MRSPTU SKILL CERTIFICATE COURSE IN NASTRAN SYLLABUS
2022 BATCH ONWARDS (6 months course)

Code	Units	Study Scheme Total Hrs.		Credits	Marks Evaluation Scheme								Total Marks
					Internal Assessment			External Assessment					
		Th	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
CNTNS1-101	Aspects of FEM	20	-	1	25	-	25	50	2	-	-	50	75
CNTNS1-102	Introduction to Patran and MSC Apex	-	60	2	-	50	50	-	-	100	4	100	150
CNTNS1-103	Preprocessing	30	-	1	25	-	25	50	2	-	-	50	75
CNTNS1-104	Preprocessing Lab in Patran and MSC Apex	-	92	3	-	50	50	-	-	100	4	100	150
CNTNS1-105	Solution development in MSC Nastran	25	-	1	25	-	25	50	2	-	-	50	75
CNTNS1-106	Nastran Lab	-	90	3	-	75	75	-	-	100	4	100	175
CNTNS1-107	Post Processing	23	-	1	25	-	25	50	2	-	-	50	75
CNTNS1-108	Post Processing Lab in Patran and MSC Apex	-	92	5	-	75	75	-	-	100	4	100	175
CMEE5-106P	#Student Centre Activity	-	48	2	-	25	25	-	-	-	-	-	25
CMEE5-107P	+4–Week Industrial Training at the end of Semester and Major Project	-	-	4	-	-	-	-	-	100	3	100	100
	TOTAL	**106**	**406**	**25**	**125**	**300**	**425**	**225**	**-**	**550**	**-**	**775**	**1200**

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

+**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 program.

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 to75% Nil
b) 75%to80% 02marks
c) 80%to85% 03marks
d) Above85% 05marks

iii) 15 marks maximum for sports/NCC/NSS/Cultural/Co-curricular activities asper 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 differentsubjects.

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 • 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)
• Looking up words in a dictionary(meaning and pronunciation) (2hours)	Functional Grammar and Vocabulary • Parts of speech • Tenses • Correction of incorrect sentences (2hours)
• Self and peer introduction • Greetings for different occasions (1 hour)	Listening • Meaning and process of listening • Importance of listening • Methods to improve listening skills Speaking • Importance • Methods to improve speaking • Manners and etiquettes (2hours)
• Newspaper reading (1 hour)	Reading • Meaning • Techniques of reading: skimming, scanning, intensive and extensive reading (1hour)
• Vocabulary enrichment and grammar exercises • Exercises on sentence framing accurately (6hours)	Functional Vocabulary • One-word substitution • Commonly used words which are often misspelt • Punctuation • Idioms and phrases (2hours)

• Reading a loud article and essays on current and social issues • Comprehension of short paragraph (5hours)	
• Write a short technical report • Letter writing (3hours)	
• Participate in oral discussion • Respond to telephonic calls and emails 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

UNIT-II
SUBJECT CODE: CNTNS1-102
INTRODUCTION TO PATRAN AND MSC APEX

Learning Outcomes:
After undergoing study of this unit the students will be able to
1. Understand the basics of FEA
2. Know the software basics
3. Learn about meshing.

Practical's **60hrs.**	**Theory** **20hrs.**
• Introduction to Patran • Patran Workspace • Entering and Reviewing Data • Working with files • All about groups • Viewports • Right Mouse Button • Viewing a model • Display control • Tools • Preferences • Patran Model Browser tree • Random Analysis • Printing options • Mass properties • List Processor	• Introduction to Finite Element analysis • Past present and Future of FEA • Types of analysis • Basics of Statics and Strength of Material • Introduction to Meshing • 1D Meshing • 2D Meshing • 3D Meshing • Materials property and boundary condition

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

UNIT-III
SUBJECT CODE: CNTNS1-104
PREPROCESSING LAB IN PATRAN AND MSC APEX

Learning Outcomes:
1. Patran
2. MSC Apex

Practical **92hrs.**	**Theory** **30hrs.**
• Features of Patran • Geometry import • Different types of import • Geometry clean up • Mid surface extraction • Geometry edit tools for mid surface • Meshing in 1D • Meshing in 2D • Meshing in 3D • Quality Parameters. • 3D solid linear static analysis • Point masses, springs problems • Shells and cylindrical coordinates problems • Linear buckling analysis problem. • Modal Transient response problems with bars, springlets • Transient heat transfer problems • Steady state heat transfer • S-N analysis <u>Design optimization:</u> • Design model definition procedure—choosing the design variables, objective, and constraints • Structural Optimization • Approximation concept NASTRAN	• Linear static analysis: Definition, staring any Finite Element Analysis Project, checking mesh model, Design modification, Case study, Linear static solver, solution restart method, h element vs p modeling's modelling, linear Bulkinganalysis. • Dynamic analysis : Static analysis vs Dynamic analysis, definition, difference between time domain and frequency domain, types of loading, simple harmonic solution, free vibration, resonance, damping, forced vibration, Single DOF frequency response analysis,single DOF transient response analysis, Mass input (lumped and coupled mass),Dynamic analysis solvers. • Thermal analysis: Introduction, conduction heat transfer, steady state, convection heat transfer, forced convection, meshing for thermal analysis.

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

UNIT-IV SUBJECT CODE:CNTNS1-105 **Solution Development in MSC Nastran**	
Learning Outcomes: After undergoing study of this unit, the students will be able to • Find solution to different problems	
Practical **90hrs.**	**Theory** **25 hrs.**
• Sol 101- Static Analysis • Organization of MSC NASTRAN Files • Overview of Nastran Input • Overview of Nastran Output files • Nastran element: 0D,1D,2D,3D • Material Cards • Property cards • Loads and Boundary conditions • Param Cards • Case control cards	• Explanation of BDF • Organization of BDF • FILE Management section • Execute section • Case control • Bulk Data Section

Means of Assessment

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

UNIT-V **SUBJECT CODE: CNTNS1-107** **POSTPROCESSING**	
Learning Outcomes: 1. After undergoing study of this unit, the students will be able to 2. Analyze and interpret results.	
Practical **92hrs.**	**Theory** **23 hrs.**
• Validate and check accuracy of the result, • View results. • Average and unaverage stresses • Special tricks for post processing • Interpretation of results • Design Modifications • Common mistakes and errors	• Theories of failure • Maximum Principal stress theory • Maximum shear stress theory • Maximum Principal Strain theory • Maximum strain energy theory • Maximum distortion energy theory.

Means of Assessment

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

SUBJECT CODE: CMEE5- 107P
INDUSTRIAL TRAINING– I (4 Weeks) &
Major Project

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. Developconfidenceamongstthestudentsthroughfirst-handexperiencetoenablethemto use and apply institute-based knowledge and skills to perform field activities.
3. Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values.

It is needless to emphasize further the importance of Industrial Training of students during their certificate program. 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 have 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%

Major Project: All students are required to submit a major project before the completion of the course using their knowledge and skills to solve industrial related practical problems.