
- 2.7. Principles of dimensioning and practice dimensioning technique as BIS: SP: 46-2003.

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2.8. Free hand sketching of straight lines, circle, square, Polygons

**Hands on training:**

- To divide line of length 120mm into 9 equal parts
- Divide a circle into 12 equal parts by using engineering compass

**9. Introduction to Projection:**

3.3. Introduction to first and third angle projection

3.4. Introduction to projection of point, line and plane

**Hands on training:**

- Practice for projection of point
- Practice for projection of line
- Practice for projection plane

**10. Isometric projection**

1.2 Isometric drawing of simple geometric solids

**Hands on training:**

- Prepare drawing sheet of isometric projection.

**11. Orthographic projection**

1.2 Orthographic projection of simple geometric solids.

**Hands on training:**

- Prepare drawing sheet of orthographic projection

**Hands on training:**

- Prepare drawing sheet of orthographic projection
- Prepare drawing sheet of isometric projection.

**Text Book**

4. Engineering Drawing Plane and Solid Geometry : N.D. Bhatt and V.M. Panchal, Forty-
5. Fourth Edition 2002, Charotar Publishing House.
6. Engineering Graphics and Drafting : P.S. Gill, Milenium Edition, S.K. Kataria and Sons.

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: Language (English)****Subject code: ENG-301**

Credit	Hours	Marks		
		I	E	To
3	45	15	35	50

**Objectives**

- Develop effective communication skills among the students for the business world.

**Learning Outcomes**

- Able to differentiate in the vowels and consonants that can help the students to pronounce words better and be able to learn phonetics.
- Learn the correct pronunciation of the words helping in the reduction of Mother Tongue Influence.  
Able to communicate effectively and will have improved verbal communication.
- Learn to frame the sentences properly with the correct formation. This will improve the written skills of the students.
- Able to write paragraphs on different topics with the correct usage of vocabulary and will improve the written as well as verbal communication.
- Learn the correct usage of the punctuation marks, will draft formal & informal emails and will comprehend the articles.
- Effectively use established communication systems and protocols in the workplace.

Unit	Topic	Key Learning
I	<b>Communication</b>	<ul style="list-style-type: none"> <li>• Meaning of Communication,</li> <li>• Importance of Communication,</li> <li>• Types of Communication, Process of Communication,</li> <li>• Communication network in an organization,</li> <li>• Barriers to Communication,</li> <li>• Essentials of good Communication.</li> </ul>
II	<b>Grammar and Usage</b>	<ul style="list-style-type: none"> <li>• Subject and verb agreement,</li> <li>• Tenses: simple past (negatives/interrogatives) present perfect,</li> <li>• past perfect continuous,</li> <li>• past perfect,</li> <li>• expressing future time (will and going to),</li> </ul>

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		<ul style="list-style-type: none"> <li>• Passive voice (perfect tenses and modals),</li> <li>• Modals (must, should, ought to, would),</li> <li>• Linking words (to like because although, instead of, if, as, since, who, which that, when however, in spite of),</li> <li>• Reported speech, statements, questions (yes/no).</li> </ul>
III	<b>Reading Skills</b>	<ul style="list-style-type: none"> <li>• Prose texts: The Gift of the Magi by O. Henry</li> <li>• Poems: 1. Death the Leveller by James Shirely</li> <li>• 2. Mending wall – Robert Frost</li> <li>• Drama: Refund by Fritz Karinthy</li> </ul>
IV	<b>Listening Skills</b>	<ul style="list-style-type: none"> <li>• The process of listening,</li> <li>• Types of listening,</li> <li>• Benefits of effective listening,</li> <li>• Barriers to listening.</li> </ul>
V	<b>Writing Skills</b>	<ul style="list-style-type: none"> <li>• Paragraph Writing:(Describing objects,describing people,Narrating events,stories)</li> <li>• Letter Writing: Application for leave Application for jobs, asking for information from various agencies (e.g. Last date for getting prospects; price of items before placing orders) Note making</li> <li>• Ending (punctuation, spelling, appropriate vocabulary, structures)</li> </ul>

**Suggested Readings:**

- Sethi, J & et al. A Practice Course in English Pronunciation, Prentice Hall of India, New Delhi.
- Sen, Leena. Communication Skills, Prentice Hall of India, New Delhi.
- Prasad, P. Communication Skills, S.K. Kataria& Sons.
- Bansal, R.K. and J.B. Harrison. Spoken English, Orient Language.
- Roach Peter. English Phonetics and Phonology.
- A.S. Hornby&#39;s. Oxford Advanced Learners Dictionary of Current English, 7th Edition.
- Prasad, P. The Functional Aspects of Communication Skills, Delhi.
- McCarthy, Michael. English Vocabulary in Use, Cambridge University Press.
- Rajinder Pal and PremLata. English Grammar and Composition, Sultan Chand Publication.
- Idioms & Phrases (English-Hindi), Arihant Publication (India) Pvt. Ltd.

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- One Word Substitution, Dr. Ashok Kumar Singh, Arihant Publications (India) Pvt,Ltd

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: Language English Lab****Subject code: ENG-301 L**

Credit	Hours	Marks		
1	30	I	E	To
		35	15	50

**Objectives:** Develop effective communication skills among the students for the business world

**Learning Outcomes**

- Able to differentiate in the vowels and consonants that can help the students to pronounce words better and be able to learn phonetics.
- Learn the correct pronunciation of the words helping in the reduction of Mother Tongue Influence.  
Able to communicate effectively and will have improved verbal communication.
- Learn to frame the sentences properly with the correct formation. This will improve the written skills of the students.
- Able to write paragraphs on different topics with the correct usage of vocabulary and will improve the written as well as verbal communication

**List of Practical's**

9. 1. Greetings and starting a conversation.
10. Nov Verbal Communication Techniques during conversation.
11. Verbal Communication Techniques during Conversation.
12. PPT presentation.
13. Debate.
14. Situational dialogues / Role play.
15. Telephonic skills.
16. Group Discussions

**Subject: Workshop Technology****Subject code: ME-303**

Credit	Hours	Marks		
4	60	I	E	To
		30	70	100

**Unit-1: Metal Cutting**

Introduction and definition, various types of single point cutting tools and their uses, Single point cutting tool geometry, Tool signature and its effect, Heat produced during cutting and its effect, cutting speed, feed and depth of cut and their effect.

**Unit-2: Lathe, drilling and boring operations**

Introduction, function of various parts of a lathe, classification and specifications of various types of lathe, Lathe operations- plain and step turning, facing, parting off, taper turning, drilling, reaming, threading and knurling. Lathe accessories-centres, dogs, types of chucks, face plate, angle plate, mandrel, steady rest. Work holding devices.

Working principle of drilling, its classification, various operations performed on drilling machine-drilling, spot facing, reaming, boring, counter boring, counter sinking, tapping, nomenclature of a drill, types of drills

Working principle of boring, classification of boring machines, boring tools, boring bars and boring heads.

**Unit-3: Milling and Grinding operations**

Introduction, working principle of milling machine, classification, brief description and applications of milling machine, Main parts of column and Knee type milling machine, Milling methods-up milling and down milling, Milling operation-face milling, angular milling, form milling and gange milling, working holding devices.

Purpose of grinding, various elements of grinding wheel-Abrasive, Grade, Structure, Bond. Common wheel shapes and types of wheels- built up wheels, mounted wheels and diamond wheels, specification of grinding wheels as per BIS, Truing, dressing, balancing and mounting



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of wheel, Grinding methods-Surface grinding, cylindrical grinding and centreless grinding, Grinding machine-Cylindrical grinder, surface grinder, internal grinder

**Unit-4: Welding**

Principle of welding, classification of welding processes, Advantages and limitations of welding, Industrial applications of welding, welding positions and techniques, symbols, Gas welding-Principle of operation, types of gas welding flames and their applications, Gas welding equipment, Gas welding torch. Arc. Welding-Principle of operation, Arc welding machines and equipment, A.C. and D.C. arc welding, effect of polarity, current and voltage regulations. Welding defects-types of welding defects, their causes and remedies

**Unit-5: Cutting Tool Materials**

Introduction, properties of cutting tool materials, study of cutting tool materials- High speed steel, Tungsten Carbide, Cobalt steel cemented carbides, stellite, ceramics and diamond.

**Recommended Books**

1. Manufacturing Technology by Rao: Tata McGraw Hill Publications, New Delhi
2. A Text Book of Production Engineering by P.C. Sharma: S. Chand and Company Ltd., New Delhi.

**Subject: Applied Mathematics**

**Subject code: MTH-301**

Credit	Hours	Marks		
		I	E	To
4	60			
		30	70	100

**Objectives**

- Develop the knowledge in the area of algebraic functions to solve engineering problems.

**Learning Outcomes**

- Learn the applications of Sets, Relations and Functions.
- Learn to solve special series and sequences
- Understand basic arithmetic and calculation methods.
- Learn co-ordinate Geometry.
- Learn to solve Statistics and Probability related problems.

Unit	Topic	Key Learning
I	<b>Sets, Relations and Functions</b>	<ul style="list-style-type: none"> <li>• Theory of Sets,</li> <li>• Relations,</li> <li>• Functions,</li> <li>• Polynomials and Graphical Representation</li> </ul>
II	<b>Sequence and Series</b>	<ul style="list-style-type: none"> <li>• Introduction to Sequence and Series,</li> <li>• Arithmetic Progression (A.P.),</li> <li>• Geometric Progression (G.P.),</li> <li>• Harmonic Progression (H.P.)</li> </ul>
III	<b>Algebra-I</b>	<ul style="list-style-type: none"> <li>• Partial Fraction,</li> <li>• Permutation,</li> <li>• Combination,</li> <li>• Binomial Theorem</li> </ul>
IV	<b>Trigonometry</b>	<ul style="list-style-type: none"> <li>• Trigonometric Ratio,</li> <li>• Compound Angles,</li> <li>• Multiple and sub multiple angles,</li> <li>• Transformations of products into sums or differences and vice versa</li> </ul>
V	<b>Straight Lines</b>	<ul style="list-style-type: none"> <li>• Cartesian and Polar Coordinate,</li> <li>• Different Forms of a Straight Line,</li> <li>• General Equation of a Line,</li> <li>• Distance of a Point from a Line</li> </ul>

**Suggested Readings:**

- Mathematics for class XI Part I and II NCERT.

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

- Mathematics for class XII Part I and II NCERT.

**Subject: Basics of Computer****Subject code: CSE-301****Objectives**

- Build basic technical skills and develop any kind of computer application.

Credit	Hours	Marks		
		I	E	To
3	45	15	35	50

**Learning Outcomes**

- State the applications of Computers and understand the basic components of computer.
- Identify & describe various parts of computers like CPU, keyboard, monitor, etc.
- View files, work with files and customize window.
- Able to Differentiate in various operating system.
- Apply the office Applications for the task assigned by the authorities.
- Outline the basics of Networking.
- Make use of Internet and its applications when required.

Unit	Topic	Key Learning
I	<b>Introduction to Computer system</b>	<ul style="list-style-type: none"> <li>• Basic Applications of Computer;</li> <li>• Block Diagram of Computer System, Input / Output Devices,</li> <li>• Computer Memory,</li> <li>• Concepts of Hardware and Software;</li> <li>• Computer Virus: Definition,</li> <li>• Types of viruses, Characteristics of viruses, Anti-virus software.</li> </ul>
II	<b>Operating System</b>	<ul style="list-style-type: none"> <li>• Overview of operating system:</li> <li>• Definition,</li> <li>• Functions of operating system,</li> <li>• Need and its services,</li> <li>• Types of operating system,</li> <li>• Batch Processing,</li> <li>• Spooling, Multiprocessing, Multiprogramming, Time-Sharing,</li> <li>• Comparison between DOS and windows,</li> <li>• Comparison between Unix and Windows.</li> </ul>
III	<b>Office Applications</b>	<ul style="list-style-type: none"> <li>• Introduction to MS Word, Introduction to MS Excel,</li> <li>• Introduction to MS PowerPoint,</li> <li>• Menus,</li> <li>• Shortcuts,</li> <li>• Document types,</li> </ul>

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		<ul style="list-style-type: none"> <li>• Formatting documents,</li> <li>• spread sheet and presentations,</li> <li>• Working with Spreadsheets,</li> <li>• Different templates.</li> </ul>
IV	<b>Networking</b>	<ul style="list-style-type: none"> <li>• Network Technologies,</li> <li>• Introduction to Internet: Network connecting devices,</li> <li>• Topologies,</li> <li>• HTTP,</li> <li>• HTTPS DNS,</li> <li>• Hub,</li> <li>• Switches,</li> <li>• Router,</li> <li>• Repeater, Firewalls</li> </ul>
V	<b>World Wide Web</b>	<ul style="list-style-type: none"> <li>• WWW and Web Browsers Introduction,</li> <li>• Objectives,</li> <li>• Concept of internet,</li> <li>• Overview of search engines,</li> <li>• Popular search engines in use,</li> <li>• Surfing the web and websites.</li> </ul>

**Suggested Readings:**

- Computers and Beginners by Jain, V.K.;
- Computer Fundamentals by Anita Goel, Pearson.

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**Subject: Basics of Computer lab****Subject Code: CSE-301L****Objectives:** Build basic technical skills and develop any kind of computer application.

Credit	Hours	Marks		
1	30	I	E	To
		35	15	50

**Learning Outcomes**

- State the applications of Computers and understand the basic components of computer.
- Identify & describe various parts of computers like CPU, keyboard, monitor, etc.
- View files, work with files and customize window.
- Able to Differentiate in various operating system.
- Apply the office Applications for the task assigned by the authorities.
- Outline the basics of Networking.
- Make use of Internet and its applications when required.

**List of Practical's**

11. Troubleshooting
12. Practical based on to be exposed/shown various components and supposed how to switch on a computer.
13. Handling Boot Setup, Installation of Operating System
14. WordPad, Notepad, Sticky Note, Snipping tool, Paint
15. Ms Word
16. MS-Excel- Creating charts, Creating tables
17. MS-PowerPoint
18. Case study on Operating systems (Windows/ Ubuntu/ Android/iOS)
19. Networking
20. Sending E-mails

**Suggested Readings:**

1. Introduction to Information Technology, Leon Tech World by Leon and Leon
2. Foundations of Computing, BPB Publication by Sinha, Kr. Pradeep and Preeti Sinha;
3. Word Processing and Typing by Sharon Spencer, Heinemann.
4. MS Office by S.S. Srivastava, Firewall Media.
5. Microsoft Office 2010 by Bittu Kumar, V & S Publications
6. Data Communication and Networking by Behrouz.A. Forouzan, McGraw Hill

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: Fundamental of Industrial Management****Subject code: IMS-301**

Credit	Hours	Marks		
		I	E	To
3	45	15	35	50

**Course Objectives:**

- Understanding the knowledge of Quality Control, inspection and quality assurance management used in the organization.
- Develop the skill for using tool and techniques for quality in Industry
- Apply elementary knowledge of quality concepts for quality assurance.

**Learning Outcome:**

- Students will be able to understand the daily management system related to Quality in the shop floor.
- Student will able to solve different type of problems in their manufacturing processes.
- Ensure implementation of 5S activities at the shop floor/ office area.
- Students will able to apply 5S and safety in their work place.

**Unit-1****Concept of Quality:**

1.1 Quality: Definition, History, Importance

1.2 Introduction to Quality Control.

**Unit-II****Organizational Aspects of Quality Assurance:**

2.1 Quality Assurance (QA): Introduction, Definition, QA in different stages, Quality Planning.

2.2 ISO: Introduction, Benefits of ISO.

2.3 ISO 9001, Benefits of ISO 9001.

**Unit-III****Problem solving tools and techniques:**

3.1 Definition of a problem

3.2 Type of problems, classification of problems

3.3 Problem solving tools: Introduction to Cause and effect diagram, Histogram, Pareto charts,

**Unit-IV**

**Total Quality Management:**

- 4.1 Basic concept of TQM, features of TQM
- 4.2 principles of TQM
- 4.3 Concept of TPM
- 4.4 Quality allied concept: KAIZEN, Poke yoke

**Unit-V**

**5 S and Safety:**

- 5.1 Detailed concept of 5S and safety used in Industries
- 5.2 Integrated Management system

**Suggested Readings:**

- 3. Total quality Management by L.Sganthi & Anand A. Samuel, PHI Publication.
- 4. Total quality Management by Poornima M Charantimath, Pearson Publication.

**Subject: Fundamentals of Industrial Management lab**

**Subject code: IMS-301 L**

<b>Credit</b>	<b>Hours</b>	<b>Marks</b>		
1	30	I	E	To
		35	15	50

**List of Experiments**

1. Draw and Demonstrate the process flow diagram
2. Draw and demonstrate Pareto diagram
3. Draw and Demonstrate cause and effect diagram



## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

## Semester: Third

**SUBJECT: MOOC Course (Manufacturing Process Technology I and II)**

CODE: MC-401

CATEGORY: General Education Component

Credit	Hours	Marks		
		I	E	To
2	30	30	70	100

Unit	Topic	Key Learning
I	<b>Basics of Manufacturing Processes</b>	<ul style="list-style-type: none"> <li>Introduction, History of Manufacturing Process, broad classification, Introduction to non-conventional processes, Stress- strain diagram for different types of materials, basic material properties,</li> </ul>
II	<b>Introduction to Casting Process</b>	<ul style="list-style-type: none"> <li>Introduction to casting, types of pattern and moulds, pattern allowances, mould making procedure, introduction to gating system.</li> </ul>
III	<b>Machining Processes</b>	<ul style="list-style-type: none"> <li>Introduction, basic machining processes- turning, milling, drilling, mechanism of chip formation, types of chip produced in metal cutting, tool life: wear and failure, Taylor's tool life equation.</li> </ul>
IV	<b>Advanced Machining Processes</b>	<ul style="list-style-type: none"> <li>Introduction and Classification, Introduction to- Abrasive Jet machining process, Ultrasonic machining process, Electrochemical machining process, Electric Discharge Machining.</li> </ul>
V	<b>Metal forming processes</b>	<ul style="list-style-type: none"> <li>Introduction, Metal forming processes-rolling, forging, extrusion and drawing. Sheet metal working processes.</li> </ul>

**Text Book:**

- Fundamentals of Modern Manufacturing: Materials, Processes, and Systems by Mikell P. Groover

**Reference Books**

- Manufacturing Engineering and Technology, 4e by Kalpakjian
- Manufacturing Science by Amitabha Ghosh and Mallick

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**SUBJECT: MOOC Course (Industrial Best Practices)**

CODE: MC-402

CATEGORY: General Education Component

Credit	Hours	Marks		
		I	E	To
2	30			
		30	70	100

**Unit-1: Types of Maintenance**

Planned & unplanned maintenance, Break down maintenance, Corrective maintenance, Routine maintenance, Preventive maintenance, Predictive maintenance, condition based maintenance system & Design-out maintenance.

**Unit-2: Condition Monitoring**

Primary & Secondary signals, on-line & Off-line monitoring, Visual & Temperature monitoring, leakage monitoring, lubricant monitoring, corrosion monitoring, noise/ sound monitoring. Smell/ odour monitoring.

**Unit-3: Lean Manufacturing**

Objectives of lean manufacturing-key principles and implications of lean manufacturing Traditional Vs lean manufacturing, Lean benefits ,Value creation and waste elimination.

**Unit-4: Agile manufacturing**

Types of Production, The Agile Production Paradigm, History of Agile Manufacturing, Agile Manufacturing Vs Mass Manufacturing, Agile Manufacturing Vs Mass Customization.

**Unit-5: Supply chain management**

Concept of supply management and SCM, Importance of supply chain flows, Value chain, Elements of supply chain efficiency, Key issues in SCM, Decision phases, Supply chain integration, Uncertainties in supply chain

**Semester: Fourth****Subject: CAD lab****Subject Code: ME-401L**

Credit	Hours	Marks		
		I	E	To
4	120	70	30	100

**List of Experiments**

5. Introduction to Computer Aided Drafting (2D) commands of any one software (Auto CAD, Solid works, Unigraphics etc.).
  - 5.1 Concept of Auto CAD, Tools bars in CAD software, coordinate system, snap, grid and ortho mode (Absolute, Relative and Polar), setting of units and layout.
  - 5.2 Drawing commands-point, line, arc, circle, ellipse
  - 5.3 Editing commands-scale, erase, copy, stretch, lengthen and explode
  - 5.4 Dimensioning and placing text in drawing area
  - 5.5 Sectioning and hatching
  - 5.6 Inquiry for different parameters of drawing entity
  - 5.7 Create layers within a drawing
  - 5.8 Specifying geometrical dimensioning & tolerancing (GD & T) parameters in drawing
6. Details and assembly drawing of the following using drafting software (2D)
  - 6.1 Stepped pulley, V-belt pulley
  - 6.2 Flanged coupling
  - 6.3 Machine tool holder
7. Isometric Drawing by using CAD using any part modelling software (3D)  
Drawing of the following on computer
  - (f) Cone
  - (g) Cylinder
  - (h) Cube
  - (i) Spring
  - (j) Isometric view of objects
8. Introduction to any part modelling software (Pro-E, Solid works, Auto CAD, Unigraphics, Catia etc.)  
Introduction to Sketcher, Sketch entities, sketch tools, blocks, dimensioning

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8.1 part modelling tools:

- 8.1.1 Creating loft features
- 8.1.2 Creating extrude features creating revolve creating swept
- 8.1.3 Creating reference- points, axis, coordinates
- 8.1.4 Creating curves
- 8.1.5 Creating fillet features
- 8.1.6 Inserting Hole types
- 8.1.7 Creating Chamfer
- 8.1.8 Creating Shell
- 8.1.9 Creating Rib
- 8.1.10 Environment & utilities- Working with views and manipulating views
- 8.1.11 Create parts e.g. Piston, pin, bolts and nuts, fixture, jig parts, washer, rings, gaskets etc.

**List of books**

- 3. Auto CAD 2000 by Ajit Singh, TMH, New Delhi
- 4. Engineering drawing with AutoCAD by T.Jeyapooran; Vikas publishing house, Delhi

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: CNC machines & Automation****Subject Code: ME-404**

Credit	Hours	Marks		
4	60	I	E	To
		30	70	100

**Unit-1: Introduction**

Introduction to NC, basic components of NC, MCU, input devices, advantages/ disadvantages of NC machine over conventional machines, CNC & DNC, their types, their advantages, disadvantages and applications, selection of parts to be machined on CNC machines, problems with conventional NC.

**Unit-2: System Devices**

Control system, feedback control classification (open & close loop), Actuators, transducers and sensors, characteristics of sensors, techpmeter, LVDT, opto-interrupters, potentiometers for linear and angular position, encoder and decoder, axis drive, other classification of CNC machines-feedback, motion, positioning.

**Unit-3: Problems in CNC machines**

Common problems in mechanical, electrical, pneumatic, electronic and PC components of CNC machines, diagnostic study of common problems and remedies, use of on-line fault finding diagnosis tools in CNC machines, methods of using discussion forums, environmental problems.

**Unit-4: Automation and NC system**

Automation, suitability of production system to automation, types, emerging trends in automation, automatic assembly, manufacture of printed circuit boards, manufacture of integrated circuits, overview of FMS, AGV, ASRS, group Technology, CAD/CAM and CIM, Automated identification system, concept of AI, Robotics, nomenclature of joints, motion.

**Unit-5: Part programming**

Part programming and basic procedure of part programming, NC blocks, part programming formats, simple programming for rational components (point to point, straight line, curved surface), tool offset, cutter radius compensation and wear compensation.

**Text Book:-**

4. CNC Machines by By B. S. Pabla, M. Adithan( First Edition), New Age International (P) Ltd.
5. CNC Machines and Automation Paperback – 2014, by Khushdeep Goyal, Katson Books
6. CNC Machines by Sandeep Bajaj, Ishan Publication

**Reference Book:-**

CNC Technology & Programming by Tilak Raj, DhanpatRai Publication

**Subject: Fundamentals of CNC Machines Lab**

Subject Code: ME-502L

Credit	Hours	Marks		
		I	E	To
4	120	70	30	100

**Objectives**

To make students in depth knowledge about CNC Machines, Machine setting , Tools used , tool offset and setting of CNC Machines.

**Learning Outcomes**

- 1.To be able to differentiate between conventional & CNC Machine in respect to working, components, operation.
2. To understand setting up of tooling for CNC. One should have knowledge of types of cutting tools & tool material used.
3. To understand tool & work holding devices used & locating principle
4. To take tool offsets and work-offset on CNC machine.

**List of Experiments**

1. Introduction to CNC and Understanding of Panel board.
2. Types of programs like Fanuc, Siemens, Mitsubishi, Allen Bradley etc.
3. Movement of Axis, tool change, use of hands wheel, Jog and manual data input.
4. Study of ATC with demonstration and Setting and adding new tool in ATC.
5. Practically finding out tool parameters on tool presetter machine.
6. Finding out coordinates for work and tool.
7. Performing tool offset for milling machine.
8. Performing Work offset for milling machine
9. Performing tool offset for Lathe machine.
10. Performing Work offset for Lathe machine.

**Process**

1. Interpretation and understanding of the component Drawing
2. To conceptualize the process based on location points, resting points and clamping points.  
Which surfaces and operations (drilling, milling, tapping, boring, reaming, to be done.

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3. Writing down detail process operation by operation using different jigs and fixtures as conceptualized.

4. Organising fixtures tools, toolings, material for machining the component.

**Preparing machine for production**

1. Select or write the program for machining the component.

2. Arranging the tools and setting them on presenters.

3. Loading the tools on Auto tool changer as per the program

4. Load the fixture



**Subject: Basics of Electrical and Electronics Engineering****Subject Code: EE-401**

Credit	Hours	Marks		
		I	E	To
3	45	15	35	50

**Objectives**

- Provide quality electrical engineering knowledge with extensive hands-on and laboratory experience.

**Learning Outcomes**

- Outline various electrical quantities and their units.
- Able to derive Ohm's Law and make use of its applications.
- Able to understand the concept of AC circuits
- Able to understand the basic concept of semiconductor materials.
- Outline the various concepts of SMPS, inverter & UPS.

Unit	Topic	Key Learning
I	<b>Basic Electrical Quantities</b>	<ul style="list-style-type: none"> <li>• Basic concept of charge,</li> <li>• current,</li> <li>• voltage,</li> <li>• resistance,</li> <li>• power,</li> <li>• energy and their units,</li> <li>• Conversion of units of work,</li> <li>• power and energy from one form to another</li> </ul>
II	<b>DC Circuits</b>	<ul style="list-style-type: none"> <li>• Ohm's Law, Series – parallel resistance circuits,</li> <li>• calculation of equivalent resistance,</li> <li>• Kirchhoff's Laws and their applications</li> </ul>
III	<b>AC Circuits</b>	<ul style="list-style-type: none"> <li>• Concept of AC Generation,</li> <li>• Difference between AC and DC,</li> <li>• Concept of alternating current and voltage,</li> </ul>

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		<ul style="list-style-type: none"> <li>• equation of instantaneous values,</li> <li>• average value, r.m.s value, form factor, power factor etc.,</li> <li>• A.C. Series Circuits with (i) resistance and inductance (ii) resistance and capacitance and (iii) resistance inductance and capacitance</li> <li>•</li> </ul>
IV	<b>Basics of Semiconductor</b>	<ul style="list-style-type: none"> <li>• Semiconductor materials,</li> <li>• Metals and Semiconductors and Photo-electric emission. N-type and P-type semiconductor,</li> <li>• PN junction diode,</li> <li>• Forward &amp; Reverse bias, Zener diode.</li> </ul>
V	<b>Power supply</b>	<ul style="list-style-type: none"> <li>• Introduction and Working of Switched Mode Power Supply (SMPS),</li> <li>• Voltage Regulator, Introduction to Inverters and UPS.</li> </ul>

**Suggested Readings:**

- Electrical Technology by BL Theraja, S Chand and Co, New Delhi.
- Basic Electrical and Electronics Engineering by SK Sahdev; Dhanpat Rai and Sons, New Delhi.
- Experiments in Basic Electrical Engineering by SK Bhattacharya, KM Rastogi; New Age International (P) Ltd.; Publishers New Delhi.

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**Subject: Basics of Electrical and Electronics Engineering lab****Subject Code: EE-401L**

Credit	Hours	Marks		
		I	E	To
1	30	35	15	100

**Objectives:** Provide quality electrical engineering knowledge with extensive hands-on and laboratory experience.

**Learning Outcomes**

- Outline various electrical quantities and their units.
- Able to derive Ohm's Law and make use of its applications.
- Make use of the capacitors and use them in series and parallel connection.
- Able to understand the electromagnetic effects and its laws.
- Outline the various concepts of AC Circuits and its connection with resistance, inductance and capacitance.

**List of Experiments**

10. Verify that resistance of conductor is directly proportional to resistivity and length and inversely proportional to cross-sectional area of the conductor
11. Verification of Ohm's Law
12. Study of series resistive circuits
13. Study of parallel resistive circuits.
14. Verification of Kirchhoff's current and voltage laws applied to DC circuits
15. Study of current, voltage and resistance measurement using of Multi-meter
16. Verification of Faraday's Laws of electromagnetic induction.
17. Study of SMPS Circuit.
18. Study of V-I Characteristic of Diode

**Suggested Readings:**

- Electrical Technology by BL Theraja, S Chand and Co, New Delhi.
- Basic Electrical and Electronics Engineering by SK Sahdev; Dhanpat Rai and Sons, New Delhi.

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- Experiments in Basic Electrical Engineering by SK Bhattacharya, KM Rastogi; New Age International (P) Ltd.; Publishers New Delhi.

**Subject: Applied Physics**

**Subject Code: PHY-401**

Credit	Hours	Marks		
		I	E	To
3	45	15	35	50

**Learning Outcomes:**

- To impart fundamental knowledge in the areas of scalar and vector quantities, basic laws of science, magnetism and electrical concepts.
- To apply fundamental knowledge in the area of Magneto-static and electro-magnetism.
- At the end of the course the students are familiar with the basic principles and applications of physics in various fields

Unit Number	Key Learning
<b>Unit-I Physical quantities, Units and Dimensions, Vectors and scalars:</b>	Physical quantities, units, systems of units – CGS, MKS and SI, dimensions and dimensional formula, Principle of Homogeneity, Checking the correctness of physical equations, Vectors and scalars, representation of a vector, Resolution of vectors, Rectangular components of vectors, Dot Product and Cross Product of vectors, Simple numerical
<b>Unit-II Newton's Laws of Motion,:</b>	Motion along a Straight Line, Distance and displacement, Speed and velocity, average velocity, acceleration, Introduction of force
<b>Unit-III Work, Energy and Power</b>	Laws of motion, momentum, conservation of momentum, Work done by force, negative work and positive work, Energy, Power, Kinetic and potential energy, Laws of conservation of energy, Work energy theorem.
<b>Unit-IV Gravitation</b>	Keplar's laws of planetary motion. The universal law of gravitation, Acceleration due to gravity and its variation with altitude and depth. Gravitational potential energy and gravitational potential. Escape velocity. Orbital velocity of a satellite. Geo-stationary satellites.
<b>Unit-V Thermodynamics</b>	Thermal equilibrium and definition of temperature (zeroth law of thermodynamics). Heat, work and internal energy. First law of thermodynamics. Isothermal and adiabatic processes, Second law of thermodynamics: reversible and irreversible processes. Heat engine and refrigerator

**Recommended Books:-**

- Halliday and Resnick (2013), 'Fundamentals of Physics', Wiley Eastern Limited, 10th Edition

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2. 'Modern Engineering Physics', S. Chand Publications

**Subject: Applied Physics Lab**

**Subject Code: PHY-401L**

Credit	Hours	Marks		
1	30	I	E	To
		35	15	50

**List of Experiments**

10. Measurement of volume of a solid/hollow cylinder by Vernier Caliper.
11. Measurement of cross-sectional area of a wire by Screw Gauge.
12. Measurement of radius of curvature of a spherical surface by a Spherometer.
13. Calibration of a meter scale by using travelling microscope.
14. Determination of co-efficient of Friction by inclined Plane Method.
15. Determination of g by simple pendulum.
16. Determination of Moment of Inertia using a fly wheel.
17. Tracing of Lines of force due to a bar magnet with N-pole pointing North & N-pole pointing South and locate the neutral points.
18. Verification the laws of resistance by connecting two given standard resistances in series & in parallel using Ohm's Law.

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: Estimating & Costing****Subject Code: IMS-401**

Credit	Hours	Marks		
		I	E	To
4	60	30	70	100

**Unit-1: Introduction**

definition of estimation, importance, aims and functions of estimating- cost accounting, purposes of cost accounting, comparison of estimating and costing, estimating procedure, cost estimators and their qualifications, types of estimates, constituents of job estimates, cost of production, selling price, capital investment, rate of return (ROR) on investment.

**Unit-2: Elements of costing**

Definitions, objectives, elements of cost, components of costs, overhead expenses-factory expenses, depreciation causes, methods of calculation of depreciation cost, selling and distributions overheads and methods of allocation of overhead charges, procedure for costing.

**Unit-3: Fundamentals of estimating**

Objectives of cost estimating, functions of cost estimating, organization of estimating department, principal factors in estimating, miscellaneous allowances, estimating procedures, qualities of estimator.

**Unit-4: Estimation of material cost**

Estimation of volumes, weights and cost of material for items like pulleys, spindle, lathe centre, fly wheel, crank shaft and similar items

**Unit-5: Estimation of machine shop**

Set up time, operation time, handling time, machining time, tear down time, allowances, personal, fatigue, tool checking/sharpening /changing, unit operation time, operations for different tools materials and product materials, estimation of time for various operations machining operations-turning, drilling, boring, tapping, shaping, planing, milling and grinding.

**List of suggested books**

4. Mechanical estimating and costing by TTTI madras, TMH
5. Mechanical estimating and costing by BP Sinha, TMH

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6. Production and costing by GBS, Narang and V. Kumar, Khanna publishers, New Delhi

**Subject: EVS**

**Subject Code: EVS-401**

Credit	Hours	Marks		
		I	E	To
4	60	30	70	100

**Objectives:**

Create awareness between the students about our ecosystem, related problems and our role in that.

**Learning Outcomes:**

- Encourage to solve the environment related problems and Make other people aware about environment problems
- Comply with the safety policies of ecosystem and environment
- Identify and recommend the opportunity for improving the environment hazards to the organization and society
- Report the polices and procedure need to adapt for environmental safety
- Create awareness among the employees and the society regarding the hazards of environmental pollution.

Unit	KEY LEARNING
<b>Unit-I</b> <b>Understanding our Environment</b>	Definition, Scope and Importance, Natural Resources, Forest Resources, Water Resources, Mineral Resources, Energy Resources, Food Resources, Land Resources.
<b>Unit-II</b> <b>Living things in Ecosystem</b>	What is Ecosystem, Habitat and ecological niche, interaction of species with each other, adapting to environment, bio geographic zones of India, Energy flow in ecosystem, cycling of materials, Kinds of ecosystem.
<b>Unit-III</b> <b>Atmosphere and Climate</b>	The atmosphere, layers of the atmosphere, climate, greenhouse effect, theOzone layer, deforestation, soil erosion
<b>Unit-IV</b> <b>Urbanisation</b>	Causes of urbanisation, Manifestations of Urbanisation, social economic and environmental problems in urbanisation, Agriculture, unsustainable

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	patterns of modern industrialised agriculture, green revolution.
<b>Unit-V Environmental Pollution</b>	Causes of Air pollution, major air pollutants, classification of air pollutants, thermal inversions, photochemical smog, acid preparation in air, impact of Air Pollution.

**Field work**

- Visit to a local area to document environmental assets river/forest/grassland/hill/mountain
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc.

**Recommended Books****Text Books**

E- book:<https://ugc.ac.in/oldpdf/modelcurriculum/env.pdf>

**Reference Books**

1. Industrial Safety and Health management” Pearson Prentice Hall,2003 by C.RayAsfahl
2. National Safety Council, “Accident Prevention Manual for Industrial Operations”, N. S. C. Chicago, 1988.
3. Industrial Accident Prevention” McGraw-Hill Company, New York,1980 by Heinrich H.W.



**Subject: Applied Mechanics**

**Subject Code: ME-403**

Credit	Hours	Marks		
		I	E	To
3	45			
		15	35	50

**Unit-1: Introduction**

Concept and definition of engineering mechanics, statics, dynamics, application of engineering mechanics in practical fields, different systems of units (FPS, MKA and SI) and their conversions from one form to another forms e.g. density, force, pressure, work, power, velocity, acceleration (simple numericals), fundamentals and derived units.

**Unit-2: Laws of forces**

Definition and types of forces, point/concentrated force, uniform distributed force, effect of force, characteristics of force, different force systems, principle of transmissibility of forces, law of super-position

Composition and resolution of coplanar concurrent forces, resultant force, method of composition of forces, laws of forces, triangle law of forces, polygon law of forces, free body diagram, Equilibrium force and its determination, Lami's theorem.

**Unit-3: Friction**

Definition and concept of friction, coefficient of friction, angle of friction, angle of repose, equilibrium of a body lying on a horizontal plane, equilibrium of a body lying on a rough inclined plane.

**Unit-4: Simple Machines**

Definition of simple and compound machine, definition of load, effort, velocity ratio, mechanical advantage and efficiency of a machine and their relationship, laws of machines, Definition of ideal machine, reversible and self locking machine, determination of maximum mechanical advantage and maximum efficiency, system of pulleys (first, second, third system of pulleys), determination of velocity ratio, mechanical advantage and efficiency, working principle and application of wheel and axle, simple screw jack and worm and worm wheel, expression for their velocity ratio and field of their application.

**Unit-5: Moment**

Concept of moment, moment of force and units of moment, principle of moment and its applications (lever-simple and compound), parallel forces (like and unlike parallel forces), calculating their resultant, concept of couple, its properties and effects, general conditions of equilibrium of bodies under coplanar forces.

**Suggested Book**

1. Engineering Mechanics by V. Jayakumar and M. Kumar, PHI
2. Engineering Mechanics”, D. P. Sharma, PHI
3. Engineering Mechanics”, M. V. Sheshagiri Rao, and D. Rama Durgaiah, University Press

**Subject: Applied Mechanics lab**

**Subject Code: ME-403L**

<b>Credit</b>	<b>Hours</b>	<b>Marks</b>		
1	30	I	E	To
		35	15	50

**List of experiments**

6. To verify the forces in different members of jib crane
7. To find the mechanical advantage, velocity ratio, and efficiency in case of an inclined plane.
8. To verify the reaction at the supports of a simple supported beam
9. To find the mechanical advantage, velocity ratio, and efficiency of a screw jack.
10. To determine the coefficient of friction between three pairs of given surface.

**Semester: Fifth**

**Subject: Project (Live)**

**Subject code: PRO-501**

Some of the suggested project activities are given below;

1. Projects connected with repair and maintenance of machines
2. Estimating and costing of projects
3. Design of jigs/ fixtures
4. Projects related to quality control
5. Projects work related to increasing productivity
6. Projects related to installation, calibration and testing of machines
7. Projects related to wastage reduction
8. Projects related to fabrication
9. Energy efficiency related projects
10. Projects related to improving an existing system

Note: Each student has to take one project individually and one to be shared with a group of four-five students depending upon cost and time involved. There is no binding to take up the above projects as it is only a suggestive list of projects.

Semester: 6<sup>th</sup>

Subject: CAD/ CAM lab

Subject Code: ME-501L

Credit	Hours	Marks		
4	120	I	E	To
		70	30	100

**List of Experiments**

- (i) Introduction to NX7: Introduction to Nx7, use interface overview, file operations, sketcher task environment, WCS, creating a sketch.
- (j) Constraining sketches: Sketch options, geometric constrains, dimensional constraints
- (k) Solid Modeling I : Sketch operations, Editing sketches, extrude, revolve, hide/show
- (l) Datums : Datum planes, datum axes, datum coordinate systems
- (m) Solid Modeling II: Holes Pre-NXS, holes the new way, grooves, slots, chamfers, edge blends
- (n) Object Replication: Instance features, mirror features, mirror body, sweep along guide, tube, threads
- (o) Swept features: Swept features, helical gear project, mouse cover project, gasket project
- (p) Solid Modeling III: Editing features, editing position, boss, pocket, pad, draft

**Subject: Introduction to Jigs & Fixtures****Subject Code: ME502**

Credit	Hours	Marks		
4	60	I	E	To
		30	70	100

**Unit-1: Jigs and Fixtures**

Concept of jigs and fixtures, need and advantages, concept of interchangeability, classification of jigs and fixtures

**Unit-2: Location and Clamping devices**

Basic principles of location, 3-2-1 principle of location, location for various services, location methods and devices, concept of clamping and various clamping devices

**Unit-3: Drilling jigs**

Definition of drilling jigs, Drilling jigs, Drilling bushes & their function, types of drilling jigs such as box type, channel jig, latch jig, indexing jig.

**Unit-4: Fixtures**

Introduction to fixtures, types of fixtures such as milling fixtures ( single piece, gang milling), lathe and boring fixtures, grinding and welding fixtures, application of pneumatic in jigs and fixtures

**Unit-5: Limit Gauges**

Introduction to plain limit gauges, classification of limit gauges such as plug, ring & snap gauges, brief description of thread gauges, material selection, Taylor`s principle of maximum and minimum material condition, Go and Not go ends of gauges and selection of gauges for inspection.

**List of books**

4. Prakash H Joshi, Press tools design & construction, wheeler publisher
5. Fundamentals of tool design by Donaldson
6. Production Engineering & Design by Surender Kr & Umesh Chandra, Satya Parkashan, New Delhi

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: CNC Programming lab****Subject Code: ME-503L**

<b>Credit</b>	<b>Hours</b>	<b>Marks</b>		
4	120	I	E	To
		30	70	100

**List of Experiments**

5. Write the NC program for 4 holes to be drilled on 10mm thick plate in symmetry using CNC milling
6. Write NC program with subroutines, Do- loops for component to be machined.
7. Use of software for turning operations on CNC turning center.
8. Use of software for milling operations on machine centres.

**Subject: Materials and Metallurgy**

**Subject Code: ME-504**

Credit	Hours	Marks		
		I	E	To
3	45			
		15	35	50

### **Unit-1: Introduction**

Overview of various engineering materials and applications, importance, classification of materials, difference between metals and non-metals, physical and mechanical properties of various materials, present and future needs of materials.

### **Unit-2: Crystallography**

Fundamentals, crystalline solid and amorphous solid, unit cell, space lattice, arrangement of atoms in SCC, BCC, FCC and HCP crystals, number of atoms per unit cell, atomic packing factor, coordination number.

Deformation- Overview of deformation behaviour and its mechanisms, elastic and plastic deformation, behaviour of materials under load and stress-strain curve, failure mechanism- Overview of failure modes, fracture, fatigue and creep

### **Unit-3: Metallurgy**

Introduction, cooling curves of pure metals, dendritic solidification of metals, effect of grain size on mechanical properties, binary alloys, thermal equilibrium diagrams, lever rule, solid solution alloys

### **Unit-4: Metals and Alloys**

Ferrous metals: Different iron ores, flow diagram for production of iron and steel, allotropic forms of iron, Alpha, Delta, Gamma, basic process of manufacturing of pig iron and steel making.

Cast Iron; properties, types of cast iron, manufacturing and their use.

Steels: plain carbon steels and alloy steel, classification of plain carbon steels, properties and application of different types of plain carbon steel, effect of various alloying elements on



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properties of steel, uses of alloy steels (high speed steel, stainless steel, silicon steel, spring steel. Non-ferrous materials; properties and uses of Copper, Aluminium and their alloys

**Unit-5: Heat Treatment**

Definition and objectives of heat treatment, iron carbon equilibrium diagram, different microstructures of iron and steel, formation and decomposition of Austenite, Martensitic transformation. Various heat treatment processes-hardening, tempering, annealing, normalizing, surface hardening, carburising, nitriding, cyaniding, hardenability of steels, types of heat treatment furnaces (only basic idea), measurement of temperature of furnaces.

**List of suggested books**

3. Text book of material science by RK Rajput, Katsons pub., Kudhiana
4. Text book of materials science by VK manchanda and GBS Narang, z\Khanna publishers, New Delhi

**Subject: Materials and Metallurgy lab**

**Subject Code: ME-504 L**

Credit	Hours	Marks		
1	30	I	E	To
		35	15	50

**List of experiments**

6. Classification of about 25 specimens of materials/machine parts in to
  - (v) Metals and non-metals
  - (vi) Metals and alloys
  - (vii) Ferrous and non-ferrous metals
  - (viii) Ferrous and non-ferrous alloys
7. Study of a metallurgical microscope and a specimen polishing machine
8. To anneal a given specimen and find out difference in hardness as a result of annealing.
9. To normalize a given specimen and to find out the difference in hardness as a result of normalizing.
10. To harden and temper a specimen and to find out the difference in hardness due to tempering.

**Subject: Hydraulics & Pneumatics**

**Subject Code: ME-505**

Credit	Hours	Marks		
		I	E	To
3	45			
		15	35	50

### **Unit-1: Introduction**

Introduction to hydraulics and pneumatics, fluid, types of fluid, properties of fluid-mass density, weight density (specific weight), specific volume, capillarity, specific gravity, viscosity, compressibility, surface tension, kinematic viscosity and dynamic viscosity and their units

### **Unit-2: Pressure and Measurement**

Concept of pressure, intensity of pressure, static pressure and pressure head, types of pressure (atm. Pressure, gauge pressure, absolute pressure)

Pressure measuring devices-Manometers and Mechanical Gauges, Manometers- Piezometers, simple U-tube manometer, Inverted U-tube manometers, construction, working and application, Mechanical Gauges- Bourdon tube pressure gauge, diaphragm pressure gauge, dead weight pressure gauge, construction, working and applications, statement of Pascal's law and its applications.

### **Unit-3: Flow of fluids**

Types of fluid flow- steady and unsteady, uniform and non-uniform, laminar and turbulent, rate of flow and its units, continuity equation of flow, hydraulic energy of a flowing fluid, total head, Bernoulli's theorem statement (without proof), and its applications, discharge measurement with the help of Venturimeter, Orifice meter, Pitot tube, limitations of Bernoulli's theorem. Pipe and pipe flow- loss of head due to friction- Chezy's equation and Darcy's equation of head loss (without proof), Reynold's number and its effect on pipe friction.

### **Unit-4: Hydraulic machines**

Description, operation and application of- hydraulic press, hydraulic jack, hydraulic brake, hydraulic door closer

### **Unit-5: Oil power hydraulic and pneumatic system**

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Introduction to oil power hydraulic and pneumatic system, relative merits and demerits as oil power hydraulic and pneumatic system, industrial applications of oil power hydraulic and pneumatic system, basic components of hydraulic system, definition and functions of each component in a hydraulic circuit, hydraulic oils-classification and their properties, seals and packing-classification of seals, sealing materials, maintenance of hydraulic system-common faults in hydraulic system, simple visual checks of oil, causes of contamination, preventive measures

Basic components of pneumatic systems, definition and functions of each component in a pneumatic circuit necessity of filter, regulator and regulators (FLR)

Common problems in pneumatic systems, maintenance schedule of pneumatic systems.

**List of suggested books**

4. Fluid mechanics by K.L. Kumar, S. Chand and Co. Ltd., New Delhi
5. Hydraulics and Fluid Mechanics by R.S. Khurmi, S. Chand & Co. Ltd., New Delhi
6. Fluid Mechancs by Dr. A.K. Jain, Khanna Publisher

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: Hydraulics & Pneumatics lab****Subject Code: ME-505L**

Credit	Hours	Marks		
		I	E	To
1	30			
		35	15	50

**List of practical**

8. Measurement of pressure head by using
  - (iii) Piezometer tube
  - (iv) Simple U-tube manometer
9. Verification of Bernoulli's theorem
10. Measurement of flow by using venturimeter
11. To find the value of coefficient of discharge for a venturimeter
12. To find the value of coefficient of friction for a pipe
13. Study of hydraulic circuit of any available machine or working model
14. Study of pneumatic circuit of any available machine or working model

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: Plant maintenance and material handling****Subject Code: ME-506**

Credit	Hours	Marks		
4	60	I	E	To
		30	70	100

**Unit-1: Introduction**

Necessity and advantages of testing, repair and maintenance, common instruments required for testing, significance of B-T curve in the life span of machine tool, acceptance test for machine tools, economic aspects, manpower planning and materials management, Fits and Tolerances-common fits and tolerances used for various machine parts.

**Unit-2: Testing of machines**

Testing equipment, dial gauge, mandrel, spirit level, straight edge, auto collimator, recalibration of measuring instruments like Vernier calliper, testing methods-geometrical/alignment test, performance test, testing under load, run test, vibrations, noise.

**Unit-3: Repairing**

Common parts which are prone to failure, reasons of failure, repair schedule, parts that commonly need repair such as belts, couplings, nuts and bolts repairing the engines, compressors and boilers

**Unit-4: Lubrication system**

Lubrication methods and periodical lubrication chart for various machines (daily, weekly, monthly), handling and storage of lubricants, lubricants conditioning and disposal, lubricant and their grades needed for specific components such as gears, bearings and chains, purpose and procedures of changing oil periodically (like gear box oil)

**Unit-5: material handling systems**

Basic principles of material handling, basic types of material handling equipments and its characteristics, uses and limitations, forklift trucks, selection of material handling equipment, unit load-pallet sizing and loading, conveyor models, AGV systems, Automated storage & retrieval system(ASRS)

**List of books**

4. Industrial maintenance by HP Harg, S. Chand and company, Delhi

**SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL**

5. Installation, testing and maintenance by JS Narang, Dhanpat Rai & Sons, New Delhi
6. Plant maintenance Engineering by RK Jain, Khanna Publisher, Delhi

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: Fabrication processes****Subject Code: ME-507**

Credit	Hours	Marks		
		I	E	To
3	45	15	35	50

**Unit-1: Welding consumables**

Classification of electrodes, functions of electrodes coating, types of coating, classification and coding of heavy coated electrodes, welding fluxes, functions of fluxes, roles of flux in gradients, basicity index, classification of fluxes, characteristics of inert gases used in welding.

**Unit-2: Weldability**

Definition of weldability, different aspects of welding, weldability tests, weldability of carbon steel, stainless steel and aluminium.

**Unit-3: Welding inspection**

Visual inspection, tensile and bend test of a weldment as per standard practice, principle and procedure of dye penetant, magnetic particle, ultrasonic and X-ray inspection.

**Unit-4: Distortion and residual stresses**

Causes of the development of distortion and residual stresses, different methods to control distortion and residual stresses in the weldment.

**Unit-5: Safety codes and practices related to welding**

Effect and protection from fumes and gases, chromium and Nickel in welding fumes, Radiation, noise shocks, safe storage, handling and use of gas cylinders, eye and face protection for welding and cutting operations.

**List of books**

1. Welding Engineering by Dr. RS parmar, Khanna Publisher, Delhi
2. Welding Technology by OP Khanna, Dhanpat Rai & Sons, Delhi



**Subject: Fabrication Processes lab**

**Subject Code: ME-57L**

<b>Credit</b>	<b>Hours</b>	<b>Marks</b>		
1	30	I	E	To
		35	15	50

**List of Experiments**

1. To prepare a joint by using the spot welding machine
2. To analyse the effect of welding parameters (voltage, welding speed, current etc.) on the weld bead geometry (penetration, bead width etc.)
3. To prepare a weldment and perform the tensile and band tes of the same as per standard practice.
4. To inspect a given weld joint by using penetrant test.

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: Strength of Materials****Subject Code: ME-508**

Credit	Hours	Marks		
		I	E	To
3	45	15	35	50

**Unit-1: Stresses and Strains**

Concept of stress and strain, concept of load, stresses and strain, tensile, compressive and shear stresses and strains, concept of Elasticity, Elastic limit and limit of proportionality, Hook's law, Poisson ratio, longitudinal and circumferential stresses in seamless thin walled cylindrical shells (derivation not required)

**Unit-2: Bending stresses**

Concept of bending stress, theory of simple bending, use of equation  $f/y=M/I=E/R$ , concept of moment of resistance, bending stress diagram, calculation of maximum bending stress in beams of rectangular, circular, and T-section.

**Unit-3: Columns**

Concept of column, modes of failure, types of columns, buckling load, crushing load, slenderness ratio, factors effecting strength of a column, end restraints, effective length, strength of column by Euler formula without derivation, simple numerical problems

**Unit-4: Torsion**

Concept of torsion difference between torque and torsion, use of torque equation for circular shaft, comparison between solid and hollow shaft with regard to their strength and weight, power transmitted by shaft, simple numerical problems

**Unit-5: Springs**

Closed coil helical springs subjected to axial load and impact load, stress deformation, stiffness and angle of twist and strain energy, proof resilience, laminated spring (semi elliptical type only), determination, simple numerical problems.

**List of Books**

1. SOM by RS Khurmi, S. Chand & Co., New Delhi
2. SOM by Birinder Singh, katson publishing house, New Delhi

## SHRI VISHWKARMA SKILL UNIVERSITY, PALWAL

**Subject: Strength of materials lab****Subject Code: ME-508L**

<b>Credit</b>	<b>Hours</b>	<b>Marks</b>		
1	30	I	E	To
		35	15	50

**List of Experiments**

1. Tensile test on bars of mild steel
2. Bending tests on a steel bar
3. Impact test on metals (a) Izod test (b) Charpy test
4. Torsion test on specimens of different metals for determining modulus of rigidity
5. To determine the stiffness of helical spring and to plot a graph between load and extension
6. Hardness test on different metals