Regulation 2018		Semester I&II	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	18GNM101L	Physical and Mental Health using Yoga	0	0	2	0

Prerequisite Course (s) Nil

Course Objective (s):

The purpose of learning this course is to:

CLR-1	provide deeper insight into the curriculum of Yogic Sciences along with the practical applications of Yoga
CLR-2	intend that students should get familiar with the poses of Yogasanam.
CLR-3	Promote positive health in the Student through Yoga and enabling and imparting skill in them to practice and apply Yogic
CLR-4	practice for Health to general public and teach Yoga for Total personality development and spiritual evolution.

Course Outcome (s) (Cos):

At the end of this course, learners will be able to:

CO1	increase the muscle strength
CO2	improve respiration, energy and vitality.
CO3	maintain a balanced metabolism and weight reduction.
CO4	maintain cardio and circulatory health.
CO5	improve athletic performance and protection from injury.

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-
CO2	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-
CO3	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-
CO4	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-
CO5	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-
CO (Avg)	-	-	-	-	-	1	-	-	-	-	-	2	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

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	Introduction:	6
▪ Human Body- Meaning and its Importance in Yoga ▪ Definition of Anatomy and Physiology ▪ Cell: Structure & Function		
	General information, Different parts, Structure, Function and Effect of Yogic Practices.	24
▪ Tissues: Types, Structure & Function. ▪ Musculo-Skeletal System ▪ Digestive system ▪ Excretory system ▪ Respiratory system ▪ Circulatory system ▪ Nervous System ▪ Endocrinal system		

Text / Reference (s) books:

1. Shirley Telles - A Glimpse of the Human Body The structure anf Functions, Swami Vivekananda Yoga Prakashana, Bangalore.
2. Makarand Madhukar Gore - Anatomy and Physiology of Yogic Practices, Motilal Banarsidass, New Delhi, 2007
3. Anne Waugh, Allison Grant - Ross and Wilson Anatomy and Physiology in Health & Illness, Churchill Livingstone; 2010

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Regulation 2018		Semester III / Semester IV	Total Hours			15
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	18LEM103T	INDIAN TRADITION AND HERITAGE	1	0	0	-

Prerequisite Course (s)

Nil

Course Objective (s):
The purpose of learning this course is to:

CLR-1	Make students understand the role and impact of culture in human life.
CLR-2	Draw attention towards languages and literatures of ancient period.
CLR-3	Cultivate secularism in students
CLR-4	Equip students with the knowledge of Indian art and architectural evolution over years.
CLR-5	Make students identify Indian culture in abroad

Course Outcome (s) (Cos):
At the end of this course, learners will be able to:

CO1	Understand the meaning of culture, trace the influence and significance of geographical features on Indian culture.
CO2	Develop an awareness of the variety of languages and literatures in India
CO3	Recognise the characteristics of various religious movements in ancient India
CO4	Identify the characteristics and various styles of Indian architecture and sculpture at different times
CO5	Examine various modes through which Indian culture spread abroad

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	2	2	2	2	2	-	2	-	-
CO2	-	-	-	-	-	2	2	1	2	2	1	2	-	-
CO3	-	-	-	-	-	1	1	1	1	1	1	1	-	-
CO4	2	2	2	2	2	2	2	2	2	2	1	2	-	-
CO5	-	-	-	-	-	2	2	2	2	2	-	2	-	-
CO (Avg)	2	2	2	2	2	1.8	1.8	1.6	1.8	1.8	1	1.8	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

UNIT I	HISTORY OF INDIAN CULTURE	2
Characteristics of Indian Culture - Significance of Geography on Indian Culture -Society in India through ages- Ancient Period - Varna and Jati, family and marriage in India - Position of women in ancient India- Contemporary period; Caste system and communalism.		
UNIT II	LITERATURE AND EDUCATION	4
Evolution of script and languages in India : Harappan Script and Brahmi Script, Short History of the Sanskrit Literature: The Vedas, The Brahmanas and Upanishads and Sutras, Epics: Ramayana and Mahabharata&Puranas - History of Buddhist and Jain Literature in Pali, Prakrit and Sanskrit, Sangam Literature and Odia Literature.		
UNIT III	RELIGION AND PHILOSOPHY	4
Religion and Philosophy in India: Ancient Period: Pre-Vedic and Vedic Religion, Buddhism and Jainisim, Indian Philosophy - Vedanta and Mimansa school of Philosophy.		
UNIT IV	ART AND ARCHITECTURE	2
Indian Art & Architecture: Gandhara School and Mathura School of Art; Hindu Temple Architecture, Budhhist Architecture, Medieval Architecture and Colonial Architecture, Indian Painting Tradition, Performing Arts: Divisions of Indian classical music: Hindustani and Carnatic, Dances of India, Rise of modern theatre and Indian cinema.		
UNIT V	SPREAD OF INDIAN CULTURE ABROAD	3
Causes, Significance and Modes of Cultural Exchange - Through Traders, Teachers, Emissaries, Missionaries and Gypsies, Indian Culture in South East Asia, India, Central Asia and Western World through ages.		
Text Book (s)		
	Nil	
Reference (s)		
Chakravarti, Ranabir: Merchants, Merchandise & Merchantmen, in: Prakash, Om (ed.): *The Trading World of the Indian Ocean, 1500-1800* (*History of Science, Philosophy and Culturein Indian Civilization*, ed. by D.P. Chattopadhyaya, vol. III, 7), Pearson, Delhi, 2012.		

Regulation 2018		Semester V/ VI	Total Hours			15
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	18LEM301T	INDIAN ART FORMS (Common to all UG Programmes)	1	0	0	-

Prerequisite Course (s)

NIL

Course Objective (s):
The purpose of learning this course is to:

CLR-1	Introduce the learners to various art forms and whet their aesthetics sense.
CLR-2	Improve learners' knowledge on history of theatre and drama and draw connections between theatrical practices and social contexts in both modern and pre modern periods..
CLR-3	Enable the learners to identify and understanding various types of dance and music concepts
CLR-4	Make learners explore the diversity of Architecture, Sculpture, Painting and its intersection with community, culture and society.
CLR-5	Make students to get familiarized with the formal, historical, and theoretical aspects of literary arts.

Course Outcome (s) (COs):
At the end of this course, learners will be able to:

CO1	Identify aesthetics traits found throughout Indian art.
CO2	Demonstrate understanding of the social and artistic movements that have shaped theatre and dance.
CO3	Recognize different concepts involved in music and dance.
CO4	Identify and appreciate the salient features and various styles of Indian Architecture, Sculpture and Painting at different times.
CO5	Demonstrate a broad understanding of Indian literary arts and appreciate the role that historical context plays in the creation and interpretation of literary works

CO-PO Mapping

COs	POs												PSOs		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO 11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	1	1	2	2	2	-	2	-	-	-
CO2	-	-	-	-	-	1	1	2	2	1	-	2	-	-	-
CO3	-	-	-	-	-	1	1	2	2	1	-	2	-	-	-
CO4	-	-	-	-	-	1	1	2	2	2	-	2	-	-	-
CO5	-	-	-	-	-	1	1	2	2	2	-	2	-	-	-
CO (Avg)	-	-	-	-	-	1	1	2	2	1.6	-	2	-	-	-

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

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UNIT I	INDIAN ARTS	3
Introduction to art (aesthetics, taste)- fine arts - applied arts –Terminology - Subject matter -Art as propaganda - Purposes/uses of art.		
UNIT II	**THEATRE & DRAMA**	**3**
History of Theatre and Drama- Traditional Theatre forms- Modern Theatre and its characteristics- Puppetry –different forms and elements of drama.		
UNIT III	**MUSIC AND DANCES**	**3**
Origin of Music and Dance- Classical music and Carnatic Music- Regional Music -Musical Instruments-Regional Classical Dances.		
UNIT IV	**ARCHITECTURE, SCULPTURE, PAINTING**	**3**
History of architecture, sculpture, painting -Indo-Islamic Architecture- Temple Architecture– different types of Sculptures and its characteristics-Painting and its different styles.		
UNIT V	**LITERARY ARTS**	**3**
Ancient Indian Literature- Early Dravidian Literature- Medieval Literature- Modern Indian Literature-Contemporary Literature.		

Text Book (s)

	NIL

Reference (s)

1	Dhar, Parul Pandya, ed., 2011, Indian Art History Changing Perspectives, New Delhi: D.K. Print world and National Museum Institute (Introduction).
2	Guha-Thakurta, Tapati, The making of a new modern Indian art: Aesthetics and nationalism in Bengal, 1850-1920, Cambridge University Press, 1992
3	Huntington, Susan, The Art of Ancient India: Hindu, Buddhist, Jain, Weatherhill, 1985
4	Mitter, Partha, Indian Art, Oxford History of Art series, Oxford University Press, 2001

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Regulation 2019		Semester I	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	19PATM101	Research Methodology and IPR	2	0	0	2

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

1	Understand and analyse the fundamental of research problem
2	Understand the Research Ethics
3	Understand that today's world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity
4	Understand Intellectual Property Rights
5	Understand Patents Rights

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Understand research problem formulation
CO2	Analyze research related information
CO3	Follow research ethics
CO4	Understanding that when IPR would take such important place in growth of individuals & nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general & engineering in particular
CO5	Understand that IPR protection provides an incentive to inventors for further research work and investment in R & D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits

UNIT I	INTRODUCTION	6

Meaning of research problem- Sources of research problem-Criteria Characteristics of a good research problem- Errors in selecting a research problem- Scope and objectives of research problem.

UNIT II	ANALYSIS OF REARCH	6

Approaches of investigation of solutions for research problem- data collection- analysis-interpretation- Necessary instrumentations Effective literature studies approaches- analysis Plagiarism,- Research ethics.

UNIT III	RESEACRH PRPOSAL AND TECHNICAL WRITING	6

Effective technical writing - how to write report-Paper Developing a Research Proposal- Format of research proposal- a presentation and assessment by a review committee.

UNIT IV	INTELLECTUAL PROPERTY	6

Nature of Intellectual Property: Patents –Designs - Trade and Copyright- Process of Patenting and

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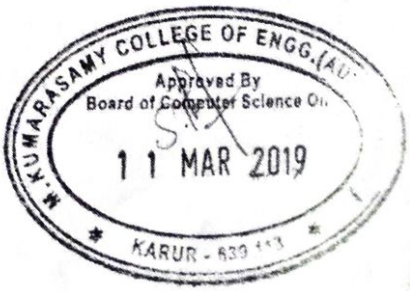
Development: technological research- innovation- patenting- And development. International Scenario: International cooperation on Intellectual Property- Procedure for grants of patents- Patenting under PCT.		
UNIT V	**PATENTS RIGHTS**	**6**
Patent Rights: Scope of Patent Rights- Licensing and transfer of technology -Patent information and databases- Geographical Indications.		
Text Book (s)		
1	Stuart Melville and Wayne Goddard, "Research methodology: an introduction for science & engineering students".	
2	Halbert, "Resisting Intellectual Property", Taylor & Francis Ltd ,2007	
Reference (s)		
1	Ranjit Kumar, 2 nd Edition , "Research Methodology: A Step by Step Guide for beginners"	
2	T. Ramappa, "Intellectual Property Rights Under WTO", S. Chand, 2008	
3	Robert P. Merges, Peter S. Menell, Mark A. Lemley, " Intellectual Property in New Technological Age", 2016.	
4	Wayne Goddard and Stuart Melville, "Research Methodology: An Introduction"	



Department	MECHANICAL ENGINEERING					Semester		II
Course Code	Course Name	Hours / Week			Total Hours	Credit	Maximum Marks	
		L	T	P		C	CA	ES	Total
19PMEE010T	NON-DESTRUCTIVE EVALUATION	3	0	0	45	3	50	50	100

Course Objective (s):

- To introduce all types of NDT and their applications in Engineering.

Course Outcomes:

- To stress the importance of NDT in engineering

Unit I	NON-DESTRUCTIVE TESTING AND PRODUCTION, VISUAL INSPECTION & LIQUID PENETRANT TESTING.	9

Introduction to various non-destructive methods, Comparison of Destructive and Non destructive Tests, Visual Inspection, Optical aids used for visual inspection, Applications. Physical principles, procedure for penetrant testing, Penetrant testing materials, Penetrant testing methods-water washable, Post – Emulsification methods, Applications

Unit II	EDDY CURRENT TESTING & ACOUSTIC EMISSION	9

Principles, Instrumentation for ECT, Absolute, differential probes, Techniques – High sensitivity techniques, Multi frequency, Phased array ECT, Applications.

Principle of AET, Instrumentation, Applications - testing of metal pressure vessels, Fatigue crack detection in aerospace structures

Unit III	MAGNETIC PARTICLE TESTING & THERMOGRAPHY	9

Principle of MPT, procedure used for testing a component, Equipment used for MPT, Magnetizing techniques, Applications.

Principle of Thermography, Infrared Radiometry, Active thermography measurements, Applications – Imaging entrapped water under an epoxy coating, Detection of carbon fiber contaminants.

Unit IV	ULTRASONIC TESTING	9

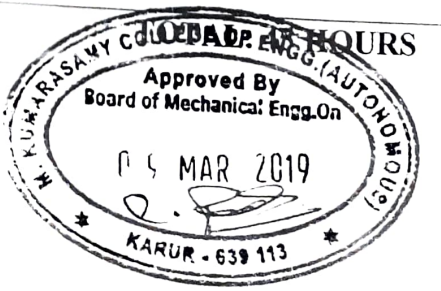
Principle, Ultrasonic transducers, Ultrasonic Flaw detection Equipment, Modes of display A- scan, B-Scan, C- Scan, Applications, Inspection Methods- Normal Incident Pulse-Echo Inspection, Normal Incident Through-transmission Testing, Angle Beam Pulse-Echo testing, TOFD Technique, Applications of Normal Beam Inspection in detecting fatigue cracks, Inclusions, Slag, Porosity and Intergranular cracks - Codes, standards, specification and procedures and case studies in ultrasonics test.

Unit V	RADIOGRAPHY	9

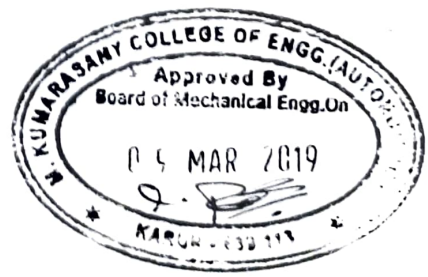
Principle of Radiography, x-ray and gamma ray sources- safety procedures and standards, Effect of radiation on Film, Radiographic imaging, Inspection Techniques – Single wall single image, Double wall Penetration, Multiwall Penetration technique, Real Time Radiography - Codes, standards, specification and procedures and case studies in Radiography test.

Case studies on defects in cast, rolled, extruded, welded and heat treated components - Comparison and selection of various NDT techniques

TOTAL: 45 HOURS



REFERENCES:	
1.	Baldev Raj, Jeyakumar,T., Thavasimuthu,M., -Practical Non Destructive Testingl Narosa publishing house, New Delhi, 2002
2.	Peter J. Shull -Non Destructive Evaluation: Theory, Techniques and Applicationl Marcel ekker,
3.	Inc., New York, 2002 Krautkramer. J., -Ultra Sonic Testing of Materialsl, 1st Edition, Springer – Verlag Publication, New York, 1996. www.ndt.net



Regulation 2018		Semester II	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	PBA18206	RESEARCH METHODOLOGY	3	1	0	4

Course Objective (s): The purpose of learning this course is to:	
1	Provide insight on basic of research methodologies
2	Provide proper insights on different scales and measurements
3	Create awareness on various research approaches and data collections
4	Apply specific statistical techniques using SPSS to draw inferences for decision making
5	Present the results of the research in appropriate way

Course Outcome (s) (COs): At the end of this course, learners will be able to:	
CO1	Aware of the various elements of research and its applications in business
CO2	Relate the different measurement and scaling techniques
CO3	Examine the different method of data collection and sampling techniques
CO4	Assess the data through hypothesis formulation and statistical techniques
CO5	Generate effective research report

CO-PO Mapping

COS	Pos										PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO 1	PSO 2
CO1	1	1	3	1	3	1	1	1	2	1	3	3
CO2	1	1	2	1	2	1	1	1	1	1	3	2
CO3	1	1	3	2	3	2	1	1	2	1	3	2
CO4	1	1	2	2	2	2	1	1	1	1	3	2
CO5	1	1	2	1	2	1	1	1	1	1	3	2
CO (Avg)	1	1	2.4	1.4	2.4	1.4	1	1	1.4	1	3	2.2

1: Slight (Low) **2: Moderate (Medium)** **3: Substantial (High)**

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UNIT I	INTRODUCTION	12
Business Research – Definition and Significance – The Research Process – Types of Research – Exploratory and Causal Research – Theoretical and Empirical Research – Cross –Sectional and Time – Series Research – Research Questions / Problems – Research Objectives – Research Hypotheses – Characteristics – Research in an Evolutionary Perspective – The Role of Theory in Research		
UNIT II	**RESEARCH DESIGN AND MEASUREMENT**	**12**
Research Design – Definition – Types of Research Design – Exploratory and Causal Research Design – Descriptive and Experimental Design – Different Types of Experimental Design – Validity of Findings – Internal and External Validity – Variables in Research – Measurement and Scaling – Different Scales – Construction of Instrument – Validity and Reliability of Instrument		
UNIT III	**DATA COLLECTION**	**12**
Types of Data – Primary vs Secondary Data – Methods of Primary Data Collection – Survey vs Observation – Experiments – Construction of Questionnaire and Instrument – Validation of Questionnaire – Sampling Plan – Sample Size – Determinants Optimal Sample Size – Sampling Techniques – Probability vs Non–Probability Sampling Methods		
UNIT IV	**DATA PREPARATION AND ANALYSIS**	**12**
Data Preparation – Editing – Coding –Data Entry – Validity of Data – Qualitative vs Quantitative Data Analyses – Bivariate and Multivariate Statistical Techniques – Factor Analysis – Discriminant Analysis – Cluster Analysis – Multiple Regression and Correlation – Multidimensional Scaling – Conjoint Analysis - Application of Statistical Software for Data Analysis		
UNIT V	**REPORT DESIGN, WRITING AND ETHICS IN BUSINESS RESEARCH**	**12**
Research Report – Different Types – Contents of Report – Need of Executive Summary – Chapterization – Contents of Chapter – Report Writing – The Role of Audience – Readability – Comprehension – Tone – Final Proof – Report Format – Title of the Report – Ethics in Research – Ethical Behaviour of Research – Subjectivity and Objectivity in Research.		
Text Book (s)		
1.	Uma Sekaran and Roger Bougie, Research methods for Business, 5th Edition, Wiley India, New Delhi, 2012.	
Reference (s)		
1.	Donald R. Cooper, Pamela S. Schindler and J K Sharma, Business Research methods, 11th Edition, Tata Mc Graw Hill, New Delhi, 2012.	
2.	Alan Bryman and Emma Bell, Business Research methods, 3rd Edition, Oxford University Press, New Delhi, 2011.	
3.	William G Zikmund, Barry J Babin, Jon C.Carr, Atanu Adhikari,Mitch Griffin, Business Research methods, A South Asian Perspective, 8th Edition, Cengage Learning, New Delhi, 2012.