

B. Tech (Civil Engineering) Syllabus from Admission Batch 2018-19

6th Semester

BIJUPATNAIKUNIVERSITY OF TECHNOLOGY, ODISHA

ROURKELA



Curriculum and Syllabus

**B. Tech (Civil Engineering) from the Admission Batch
2018-19**

Semester (6th)

Principal
Radhakrishna Institute of Technology
and Engineering, Bhubaneswar

Sixth Semester							
Theory							
Sl. No.	Category	Course Code	Course Title	L-T-P	Credit	University Marks	Internal Evaluation
1	PC		Design of Steel Structures	3-0-0	3	100	50
2	PC		Hydrology & Irrigation Engineering	3-0-0	3	100	50
3	BS		Optimization in Engineering	3-0-0	3	100	50
4	PE		Foundation Engineering	3-0-0	3	100	50
			Ground Improvement Techniques.	3-0-0			
			Environmental Geo Techniques	3-0-0			
5	OE		Human Resources Management	3-0-0	3	100	50
			Artificial Intelligence and Machine Learning	3-0-0			
			Renewable Power Generation Systems	3-0-0			
6	MC*	RIK6F001	Essence of Indian Knowledge Tradition-1	3-0-0	0	-	100 (Pass mark is 37)
Total Credit (Theory)					15		
Total Marks						500	250
Practical							
1	PC		Steel Structures Lab	0-0-3	2		100
2	PC		Irrigation Engineering Lab	0-0-3	2		100
3	PSI		Future Ready Contributor Develop Model Lab	0-0-3	2		100
4	PSI		Seminar - I	0-0-3	1		100
Total Credit (Practical)					7		
Total Semester Credit					22		
Total Marks							400
SUMMER INTERNSHIP TRAINING FOR 45 DAYS							

***Mandatory Non-Credit Courses (MC) result will be reflected with Pass (P) / Fail (F) grade. Thus the grade obtained will not be affecting the grade point average. However it shall appear on the grade sheet as per AICTE rule.**


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6 th Semester	RCI6D003	Environmental Geo Techniques	L-T-P 3-0-0	3 Credits
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Module- I**8 HOURS**

Introduction: Scope, importance, waste generation, subsurface contamination, Geosynthetics: Types, functions, applications.

Module- II**8 HOURS**

Forms of waste and their properties: Municipal waste, mineral waste, industrial waste, hazardous waste, index properties, strength, compressibility and permeability of municipal and mineral waste.

Module- III**8 HOURS**

Selection of waste disposal sites, factors affecting site selection, Landfills for municipal and hazardous waste: components of landfills, layouts, dailycells, base lining systems.

Module- IV**6HOURS**

Ash ponds and mine tailing impoundments: slurry deposition of mine tailing and coal ash in impoundments, layouts, components, design of tailing dam/ash dykes.

Module- V**6HOURS**

Remediation: Principle of remediation: Planning, source control, soil gas extraction, soil washing, and bio-remediation.

Books:

1. Geotechnology of waste management, I. S. Oweis and R. P. Khera, Butterwarths, London.
2. Engineering with geosynthetics, Ed. G. V. Rao and G.V.S.S. Raju, Tata McGraw Hill
3. Geotechnical practice for waste disposal, D. E. Daniel, Chapman and Hall, London.

Digital Learning Resources:

Course Name	ENVIRONMENTAL GEOTECHNICS
Course Link	https://nptel.ac.in/courses/105/101/105101196/
Course Instructor	PROF. D. N. SINGH, Department of Civil Engineering, IIT Bombay


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6 th Semester		Renewable Power Generation Systems	L-T-P 3-0-0	3 Credits
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Module I: (15 Hours)

Introduction: Conventional energy Sources and its Impacts, Non conventional energy–seasonal variations and availability, Renewable energy – sources and features, Distributed energy systems and dispersed generation (DG). Solar Energy: Solar processes and spectral composition of solar radiation. Solar Thermal system-Solar collectors, Types and performance characteristics, Applications-Solar water heating systems(active & passive) , Solar space heating & cooling systems , Solar desalination systems, Solar cooker.Solar photovoltaic system-Operating principle, Photovoltaic cell concepts, Cell, module, array, Losses in Solar Cell, Effects of Shadowing-Partial and Complete Shadowing, Series and parallel connections, Cell mismatching, Maximum power point tracking, Applications-Battery charging, Pumping, Lighting, Peltier cooling. Modelling of PV cell.

Module II: (10 Hours)

Wind Energy: Wind energy, Wind energy conversion; Wind power density, efficiency limit for wind energy conversion, types of converters, aerodynamics of wind rotors, power ~ speed and torque speed characteristics of wind turbines, wind turbine control systems; conversion to electrical power: induction and synchronous generators, grid connected and self excited induction generator operation, constant voltage and constant frequency generation with power electronic control single and double output systems, reactive power compensation, Characteristics of wind power plant, Concept of DFIG.

Module III: (9 Hours)

Biomass Power: Principles of biomass conversion, Combustion and fermentation, Anaerobic digestion, Types of biogas digester, Wood gassifier, Pyrolysis, Applications. Bio gas, Wood stoves, Bio diesel, Combustion engine, Application.

Module IV: (6 Hours)

Hybrid Systems: Need for Hybrid Systems, Range and type of Hybrid systems, Case studies of Diesel-PV, Wind-PV, Microhydel-PV, Biomass-Diesel systems, electric and hybrid electric vehicles.

Books:

- [1] Godfrey Boyle "Renewable Energy- Power for a Sustainable Future", Oxford University Press.
- [2] B.H.Khan, "Non-Conventional Energy Resources", Tata McGraw Hill, 2009.
- [3] S. N. Bhadra, D. Kasta, S. Banerjee, "Wind Electrical Systems", Oxford University Press, 2005.
- [4] S. A. Abbasi, N. Abbasi, "Renewable Energy Sources and Their Environmental Impact", Prentice Hall of India, New Delhi, 2006

Digital Learning Resources:

Course Name: Energy Resources and Technology
 Course Link: <https://nptel.ac.in/courses/108/105/108105058/>
 Course Instructor: Prof. S Banerjee, IIT Kharagpur


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6 th Semester	RIK6F001	Essence of Indian Knowledge Tradition-1	L-T-P 3-0-0	0 Credits
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Course Objective:

The course aims at imparting basic principles of thought process, reasoning and inferencing. Sustainability is at the core of Indian Traditional Knowledge Systems connecting society and nature. Holistic life style of Yogic-science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions. The course focuses on introduction to Indian Knowledge System, Indian perspective of modern scientific world-view and basic principles of Yoga and holistic health care system.

Course Outcomes:

- Ability to understand, connect up and explain basics of Indian Traditional knowledge modern scientific perspective.

Course Content:

- **Basic Structure of Indian Knowledge System** (i) वेद, (ii) उपवेद (आयुर्वेद, धनुर्वेद, गन्धर्ववेद, स्थापत्य आदि) (iii) वेदांग (शिक्षा, कल्प, निरुत, व्याकरण, ज्योतिष छंद), (iv) उपाङ्ग (धर्म शास्त्र, मीमांसा, पुराण, तर्कशास्त्र)
- Modern Science and Indian Knowledge System
- Yoga and Holistic Health care
- Case Studies.

Books:

1. V. Sivaramakrishna (Ed.), Cultural Heritage of India-Course Material, Bharatiya Vidya Bhavan, Mumbai, 5th Edition, 2014
2. Swami Jitatanand, Modern Physics and Vedant, Bharatiya Vidya Bhavan
3. Fritzof Capra, Tao of Physics
4. Fritzof Capra, The wave of Life
5. V N Jha (Eng. Trans.), Tarkasangraha of Annam Bhatta, International Chinmay Foundation, Velliarnad, Amaku,am
6. Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkatta
7. GN Jha (Eng. Trans.) Ed. R N Jha, Yoga-darshanam with Vyasa Bhashya, VidyanidhiPrakasham, Delhi, 2016
8. RN Jha, Science of Consciousness Psychotherapy and Yoga Practices, VidyanidhiPrakasham, Delhi, 2016
9. P R Sharma (English translation), ShodashangHridayam



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