

**BIJUPATNAIKUNIVERSITY OF TECHNOLOGY,
ODISHA
ROURKELA**



Curriculum and Syllabus

**B. Tech (Mechanical Engineering) for the Batch
2018-19 and Onwards**

Semester (5th)


A handwritten signature in green ink, appearing to be 'S. S. S.', is written over the printed name of the Principal.

**Principal
Bijupatnaik Institute of Technology
and Engineering, Bhubaneswar**

B. Tech in Mechanical Engineering
(Admission Batch: 2018-2019 and Onwards)

5th Semester

Fifth Semester					
Theory					
Sl. No.	Category	Course Code	Course Title	L-T-P	Credit
1	PC 11		Basic Manufacturing Processes	3-0-0	3
2	PC 12		Mechanisms and Machines	3-0-0	3
3	PC 13		Heat Transfer	3-0-0	3
4	PE 2		Automobile Engineering	3-0-0	3
			CAD/CAM	3-0-0	
			Tribology	3-0-0	
5	PE 3		Non-Conventional Energy Sources	3-0-0	3
			Rapid Manufacturing Processes	3-0-0	
			Finite Element Methods in Engineering	3-0-0	
6	MC 5		Universal Human Values		0
Total Credit (Theory)					15
Practical					
1	PC 14		Basic Manufacturing Processes Lab	0-0-3	2
2	PC 15		Mechanisms and Machines Lab	0-0-3	2
3	PC 16		Heat Transfer Lab	0-0-3	2
4	PSI 2		Evaluation of Summer Internship	0-0-3	1
Total Credit (Practical)					7
Total Semester Credit					22


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contaminants, Effect of sliding speed on friction, classification and mechanism of wear, Wear resistant materials.

BOOKS :

- [1] Introduction to Tribology of Bearing , B.C .Majumdar , S. Chand & Co
- [2] Fundamentals of Tribology , Basu S K., Sengupta A N., Ahuja B. B., , PHI 2006
- [3] Basic Lubrication theory, A. Cameron, John Wiley & sons
- [4] Lubrication Fundamentals, D.M.Pirro and A.A.Wessol, CRC Press
- [5] Theory and Practice of Lubrication for Engineers, Fuller, D., New York company 1998
- [6] Principles and Applications of Tribology, Moore, Pergamon press 1998
- [7] Tribology in Industries, Srivastava S., S Chand and Company limited, Delhi 2002
- [8] Lubrication of bearings – Theoretical Principles and Design, Redzimonvskay E I., Oxford press company 2000

5th Semester

PE3: Non-Conventional Energy Sources

MODULE I

(6 CLASSES)

Energy, Ecology and environment: Introduction, Classification of Energy Resources, Common Forms of Energy, Energy Chain, Advantages and Disadvantages of Conventional Energy Sources, Importance and Salient Features of Non-Conventional Energy Sources, Environmental and ecological Aspects of Energy use, Environment-Economy-Energy and Sustainable Development, World Energy Status, Energy Scenario in India. Energy Conservation and Energy Storage: Salient Features of "Energy Conservation Act, 2001", Various Aspects of Energy Conservation, Principles of Energy Conservation, General Electrical ECO's (Energy Conservation Opportunities)

MODULE II

(15 CLASSES)

Solar Energy: Basics, The Sun as a Source of Energy, Sun, Earth Radiation Spectrums, Extraterrestrial and Terrestrial Radiations, Spectral Energy Distribution of Solar Radiation, Depletion of Solar Radiation, Measurements of Solar Radiation, Solar Time (Local Apparent Time), Solar Radiation Geometry, Solar Day Length, Empirical Equations for Estimating Solar Radiation (Hourly Global, Diffuse and Beam Radiations) on Horizontal Surface Under Cloudless and Cloudy Skies, Solar Radiation on Inclined Plane Surface only (empirical relations for numerical). Solar Thermal Systems: Solar Collectors: Flat plate and concentric collectors, Solar Water Heater, Solar Passive Space - Heating and Cooling Systems, Solar Refrigeration and Air-Conditioning Systems, Solar Cookers, Solar Furnaces, Solar Green House, Solar Dryer, Solar Distillation (or Desalination of Water), Solar Photovoltaic Systems: Solar Cell Fundamentals, Solar Cell Characteristics, Solar Cell Classification, Solar Cell, Module, Panel and Array Construction, Solar PV Systems, Solar PV Applications.

MODULE III

(08 CLASSES)

Wind Energy: Origin of Winds, Nature of Winds, Wind Turbine Siting, Major Applications of Wind Power, Wind Turbine Types and Their Construction, Wind Energy Conversion Systems (WECS), Effects of Wind Speed and Grid Condition (System Integration), Biomass Energy: Photosynthesis Process, Usable Forms of Biomass, their Composition and Fuel Properties, Biomass Resources, Biomass Conversion Technologies, Urban Waste to Energy Conversion, Biomass Gasification, Biomass Liquefaction, Biomass to Ethanol Production, Biogas Production from Waste Biomass, Energy Farming.

MODULE IV

(08 CLASSES)

Geothermal Energy: Applications, Origin and Distribution of Geothermal Energy, Types of Geothermal Resource. Ocean Energy: Tidal Energy, Wave Energy, Ocean Thermal Energy Fuel Cell Technology: Types, Principle of operation, Advantages and disadvantages.

BOOKS:

- [1] Solar Energy Technology: Sukhatme and Nayak, TMH
- [2] Renewable Energy Sources and Emerging Technology: D.P.Kothari and et al., PHI
- [3] Renewable Energy Sources & Conversion Technology: N.K.Bansal, Manfred Kleenman & Michael Meliss, TMH Publication.
- [4] Non Conventional Energy Sources: B.M Khan, TMH Publications
- [5] Renewable Energy Sources: Fundamentals & Applications: G.N.Tiwari & M.K.Ghosal, Narosa Pub
- [6] Non-Conventional Energy Resources: D.S. Chauhan and S.K.Srivastava, New Age International
- [7] Non-Conventional Energy Sources: H.P.Garg
- [8] Non-Conventional Energy Systems: G.D.Rai, Khanna publications
- [9] Renewable Energy, Godfrey Boyle, Oxford University Press

Digital Learning Resources:

NPTEL MOOCs:

Course Name: Solar Energy Engineering and Technology
Course Link: https://swayam.gov.in/nd1_noc20_ph14/preview
Course Instructor: Prof. P Kalita, IIT, Guwahati.


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Radhakrishna Institute of Technology
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