

7th Semester

**BIJUPATNAIKUNIVERSITY OF TECHNOLOGY, ODISHA
ROURKELA**



Curriculum and Syllabus

**B. Tech (Computer Science & Engineering/ Computer
Science & Technology) from the Admission Batch
2018-19**

Semester (7th)


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Seventh Semester							
Theory							
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	RIT7D001	Internet of Things	3-0-0	3	100	50
		RIT7D002	Big Data Analytics				
		REC7D002	Embedded Systems				
3	PE	RCS7D001	Software Project Management	3-0-0	3	100	50
		RCS7D002	Cyber Security and Privacy				
		RCS7D003	Social Network Analysis				
4	OE	REC5D006	Digital VLSI Design	3-0-0	3	100	50
		RIS7B001	Industrial Safety Engineering				
		REL5D005	Renewable Power Generation Systems				
5	OE	REC7D001	Digital Image Processing	3-0-0	3	100	50
		RIP7E0002	Intellectual Property Right				
		RGT6A003	Green Technology				
6	OE	REV5D004	Disaster Management	3-0-0	3	100	50
		RCL7E004	Cyber Law and Ethics				
		REL7D003	Smart Grid				
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							
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


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Unit 4

Software quality- quality engineering, defining quality requirements, quality standards, practices & conventions, ISO 9000, ISO 9001, Software quality matrices, managerial and organization issues, defect prevention, reviews & audits, SEI capability maturity model, PSP, six sigma.

BOOKS:

1. B. Hughes, M. Cotterell, Rajib Mall, *Software Project Management*, McGraw Hill , 2015
2. R. Walker, *Software Project Management*, Pearson , 2003
3. R. H. Thayer, *Software Engineering Project management*, IEEE CS Press , 1988
4. R. Pressman, *Software Engineering: A Practitioner's approach*, McGraw Hill , 2005

Digital Learning Resources:

Course Name: Software Project Management
Course Link: https://onlinecourses.nptel.ac.in/noc19_cs70/preview
Course Instructor: By Prof. Rajib Mall & Prof. Durga Prasad Mohapatra

7 th Semester	RCS7D002	Cyber Security and Privacy	L-T-P 3-0-0	3 CREDITS
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Module I:

(10 Hours)

Introduction to Cyber Space, Introduction to Information Systems, Need for Cyber Security , Introduction to Cyber Attacks , Classification of Cyber Attacks, Classification of Malware, Threats, Vulnerability Assessment, Intrusion Detection Systems, Intrusion Prevention Systems

Module II:

(10 Hours)

Introduction to User Authentication Methods, Biometric Authentication Methods, Biometric Systems, Different Security Models and Security Mechanisms, Information Security and Network Security, Operating System Security, Web Security, Email Security, Mobile Device Security, Cloud Security

Module III:

(10 Hours)

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IoT Security, Cyber Physical System Security, Social Media Security, Virtual Currency, Block Chain Technology, Security Auditing, Cyber Crimes, Different Types of Cyber Crimes, Scams and Frauds, Analysis of Crimes, Human Behavior, Stylometry, Incident Handling

Module IV:

(10 Hours)

Investigation Methods, Criminal Profiling, Cyber Trails, Digital Forensics, History, Challenges, Branches of Digital Forensics, Digital Forensic Investigation Methods, Reporting, Management of Evidence, Cyber Law-Basics, Information Technology Act 2000, Amendments to IT Act 2000, Evidentiary value of Email/SMS, Cybercrimes and Offenses dealt with IPC, RBI Act and IPR Act in India, Jurisdiction of Cyber Crime, Cyber Security Awareness Tips

Books:

- [1] https://heimdalsecurity.com/pdf/cyber_security_for_beginners_ebook.pdf
- [2] <http://larose.staff.ub.ac.id/files/2011/12/Cyber-Criminology-Exploring-Internet-Crimes-and-Criminal-Behavior.pdf>

Digital Learning Resources:

Course Name: Cyber Security
 Course Link: https://onlinecourses.swayam2.ac.in/cec21_cs14/preview
 Course Instructor: Dr.G.PADMAVATHI

Course Name: Introduction to Cyber Security
 Course Link: https://onlinecourses.swayam2.ac.in/nou21_cs08/preview
 Course Instructor: Dr. Jeetendra Pande

7 th Semester	RCS7D003	Social Network Analysis	L-T-P 3-0-0	3 CREDITS
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Module I:

(10 Hours)

Social Media- Descriptions and Definitions-social media networks-introduction, rise of social media for consumer applications, applying social media to national priorities Social Media Marketing - Theory and Practice, Social Media Marketing (including Viral Marketing), Mobile Marketing, Web Analytics, Social Media Analytics - Criteria of Effectiveness, Metrics, Techniques (e.g., Social Network Analysis, Semantic Analysis, Online Sentiment Analysis), Tools, Social Media Management, Centrality Measures-opinion mining, feature based sentiment analysis

Module II:

(10 Hours)

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7 th Semester	REL5D005	Renewable Power Generation Systems	L-T-P 3-0-0	3 CREDITS
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(15 Hours)

Module I:

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.

(10 Hours)

Module II:

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.

(9 Hours)

Module III:

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.

(6 Hours)

Module IV:

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 McGrawHill, 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

Book

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7 th Semester	RIP7E0002	Intellectual Property Right	L-T-P 3-0-0	3 CREDITS
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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.

Reference:

- [1] The Copyright Act, 1957

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- [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/109/106/109106137/>
Course Instructor: Prof. Feroze Ali, IIT Madras

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7 th Semester	RGT6A003	Green Technology	L-T-P 3-0-0	3 CREDITS
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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 undertaken by Various Countries, Adaptive Measures Essential for Indian People to Cope with Climate Change

Books


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

Module I (12 hr)

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 of natural hazards; hazard assessment - Dimensions of vulnerability factors; vulnerability assessment - Vulnerability and disaster risk - Vulnerabilities to flood and earthquake hazards

Module II (6 hr)

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 hr)

Capacity Building: Capacity Building: Concept - Structural and Nonstructural 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 hr)

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

1. Earth and Atmospheric Disasters Management, N. Pandharinath, CK Rajan, BS Publications 2009.

2. 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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7 th Semester	RCL7E004	Cyber Law and Ethics	L-T-P 3-0-0	3 Credits
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Module-I: Introduction to Cyber Law

Evolution of computer technology, emergence of cyber space. Cyber Jurisprudence, Jurisprudence and law, Doctrinal approach, Consensual approach, Real Approach, Cyber Ethics, Cyber Jurisdiction, Hierarchy of courts, Civil and criminal jurisdictions, Cyberspace-Web space, Web hosting and web Development agreement, Legal and Technological Significance of domain Names, Internet as a tool for global access.

Module-II: Information Technology Act

Overview of IT Act, 2000, Amendments and Limitations of IT Act, Digital Signatures, Cryptographic Algorithm, Public Cryptography, Private Cryptography, Electronic Governance, Legal Recognition of Electronic Records, Legal Recognition of Digital Signature, Certifying Authorities, Cyber Crime and Offences, Network Service Providers Liability, Cyber Regulations Appellate Tribunal, Penalties and Adjudication.

Module-III: Cyber Law and Related Legislation

Patent Law, Trademark Law, Copyright, Software – Copyright or Patented, Domain Names and Copyright disputes, Electronic Data Base and its Protection, IT Act and Civil Procedure Code, IT Act and Criminal Procedural Code, Relevant Sections of Indian Evidence Act, Relevant Sections of Bankers Book Evidence Act, Relevant Sections of Indian Penal Code, Relevant Sections of Reserve Bank of India Act, Law Relating To Employees And Internet, Alternative Dispute Resolution , Online Dispute Resolution (ODR).

Module-IV: Electronic Business and Legal Issues

Evolution and development in E-commerce, paper vs paper less contracts E-Commerce models- B2B, B2C, E security. Business, taxation, electronic payments, supply chain, EDI, E-markets, Emerging Trends.

Module-V: Cyber Ethics

The Importance of Cyber Law, Significance of Cyber Ethics, Need for Cyber regulations and Ethics. Ethics in Information society, Introduction to Artificial Intelligence Ethics: Ethical Issues in AI and core Principles, Introduction to Block chain Ethics.

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- [2] Clark W. Gellings, "The Smart Grid: Enabling Energy Efficiency and Demand Response", CRC Press, 2009.
- [3] Stuart Borlase, "Smart Grid: Infrastructure, Technology and solutions " CRC Press
- [4] Janaka Ekanayake, Nick Jenkins, Kithsiri Liyanage, Jianzhong Wu, Akihiko Yokoyama, "Smart Grid: Technology and Applications", Wiley.
- [5] Andres Carvallo, John Cooper, "The Advanced Smart Grid: Edge Power Driving Sustainability: 1", Artech House Publishers July 2011
- [6] Mladen Kezunovic, Mark G. Adamiak, Alexander P. Apostolov, Jeffrey George Gilbert "Substation Automation (Power Electronics and Power Systems)", Springer

Digital Learning Resources:

Course Name: Introduction to Smart Grid
Course Link: <https://nptel.ac.in/courses/108/107/108107113/>
Course Instructor: Prof. N.P. Padhy and Prof. Premalata Jena, IIT Roorkee

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


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:


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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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