

MRSPTU SKILL CERTIFICATE COURSE IN SOLID WORKS
2022 BATCH ONWARDS (6 Months course)

STUDY & EVALUATION SCHEME FOR CERTIFICATE PROGRAMME IN SOLIDWORKS

Code	Units	Study Scheme Total Hrs.			Credits	Marks Evaluation Scheme									Total Marks
						Internal Assessment			External Assessment						
		Th	Tut	Pr		Th	Pr	Total	Th	Hrs	Pr	Hrs	Total		
CMEE5-101	Communication Skills	8	-	-	1	25	-	25	25	1	-	-	25	50	
CMEE5-101P	Communication Skills Lab.	-	-	24	1	-	25	25	-	-	50	3	50	75	
CSOWS1-101	Introduction to Design and Modeling	12	28	-	2	50	-	50	50	2	-	-	50	100	
CSOWS1-102	Introduction to Design and Modeling Lab.	-	-	80	3	-	50	50	-	-	100	4	100	150	
CSOWS1-103	Engineering Components and Design	25	45	-	2	50	-	50	50	2	-	-	50	100	
CSOWS1-104	Engineering Components and Design Lab.	-	-	90	4	-	50	50	-	-	100	4	100	150	
CSOWS1-105	Assembly of Engineering Components	25	55	-	2	50	-	50	50	2	-	-	50	100	
CSOWS1-106	Assembly of Engineering Components Lab.	-	-	120	4	-	50	50	-	-	100	4	100	150	
CMEE5-106P	#Student Centre Activity	-	-	48	2	-	25	25	-	-	-	-	-	25	
CMEE5-107P	+4-Week Industrial Training and Major Project (At the end of Semester)	-	-	-	4	-	-	-	-	-	100	3	100	100	
	TOTAL	70	128	362	25	175	200	375	175	-	450	-	625	1000	

SCA will comprise of co-curricular activities like extension lectures on entrepreneurship, Industrial tour, environment, sports, hobby club, such as, photography, seminars, declamation contest, educational field visits, NCC, NSS, cultural activities.

+Industrial Training

Before completion of the semester, the students will go for training in a relevant industry/field organization for a minimum period of 4 weeks and prepare a diary. The student will prepare a report at the end of training. This report will be evaluated by the concerned instructor in the presence of one industry representative from the relevant trade/field.

Total weeks per semester: 16, Total working days per week: 5, Total hours per day: 7, Total hours in a semester: 16x5x7 = 560

One credit is defined as one hour of lecture per week or two hours of practical per week in the programme.

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GUIDELINES FOR ASSESSMENT OF STUDENT CENTRED ACTIVITIES (SCA)

The maximum marks for SCA should be 25. The marks may be distributed as follows:

- i) 5 marks for general behavior and discipline

(By Principal or HOD in consultation with the instructor(s)/trainers)

- ii) 5 marks for attendance as per following

(By the instructors/ trainers of the department)

- | | |
|---------------|----------|
| a) Up to 75% | Nil |
| b) 75% to 80% | 02 marks |
| c) 80% to 85% | 03 marks |
| d) Above 85% | 05 marks |

- iii) 15 marks maximum for sports/NCC/NSS/Cultural/Co-curricular activities as per following:

(By In-charge of Sports/ Cultural/NCC/NSS/Co-curricular activities) 15 marks

- for National level participation or inter-university competition 10 marks - participation any two of the activities

05 marks – participation at the internal sports of the institute/college/university

Note: There should be no marks for attendance in the internal sessional of different subjects.

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UNIT – I	
SUBJECT CODE:CMEE5-101	
COMMUNICATION SKILLS	
Learning Outcomes: After undergoing this unit, the students will be able to: 1. Speak confidently. 2. Overcome communication barriers. 3. Write legibly and effectively. 4. Listen in proper prospective. 5. Read various genres adopting different reading techniques. 6. Respond to telephone calls and E-mails effectively.	
Practical (24Hours)	Theory (08Hours)
	Basics of Communication <ul style="list-style-type: none"> • Process of communication • Types of communication-formal and informal, oral and written, verbal and non-verbal • Objectives of communication • Essentials of communication • Barriers to communication (1hour)
<ul style="list-style-type: none"> • Looking up words in a dictionary (meaning and pronunciation) (2hours)	Functional Grammar and Vocabulary <ul style="list-style-type: none"> • Parts of speech • Tenses • Correction of incorrect sentences (2hours)
<ul style="list-style-type: none"> • Self and peer introduction • Greetings for different occasions (1 hour)	Listening <ul style="list-style-type: none"> • Meaning and process of listening • Importance of listening • Methods to improve listening skills Speaking <ul style="list-style-type: none"> • Importance • Methods to improves peaking • Manners and etiquettes (2hours)

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<ul style="list-style-type: none">• Newspaper reading <p style="text-align: right;">(1 hour)</p>	Reading <ul style="list-style-type: none">• Meaning• Techniques of reading: skimming, scanning, intensive and extensive reading. <p style="text-align: right;">(1hour)</p>
<ul style="list-style-type: none">• Vocabulary enrichment and grammar exercises• Exercises on sentence framing accurately <p style="text-align: right;">(6hours)</p>	Functional Vocabulary <ul style="list-style-type: none">• One-word substitution• Commonly used words which are often misspelt• Punctuation• Idioms and phrases <p style="text-align: right;">(2hours)</p>

Means of Assessment

1. Assignments and quiz/class tests
2. Mid-term and end-term written tests
3. Viva-voce
4. Presentation

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<ul style="list-style-type: none">• Reading a loud articles and essay son current and social issues• Comprehension of short paragraph (5hours)	
<ul style="list-style-type: none">• Write a short technical report• Letter writing (3hours)	
<ul style="list-style-type: none">• Participate in oral discussion.• Respond to telephonic calls and E-mails effectively.• Mock interview (6hours)	

Means of Assessment

1. Assignments and quiz/class tests
2. Mid-term and end-term written tests
3. Laboratory and practical work
4. Viva-voce

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UNIT-II SUBJECT CODE:CSOWS1-101 INTRODUCTION TO DESIGN AND MODELING			
Learning Outcomes: After undergoing study of this unit the students will be able to 1. Design and Modeling techniques used in Engineering. 2. 2D Modeling and sketching. 3. Engineering drawing techniques. 4. SOLIDWORKS 2D designing and sketching.			
Practical	80hrs.	Theory Tutorials	12hrs. 28hrs.
<ul style="list-style-type: none"> • Introduction to SOLIDWORKS software package • Features of SOLIDWORKS: Various products available in SOLID WORKS for Product Design,Simulation, Communication SOLIDWORKS Graphical User Interface - Feature manager design tree, Handles, Confirmation corner, mouse buttons, Command Manager • Introduction to 2D drawing or sketching • Sketch Entities – Centerline line, Line, Circle, Arc, Ellipse, Rectangle, Slots, Polygon, Parabola, Ellipse, Partial Ellipse, Spline, Spline tools, Points, Text, Construction geometry • Sketch Tools - Fillet, Chamfer, Offset, Convert entities, Trim, Extend, Mirror, Move, Copy, Rotate, Scale, Stretch, Sketch pattern, Sketch picture • Blocks – Make block, Edit block, Insert block, Add/Remove Entities, Rebuild, Save • Explode Relations-Adding Sketch Relation, Automatic relations. • Adding relations and Advanced dimensioning techniques and basefeature options 		<ul style="list-style-type: none"> • Introduction to design and modeling: Introduction to drawing equipment and use of instruments. Symbols and conventions in drawing Practice. Different types of Modeling Techniques/tools • Introduction to Dimensioning: Concepts of scale in drawing, Types of scales. • Lettering and Numbering: Single Stroke,Double Stroke, inclined, Upper case and Lowercase. • Types of lines: Definition, types and applications in Drawing Classification of lines (Hidden, centre, construction, Extension, Dimension, Section) - Drawing lines of given length (Straight, curved)- Drawing of parallel lines, perpendicular line – Methods of Division ofline segment • Basic Definition of geometrical objects: Points, lines and planes. Nomenclature and practice of - Angle: Measurement and its types, methodof bisecting. - Triangle - different types - Rectangle, Square, Parallelogram. - Circle and its elements 	

Means of Assessment

1. Assignment and quiz/class tests
2. Mid-term and end-term written tests
3. Viva–voce
4. Practical work

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UNIT-III SUBJECT CODE: CSOWS1-103 ENGINEERING COMPONENTS AND DESIGN			
Learning Outcomes: After undergoing study of this unit the students will be able to learn <ul style="list-style-type: none"> • 3D Designing and Modeling in SOLIDWORKS. • Projection of Solids • Method of Presentation of Engineering Drawing 			
Practical	90hrs.	Theory	25hrs.
		Tutorials	45hrs.
<ul style="list-style-type: none"> • Dimensioning-Smart, Horizontal, Vertical, fully define sketch.3DSketching • Creating Extrude features – Direction1, Direction2, from option, Thin feature, applying draft, Selecting contours • Creating Revolve features – Selecting Axis, Thin features, selecting contours Creating Swept Features-Selecting, Profile and Path, Orientation/twist type, Thin feature, Creating reference planes • Creating Loft features – Selecting Profiles, Guide curves, Start/End Constraints, • Centerline parameters, Close loft. • Selecting geometries – Selection Manager, Multiple Body concepts • Creating Reference - points, axis, coordinates • Creating curves- Split line, Project curve, Composite curve, Helix and Spiral • Creating Fillet Features- Inserting Hole types, • Creating Chamfer, Creating Shell, 		<ul style="list-style-type: none"> • Dimensioning: Definition, types and methods of dimensioning (functional, nonfunctional and auxiliary) – Types of arrowhead -Leader Line with text • Method of Presentation of Engineering Drawing: Pictorial View-Orthogonal View and Isometric view 	

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<p>Creating Rib</p> <ul style="list-style-type: none">• Creating Pattern - Linear pattern, Circular pattern, Sketch driven pattern, Curve driven pattern, Table driven pattern, Fill pattern, mirror.• Advanced Modeling Tools- Dome, Deform, indent, Flex.• Minor projects: Design of various machine elements<ul style="list-style-type: none">– Gears, springs, propeller, piston, turbine buckets, runners, pump impellers, pipe elbows, Tees, reducers, flanges, Trusses, etc.Analysis of structures:<ul style="list-style-type: none">– Simulation of design: Motion study, animations, etc.– Optimization of design: Material optimization, shape optimization, flow stabilization, etc.	
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UNIT-IV			
SUBJECT CODE: CSOWS1-105			
ASSEMBLY OF ENGINEERING COMPONENTS			
Learning Outcomes: After undergoing study of this unit the students will be able to <ul style="list-style-type: none"> • Assembly Modeling • Understand about Assembly Approaches • Understand about tool parts and its uses 			
Practical	120hrs.	Theory	25hrs.
		Tutorials	55hrs.
<ul style="list-style-type: none"> • Introduction to Assembly Modeling & Approaches – Top down and Bottom up Approach Applying Standard Mates- Coincident, Parallel, Perpendicular, Tangent, Concentric, Lock, Distance, Angle. • Applying Advanced Mates – Symmetric, Width, Path Mate, Linear/Linear Coupler, and Limit Mate. • Applying Mechanical Mates – Cam, Hinge, Gear, Rack Pinion, Screw, and Universal Joint. Applying Smart mates Applying Mate reference. • Manipulating Components - Replacing Components, Rotating Components, Move Components, Collision Detection, Detecting Interference • Creating Pattern- Assembly Pattern, Mirror Creating Exploded Views Top Down Assembly • Smart Fasteners • Creating Extrude, Revolve, Swept, loft, Boundary surface. Inserting Planar Surface, Offset Surface, Free form Extending a surface, Surface fill, Ruled Surface, Trim 		<ul style="list-style-type: none"> • Importance of Machine Drawing – Brief revision of 1st and 3rd angle projections - Understand the concepts of Orthographic projections and Sectional views. • Assembly Drawings and modeling – I: <ul style="list-style-type: none"> – Cotter joint – Jib and cotter joint assembly – Knuckle joint assembly – Assembly of muff coupling (solid & split) coupling – Flange couplings – Screw jack assembly • Assembly Drawings and modeling – II: <ul style="list-style-type: none"> – Bearings – Socket and spigot joint – Protective type flanged coupling – Piston of petrol engine – Cross head – Connecting rod – Sleeve and cotter joint – Lathe tool post – Big end of a connecting rod – Foot step bearing – Plummer block 	

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<p>Surface, Replace Face, Delete face, Untrim surface, knit surface, Thickening a Surface</p> <ul style="list-style-type: none">• Generating Drawing Views• Introduction to Angle of Projection• Generating Views - Generating Model View, Projected Views, Inserting Standard3 View, Auxiliary Views, and Detailed views.• Crop view, Broken –Out Section, Section View, Alternate Position View, Working assembly specific view, Drawing properties, Manipulating views.• Design of various assemblies: Cotter joint, Jib and cotter joint assembly, Knuckle joint assembly, Assembly of muffs coupling (solid & split) coupling, Flange couplings, Screw jack assembly, Bearings, Socket and spigot joint, Protective type flanged coupling, Piston of petrol engine, Cross head, Connecting rod, Sleeve and cotter joint, Lathe tool post, Big end of a connecting rod, Foot step bearing, Plummer block, Lathe tail stock.• Monocoque (Practical), spar fuselage structures basic modeling, assembly, application-oriented part.• Minor projects: Design and analysis on any of the design given by the instructor of the subject.	<p>– Lathe tail stock.</p> <p>Note: This unit will also cover the design of various couplings. The study of mass/material properties, forces, inertia, and motions will be covered in this theory part.</p>
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Means of Assessment

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SUBJECT CODE: CMEE5-107P

INDUSTRIAL TRAINING– I and MAJOR PROJECT (4 Weeks)

The purpose of industrial training is to:

1. Develop understanding regarding the size and scale of operations and nature of industrial/field work in which students are going to play their role after completing the courses of study.
2. Develop confidence among the students through first-hand experience to enable them to use and apply institute based knowledge and skills to perform field activities.
3. Develop special skills and abilities like inter personal skills, communication skills, attitudes and values.
4. To choose a mechanical component design and make a major project in SOLIDWORKS.

It is needless to emphasize further the importance of Industrial Training of students during their certificate programme. It is industrial training, which provides an opportunity to students to experience the environment and culture of world of work. It prepares students for their future role as skilled person in the world of work and enables them to integrate theory with practice.

An external assessment of 100 marks has been provided in the study and evaluation scheme of 1st Semester. Evaluation of professional industrial training report through viva-voce/presentation aims at assessing students understanding of materials, industrial process, practices in industry/field organization and their ability to engage in activities related to problem solving in industrial setup as well as understanding of application of knowledge and skills learnt in real life situations.

The instructor along with one industrial representative from the concerned trade will conduct performance assessment of students. The components of evaluation will include the following:

a)	Punctuality and regularity	20%
b)	Industrial training report	50%
c)	Presentation and viva-voce	30%

NOTE: Major project should include the complete use of SOLIDWORKS including the assembly tools. Physical model of this component should be available at the Industry where the student chooses to internship. Faculty will interact to the industry as well as students during the 4 weeks Industrial training.