Semester	Course Code	Course Category	Hours/Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	23UPHVAC1	Value Added Course – I	30	-	-	100	100

Course Title	RADIOGRAPHIC TESTING

SYLLABUS

Unit	Contents	Hours
I	Radiographic Inspection - Basic Principles - General procedure for radiographic testing – Advantages, Disadvantages and Applications - Radiographic Inspection techniques	6
II	Fundamental principles - Properties of radiations- Sources for radiographic testing - X ray machines - Gamma ray sources - Radiographic linear accelerators – Betatron	6
III	Films for radiographic testing - Intensifying Screens - Film Processing - Penetrameters – types of image quality indicator(IQI) - Placement of Penetrameters	6
IV	Different forms of radiographic testing - Personal safety and radiation protection - Applications of radiographic testing method - Range and limitations of radiographic testing	6
V	Computed Tomography (CT) - Types of scanners - Analysis and inspection techniques – Assembly - Void, crack and defect detection - Geometric dimensioning and toleranceanalysis - Image-based finite element methods - Applications of CT- Computed radiography (CR)	6

Text Book(s):

1. Patrick O. Moore, Richard H. Bossi, Frank A. Iddings, George C. Wheeler, Hand Book of Nondestructive Testing, American Society for Nondestructive Testing ,Third Edition

Reference Book(s):

1.Charles J. Hellier, Hand book of Nondestructive evaluation, McGraw-Hill

2. J.Prasad, C G K Nair, Nondestructive Testing, Tata McGraw-Hill Education Private Limited, Second Edition

Web Resource(s):

1. https://www.scribd.com/document/578358679/ME6019-NDT-LECTURE-NOTES-5

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	**CO Statement**	**Cognitive Level (K-Level)**
CO1	interpret the principle and operation of radiographic testing of a material for flaw detection	**K1&K2**
CO2	do the experiments in radiographic testing	**K3**
CO3	effective check on the overall quality of the radiographic inspection	**K4**
CO4	analyse the parameters and image quality	**K4**
CO5	Estimate the detected flaws	**K5**

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	2	2	2	2	2	2	3	1	1	2.0
CO2	1	3	2	3	2	3	2	2	3	1	2.2
CO3	1	2	3	2	2	2	2	3	2	1	2.0
CO4	2	2	2	1	3	1	2	2	3	1	1.9
CO5	1	2	3	2	1	2	3	2	2	1	1.9
Mean Overall Score											2.0
Correlation											**Medium**

Mean Overall Score	**Correlation**
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. A. Mohamed Saleem

Semester	Course Code	Course Category	Hours/Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
V	23UPHVAC2	Value Added Course – II	30	-	-	100	100

Course Title	TELESCOPE AND TECHNIQUES

SYLLABUS		
Unit	Contents	Hours
I	**Telescope Optics :** Point Sources - Extended Images - Telescope Objectives – Eyepieces – Accessories - Star Diagonal - Solar Diagonal -Barlow Lens – Telecompressor – Filters - Interferometers – Mountings - Observatories and Observing Sites	6
II	**Modern Small Telescope Design :** Introduction–Obtaining a Telescope–Making Your Own Telescope–Brief Survey of Commercially Produced Telescopes–Binoculars	6
III	**Positions in the Sky :** Spherical Polar Coordinates - Celestial Sphere - Altitude and Azimuth – Rotation - Solar and Sidereal Days - Declination and Hour Angle – Time - Right Ascension and Declination - Other Coordinate Systems - Heliocentric Time - Julian Date - Spherical Trigonometry	6
IV	**Telescope Mountings :** Introduction - Equatorial Mountings - Alt-Az Mountings - Other Types of Commercial MountingsMaking Your Own Mounting – Alignment - Setting Circles – Guiding - Modern Commercial Mountings	6
V	**Visual Observing :** Introduction - General and Practical Considerations and Safety - Finding Objects - The Moon – The Planets - The Sun - Finding the Sun - Observing the Sun – Stars - Stellar Nomenclature – Magnitudes - Observing Stars - Nebulae and Galaxies - Daytime Observing - False Observations	6

Text Book(s):
C. R. Kitchin, Telescopes and Techniques, Springer New York Heidelberg Dordrecht London, Third Edition, 2013
Reference Book(s):
C. R. Kitchin , Telescopes and techniques : an introduction to practical astronomy, Springer New York Heidelberg Dordrecht London, 2003
Web Resource(s):https://web.njit.edu/~cao/Phys320_L6.pdf

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	**CO Statement**	**Cognitive Level (K-Level)**
CO1	explain the telescope optics and different types of telescope mountings	**K1 &K2**
CO2	construct their own telescope	**K3**
CO3	discover the celestial objects through telescope	**K4**
CO4	analyse the data acquired from the objects	**K4**
CO5	estimate the periods of the objects	**K5**

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	
CO1	3	3	3	2	2	2	2	2	2	1	2.2
CO2	1	2	2	2	3	3	3	2	3	2	2.3
CO3	2	2	2	2	2	2	3	3	2	1	2.1
CO4	2	2	3	3	2	2	3	2	3	1	2.3
CO5	1	2	2	2	2	2	3	2	2	1	1.9
										Mean Overall Score	**2.16**
										Correlation	**Medium**

Mean Overall Score	**Correlation**
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. A. Mohamed Saleem

Semester	Course Code	Course Category	Hours/ Week	Credits	Marks for Evaluation		
					CIA	ESE	Total
III	23PPHVAC1	Value Added Course – I	30	-	-	100	100

Course Title	RADIOGRAPHIC TESTING

SYLLABUS		
Unit	**Contents**	**Hours**
I	Radiographic Inspection - Basic Principles - General procedure for radiographic testing – Advantages, Disadvantages and Applications - Radiographic Inspection techniques	6
II	Fundamental principles - Properties of radiations- Sources for radiographic testing - X ray machines - Gamma ray sources - Radiographic linear accelerators – Betatron	6
III	Films for radiographic testing - Intensifying Screens - Film Processing - Penetrameters – types of image quality indicator(IQI) - Placement of Penetrameters	6
IV	Different forms of radiographic testing - Personal safety and radiation protection - Applications of radiographic testing method - Range and limitations of radiographic testing	6
V	Computed Tomography (CT) - Types of scanners - Analysis and inspection techniques – Assembly - Void, crack and defect detection - Geometric dimensioning and toleranceanalysis - Image-based finite element methods - Applications of CT- Computed radiography (CR)	6

Text Book(s):

1. Patrick O. Moore, Richard H. Bossi, Frank A. Iddings, George C. Wheeler, Hand Book of Nondestructive Testing, American Society for Nondestructive Testing ,Third Edition

Reference Book(s):

1.Charles J. Hellier, Hand book of Nondestructive evaluation, McGraw-Hill

2. J.Prasad, C G K Nair, Nondestructive Testing, Tata McGraw-Hill Education Private Limited, Second Edition

Web Resource(s):

1. https://www.scribd.com/document/578358679/ME6019-NDT-LECTURE-NOTES-5

Course Outcomes		
Upon successful completion of this course, the student will be able to:		
CO No.	**CO Statement**	**Cognitive Level (K-Level)**
CO1	interpret the principle and operation of radiographic testing of a material for flaw detection	**K1&K2**
CO2	do the experiments in radiographic testing	**K3**
CO3	effective check on the overall quality of the radiographic inspection	**K4**
CO4	analyse the parameters and image quality	**K4**
CO5	Estimate the detected flaws	**K5**

Relationship Matrix:

Course Outcomes (COs)	Programme Outcomes (POs)					Programme Specific Outcomes (PSOs)					Mean Score of COs
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	
CO1	3	2	2	2	2	2	2	3	1	1	2.0
CO2	1	3	2	3	2	3	2	2	3	1	2.2
CO3	1	2	3	2	2	2	2	3	2	1	2.0
CO4	2	2	2	1	3	1	2	2	3	1	1.9
CO5	1	2	3	2	1	2	3	2	2	1	1.9
									Mean Overall Score		2.0
									Correlation		Medium

Mean Overall Score	Correlation
< 1.5	Low
≥ 1.5 and < 2.5	Medium
≥ 2.5	High

Course Coordinator: Dr. A. Mohamed Saleem