BIJUPATNAIKUNIVERSITY OF TECHNOLOGY, ODISHA

ROURKELA

Curriculum and Syllabus

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

Semester (7th)

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Sl No	Category	Course Code	Course Title	L-T-P	Credit	University Marks	Internal Evaluation
			Seventh Semester				

Sl No	Category	Course Code	Course Title	L-T-P	Credit	University Marks	Internal Evaluation
1	HS	RED7E001	Entrepreneurship Development	3-0-0	3	100	50
2	PE	REL7D001	Advanced Control Systems	3-0-0	3	100	50
		REL7D002	High Voltage Systems and DC Transmission				
		REC7D006	Advanced Digital Signal Processing				
3	PE	REL7D003	Smart Grid	3-0-0	3	100	50
		REL7D004	Flexible AC Transmission Systems				
		REL7D005	Power Station Engineering				
4	OE	RIT7D001	Internet of Things	3-0-0	3	100	50
		REC5D006	Digital VLSI Design				
		REI7D003	Mechatronics				
5	OE	REV5D004	Disaster Management	3-0-0	3	100	50
		RIP7E002	Intellectual Property Right				
		RGT6A003	Green Technology				
6	OE	RIT7D002	Bigdata Analytics	3-0-0	3	100	50
		RCS7D007	Soft Computing				
		REC7D002	Embedded System				
7	MC*	RIK7F001	Essence of Indian Knowledge Tradition - II	3-0-0	0		100 (Pass Mark is 37)
			Total Credit (Theory)		18		
			Total Marks			600	300

Practical

Sl No	Category	Course Code	Course Title	L-T-P	Credit	University Marks	Internal Evaluation
1	PSI	RMP7H201	Minor Project	0-0-6	3		200
2	PSI	RSM7H202	Seminar - II	0-0-3	1		100
3	PSI	RCV7H203	Comprehensive Viva	0-0-3	1		100
			Total Credit (Practical)		5		
			Total Semester Credit		23		
			Total Marks				400

*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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and de-modulation. Electrical components and electronic device –Resister, inductor and capacitor, reactance and impedance. Basic electronics devices junction diodes, Bipolar transistors

MODULE-II   (08Hours)

Basic Digital Technology: Digital number system, Binary number system, Hexadecimal number system, Binary addition, Boolean Algebra, Logic function, Universal GATES, FLIP-FLOP, Registers counters. System modelling: Frequency response, Mechanical system, electrical system, Thermal system, Fluid system

MODULE-III   (10Hours)

Actuators- Electric motors; D.C. Motors, Stepper motor, Hydraulic actuators, Pneumatic actuators Transducer and Sensors: Principles, difference between transducer and sensors, transducer types – photo emissive, photo conductive, photovoltaic, thermistors, Thermocouple, Inductive, capacitive, Peizoelectric, Hall effect transducers, Ionization transducer, Encoders- Incremental encoder, Optical encoder, Bimetallic strip, Strain gauge, load cell. Programmable Logic controller: Basic Structure - Programming: Ladder diagram Timers, Internal Relays and Counters - Shift Registers - Master and Jump Controls, data handling, Analog input / output, PLC Selection &Application. Microprocessor ad Microcontroller: Microprocessor based Digital control, registers, Program counter, Intel -8085 microprocessor

Books:
[1]   A Text Books of Mechatronics, R.K.Rajput, S.Chand & company
[2]   Mechatronics, N.G. P.C Mahalik, Tata McGraw Hill
[3]   Mechatronics, D.G. Alciator, M.B. Histand, Tata McGraw Hill
[4]   Mechatronics, A.Smaili & F Mrad, Oxford University Press
[5]   Mechatronics, K.P.ramchandran, G,K Vijay Raghavan, M. S Balachandran
[6]   Mechatronics An Intigrated approach, Clarence W de Sliva, CRC Press

Digital Learning Resources:

Course Name: Mechatronics
Course Link: https://nptel.ac.in/courses/112/107/112107298/
Course Instructor: Prof. Pushparaj Mani Pathak, IIT Roorkee

7th Semester	REV5D004	Disaster Management	L-T-P 3-0-0	3 CREDITS

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Module I   (12 Hours)

Understanding Disaster: Concept of Disaster - Different approaches- Concept of Risk - Levels of Disasters - Disaster Phenomena and Events (Global, national and regional) Hazards and Vulnerabilities: Natural and man-made hazards; response time, frequency and forewarning levels of different hazards - Characteristics and damage potential or natural hazards; hazard assessment - Dimensions of vulnerability factors; vulnerability assessment - Vulnerability and disaster risk - Vulnerabilities to flood and earthquake hazards

Module II   (6 Hours)

Disaster Management Mechanism: Concepts of risk management and crisis managements - Disaster Management Cycle - Response and Recovery - Development, Prevention, Mitigation and Preparedness - Planning for Relief

Module III   (6 Hours)

Capacity Building: Capacity Building: Concept - Structural and Non-structural Measures Capacity Assessment; Strengthening Capacity for Reducing Risk - Counter-Disaster Resources and their utility in Disaster Management - Legislative Support at the state and national levels

Module IV   (12 Hours)

Coping with Disaster: Coping Strategies; alternative adjustment processes - Changing Concepts of disaster management - Industrial Safety Plan; Safety norms and survival kits - Mass media and disaster management

Planning for disaster management: Strategies for disaster management planning - Steps for formulating a disaster risk reduction plan - Disaster management Act and Policy in India - Organizational structure for disaster management in India - Preparation of state and district disaster management plans

Books:

[1]   Manual on Disaster Management, National Disaster Management, Agency Govt of India.
[2]   Disaster Management by Mrinalini Pandey Wiley 2014.
[3]   Disaster Science and Management by T. Bhattacharya, McGraw Hill Education (India) Pvt Ltd Wiley 2015
[4]   Disaster Science and Management by T. Bhattacharya, McGraw Hill Education (India) Pvt Ltd Wiley 2015
[5]   Earth and Atmospheric Disasters Management, N. Pandharinath, CK Rajan, BS Publications 2009.
[6]   National Disaster Management Plan, Ministry of Home affairs, Government of India http://www.ndma.gov.in/images/policyplan/dmplan/draftndmp.pdf

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7th Semester	RIP7E002	Intellectual Property Right	L-T-P 3-0-0	3 CREDITS

MODULE-I   (12Hours)

Introduction: Intellectual property: meaning, nature and significance, need for intellectual property Right (IPR), IPR in India – Genesis and development, IPR in abroad, Examples: -Biotechnology Research and Intellectual Property Rights Management. What is a patent, what can be protected by a patent, why should I apply for a patent? Patent Law, Patentability requirements, non-Patentable subject matters, Layout of the Patents. Procedure for domestic and international filing of applications, Restoration, Surrender and Revocations of Patents, Rights of Patentee and Working of Patent, Licensing and Enforcing Intellectual Property.

MODULE-II   (10Hours)

Copyrights: Copyright: meaning, scope; What is covered by copyright? How long does copyright last? Why protects copyright? Related rights, Rights covered by copyright. Ownership: Duration, Division, Transfer and Termination of Transfers.

MODULE-III   (10Hours)

Infringement and Remedies: Literal and non-literal infringement, Role of claims, Doctrines on infringement: Equivalent doctrine, Pith and Marrow doctrine, Comparative test. Defences: Gillette Defence, General grounds, Patents granted with conditions, Parallel import. Remedies: Civil, Administrative.

MODULE-IV   (08Hours)

State Law: Trade Secret, Contract, Misappropriation, Right of Publicity Trademarks, Trade Secret - Overview, Requirements, Misappropriation of Trade Secret, Departing Employees, Remedies, Criminal Liability, Misappropriation, Clickwrap Agreements, Idea Submissions; Right of Publicity, Federal Pre-emption, Review.

Books:
[1]   W. R. Cornish and D. Llewellyn, Intellectual Property: Patents, Copyrights, Trade Marks and Allied Rights, Sweet & Maxwell.
[2]   Lionel Bently and Brad Sherman, Intellectual Property Law, Oxford University Press.
[3]   P. Narayanan, Intellectual Property Law, Eastern Law House
[4]   B. L. Wadehra, Law Relating to Intellectual Property, Universal Law Publishing Co.
[5]   V. K. Ahuja, Law Relating to Intellectual Property Rights, LexisNexis
[6]   Ajit Parulekar and Sarita D'Souza, Indian Patents Law – Legal & Business Implications;Macmillan India ltd, 2006
[7]   P. Narayanan; Law of Copyright and Industrial Designs; Eastern law House, Delhi, 2010.

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References:

[1] The Copyright Act, 1957
[2] The Patent Act, 1970
[3] The Trade Marks Act, 1999
[4] The Designs Act, 2000
[5] The Geographical Indication of Goods Act, 1999
[6] The Protection of Plant Varieties and Farmers' Rights Act, 2001
[7] The Semiconductor Integrated Circuits Layout Design Act, 2000

Digital Learning Resources:

Course Name: Intellectual Property
Course Link: https://nptel.ac.in/courses/109/106/109106173
Course Instructor: Prof. Feroz, IIT Madras

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7th Semester	RGT6A003	Green Technology	L-T-P 3-0-0	3 CREDITS

Module I: (12 Hrs)
Global Warming and its effect: - Introduction and physical definition of global warming, the New Carbon Problem: Accumulation, Long Half-Life, Heating Potential, Carbon Emission Factors, Carbon Absorption in Nature, The Global Emission Situation and its effect in India, The Kyoto and Other Protocols and its view in India, Effect of climate change and its impact.
Planning for the Future to reduce global warming: - Steps taken to Control Carbon Emissions universally, Use of Promotional and Punitive Mechanisms for Reducing Carbon in Atmosphere, The General Approach in Planning for the Future, Developing Countrywide Adaptive Measures for Safety of Local People, Developing Mitigative Measures for Global Reduction of Carbon, India's National Action Plan on Climate Change (NAPCC) till date, National Mission for a Green India, The MRV Debate.

Module II: (8 Hrs)
Opportunities in Control of Carbon Emissions and Accumulation:- Essential Steps for Control of Carbon Emissions and Accumulation, Procedure to develop own Priorities and Business Opportunities in India for control of carbon emissions and accumulation, Needs a Mix of Green and Traditional Power Sources in India, A Logical Approach for Carbon Reduction, Need in India — More Forests, Less Deforestation and payment rates procedure for controlling carbon emissions and its Promotional Mechanisms at India. Green Technologies for Energy Production: - Various Technologies Available for Energy Production, Cost Comparison of a Few Typical Systems for Power Generation, Sources of Energy Production Already in Use, Alternative Methods Ready for Use, Green Technologies Needing some Prior R&D Work.

Module III: (10 Hrs)
Green Technologies for Personal and Citywide Application: - Measures to be taken for Green city, Carbon Emission Reduction at Personal Level, Carbon Emission Reduction at Local Authority and Citywide Level, Carbon Emissions from Imports. Green Technologies for Specific Applications:- Promotion of 'Green' Buildings, Guidelines, The Energy Conservation Building Code (ECBC), Green Hotels and Hospitals, Green Technologies for Transport, Green Roads, Ports and Harbours, Industries, Carbon, Carbon Emissions from a Few Selected Industries in India, The Changing Scenario in Cities, Need for Wider Application to Town Planning and Area Re-Development Projects, 'Green' Infrastructure for Municipal Services, Bringing up Indian Villages, Green Services for Crematoria, Spreading Message to all Stakeholders.

Module IV: (10 Hrs)
Some High-tech Measures for Reducing Carbon Emissions: - Use of Solar Power with Satellite-Based Systems, Use of Carbon Capture and Storage (Sequestration), Microorganisms, A Quick SWOT Analysis.Recommended Plan of Action: - India's National Action Plan Take Us to a Low-Carbon Path, The Missions Help Develop Awareness, few case studies on Projects undertakenby Various Countries, Adaptive Measures Essential for Indian People to Cope with Climate Change

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Books
[1] Green Technologies, Soli J. Arceivala, McGraw Hill Education
[2] Green Technologies and Environmental Sustainability edited by Ritu Singh, Sanjeev Kumar

Digital Learning Resources:
Course Name: Sustainable Materials and Green Buildings
Course Link:https://nptel.ac.in/courses/105/102/105102195/
Course Instructor:Dr. B. Bhattacharjee, IIT Delhi

7th Semester	RIT7D002	Bigdata Analytics	L-T-P 3-0-0	3 CREDITS

Module-1
Introduction to Big Data: Types of Digital Data-Characteristics of Data – Evolution of Big Data - Definition of Big Data - Challenges with Big Data - 3Vs of Big Data - Non Definitional traits of Big Data - Business Intelligence vs. Big Data - Data warehouse and Hadoop environment - Coexistence. Big Data Analytics: Classification of analytics - Data Science - Terminologies in Big Data - CAP Theorem - BASE Concept. NoSQL: Types of Databases – Advantages – NewSQL - SQL vs. NOSQL vs NewSQL. Introduction to Hadoop: Features – Advantages – Versions - Overview of Hadoop Eco systems - Hadoop distributions - Hadoop vs. SQL – RDBMS vs. Hadoop - Hadoop Components – Architecture – HDFS - Map Reduce: Mapper – Reducer – Combiner – Partitioner – Searching – Sorting - Compression. Hadoop 2 (YARN): Architecture - Interacting with Hadoop Eco systems.

Module-2
No SQL databases: Mongo DB: Introduction – Features - Data types - Mongo DB Query language - CRUD operations – Arrays - Functions: Count – Sort – Limit – Skip – Aggregate - Map Reduce. Cursors – Indexes - Mongo Import – Mongo Export. Cassandra: Introduction – Features - Data types – CQLSH - Key spaces - CRUD operations – Collections – Counter – TTL - Alter commands - Import and Export - Querying System tables.

Module-3
Hadoop Eco systems: Hive – Architecture - data type - File format – HQL – SerDe - User defined functions - Pig: Features – Anatomy - Pig on Hadoop - Pig Philosophy - Pig Latin overview - Data types - Running pig - Execution modes of Pig - HDFS commands - Relational operators - Eval Functions - Complex data type - Piggy Bank - User defined Functions - Parameter substitution - Diagnostic operator. Jasper Report: Introduction - Connecting to Mongo DB - Connecting to Cassandra - Introduction to Machine learning: Linear Regression – Clustering - Collaborative filtering - Association rule mining - Decision tree.

Books:
1. Seema Acharya, Subhashini Chellappan, "Big Data and Analytics", Wiley Publication, 2015.
2. Judith Hurwitz, Alan Nugent, Dr. Fern Halper, Marcia Kaufman, "Big Data for Dummies", John Wiley & Sons, Inc., 2013.

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7th Semester	RIK7F001	Essence of Indian Knowledge Tradition - II	L-T-P 3-0-0	0 CREDITS

Course Objectives:

1. To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system.
2. To make the students understand the traditional knowledge and analyse it and apply it to their day to day life

Course Outcomes :

At the end of the Course, Student will be able to:

1. Identify the concept of Traditional knowledge and its importance.
2. Explain the need and importance of protecting traditional knowledge.
3. Illlustrate the various enactments related to the protection of traditional knowledge.
4. Interpret the concepts of Intellectual property to protect the traditional knowledge.
5. Explain the importance of Traditional knowledge in Agriculture and Medicine.

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Module-1:

Introduction to traditional knowledge: Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, Indigenous Knowledge (IK), characteristics, traditional knowledge vis-a-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge

Module-2:

Protection of traditional knowledge:The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

Module-3:

Legal framework and TK: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001 (PPVFR Act); The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016.

Module-4:

Traditional knowledge and intellectual property: Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge

Module-5:

Traditional Knowledge in Different Sectors: Traditional knowledge and engineering, Traditional medicine system, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK

Books:

1. Traditional Knowledge System in India, by Amit Jha, 2009.

2. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002.

3. "Knowledge Traditions and Practices of India" Kapil Kapoor, Michel Danino.

Digital Learning Resources:

Course Name: Ayurvedic Inheritance of India
Course Link: https://nptel.ac.in/courses/121/106/121106003/
Course Instructor: Dr M. S. Valiathan, IIT, Madras

https://www.youtube.com/watch?v=LZP1StpYEPM

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