Teaching Scheme and Syllabus
For

Bachelor of Technology
In

Minor in Tribal Technology and Management

Department of _____

Sardar Vallabhbhai National Institute of Technology

Minor in Tribal Technology and Management

Sr. No.	Semester	Subject	Code No.	Scheme L-T-P	Credits	Notional hours of Learning (Approx.)
1.	4th Semester	Tribal Knowledge Systems	MTT202	3-1-0	4	70
2.	5th Semester	Tribal Ecosystem Management	MTT301	3-1-0	4	70
3.	6th Semester	Research ,and Strategic planning for sustainable development	MTT302	3-1-0	4	70
4.	7th Semester	Sustainable agricultural practices	MTT401	3-1-0	4	70
5.	7th Semester	Mini Project	MTT403	0-0-4	2	70
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MTT202	:	Tribal Knowledge System	L	T	P	Credits
			3	0	0	03

1. Course Outcome: At the end of the course the students will be able to:

CO1	Define and describe the scope and relevance of tribal science and technology, including traditional scientific practices in tribal communities.
CO2	Understand and explain indigenous methods of observation, experimentation, and problem-solving used by tribal communities.
CO3	Analyze traditional agricultural practices, sustainable farming techniques, and resource management methods in tribal communities.
CO4	Identify and describe contributions of tribes to science and technology, such as in astronomy, mathematics, ethnobotany, and environmental management.
CO5	Understand the role of tribal communities in biodiversity conservation and maintaining ecological balance through traditional ecological knowledge.
CO6	Evaluate the challenges and opportunities in preserving tribal knowledge and technologies, including issues related to intellectual property rights and collaboration with scientific institutions.

2. Course Content

Module 1: Introduction to Tribal Folk Traditions Definition and characteristics of tribal folk traditions, Importance of folk traditions in tribal communities, Historical perspectives: challenges and stereotypes faced by tribes in mainstream society.	**(6 Hours)**
Module 2: Indigenous Technologies and Resource Management Traditional agricultural practices and sustainable farming techniques, Traditional methods of resource management and conservation, Indigenous approaches to environmental management and sustainability, Traditional water harvesting and irrigation systems.	**(9 Hours)**
Module 3: Indigenous Healthcare Systems and Ethnobotany Medicinal plants and indigenous healthcare practices, Case study: Kani tribe's medicinal plant use in Kerala, Ethnobotany and the discovery of medicinal plants	**(8 Hours)**
Module 4: Tribal Contributions to Science and Technology Tribal knowledge in astronomy, mathematics, and navigation, Innovations in handicrafts, textiles, and craftsmanship.	**(8 Hours)**
Module 5: Biodiversity Conservation and Ecological Balance Tribes as custodians of biodiversity, Traditional ecological knowledge in conservation, Indigenous practices for wildlife management and habitat preservation, Methods of maintaining ecological balance	**(8 Hours)**
Module 6: Challenges and Opportunities in Tribal Science and Technology Threats to the preservation of tribal knowledge and technologies, Intellectual property rights and ethical considerations, Collaboration between tribes and scientific institutions, Integrating traditional and modern knowledge systems	**(6 Hours)**
	(Total Lecture Hours: 45)

3. Reference Book:

1	V. Elwin, (1951). The Tribal art of Middle India, London.
2	L. P. Vidyarthi, & B. K. Rai, (Reprinted 1985). The Tribal Culture of India, Concept Publishing Company; New Delhi.
3	L. K. Mahapatra (1997). Tribal Cultures and Regional Society in Orissa in Santosh Kumar Sethi & Susmit Pani (eds.), Tribal Culture of Orissa.
4	Denis Dutton (1993). Tribal Art and Artifact, Journal of Aesthetics and Art Criticism, 51(1):13–21.
5	L.K. Mahapatra, (1996). Tribal Heritage of Indian Civilization in Banaja, Adivasi Exhibition Souvenir. Academy of Tribal Dialects and Culture, Government of Orissa,Bhubaneswar.

MTT301	:	Tribal Ecosystem Management	L	T	P	Credits
			3	0	0	03

1. Course Outcome:

At the end of the course the students will be able to:

CO1	Understand the concept and types of law, including the differences between legislative law and customary law, and the various types of human rights.
CO2	Analyze the legal arrangements for tribal governance and their implications, including the Panchayat (Extension to Schedule Areas) Act (PESA), the Scheduled Tribes (Recognition of Forest Rights) Act 2006, the Land Acquisition, Rehabilitation and Resettlement Act.
CO3	Understand the meaning and types of environmental law and tribal ecosystems.
CO4	Explore the concept, meaning, character, and scope of customary law, and understand the base of tribal customary law.
CO5	Gain an overview of customary law in tribal communities across different regions of India, including North, East, West, South, North-East, Central, and Island zones.
CO6	Analyse the strategies for tribal development

2. Course Content

Module 1: Intellectual Property Rights and Tribal Knowledge Historical perspectives on intellectual property rights (IPR), Types of IPR: patents, copyrights, trademarks, and plant variety protection, Protection of indigenous knowledge and farmers' rights, Biodiversity treaties relevant to tribal knowledge, Legal frameworks for licensing and research collaborations.	**(9 Hours)**
Module 2: Legal Frameworks for Tribal Governance and Land Rights Overview of tribal governance legislation: PESAPanchayat (Extension to Schedule Areas) Act (PESA), Forest Rights Act, Land acquisition policies: LARR Act, 2013, Issues in tribal land rights and ownership, Case studies on land rights movements and legal conflicts	**(9 Hours)**
Module 3 Environmental Law and Tribal Ecosystems Tribal communities and environmental stewardship, Environmental laws affecting tribal lands, Roles in conservation and sustainable development, Case studies on environmental conflicts and legal strategies.	**(9 Hours)**
Module 4: Tribal Self-Governance and Autonomy Constitutional recognition of tribal self-governance, Autonomous regions: case studies and governance structures, Comparative analysis of autonomy models, Challenges in implementing self-governance.	**(9 Hours)**
Module 5: Tribal Development Strategies and PVTGs Impact of policies on tribal communities, Development strategies: education, health, nutrition, empowerment, Particularly Vulnerable Tribal Groups (PVTGs): criteria and initiatives.	**(9 Hours)**
	(Total Lecture Hours: 45)

3. Reference Book:

1	Singh, K.S. (1993) : Tribal Ethnography, Customary Law and Change, Concept Publishing House, New Delhi
2	Devendra Thakur (1994), Tribal Life in India: Tribal law and Administration (Volume 7 of Tribal Life in India), Deep & Deep Publications
3	J. K. Das (2001), Human Rights And Indigenous Peoples, APH Publishing
4	Lalita Prasad Vidyarthi and Binay Kumar Rai (1977), The Tribal Culture of India, Concept Publishing Company.
5	Ranga Ranjan Das (2020). Society Culture and Heritage NorthEastern Perspective. Heritage Foundation.

MTT302	:	Research, And Strategic Planning For Sustainable Development	L	T	P	Credits
			3	0	0	03

1. Course Outcome:

At the end of the course the students will be able to:

CO1	Understand the role of Geographic Information Systems (GIS) and Database Management Systems (DBMS) in natural resource planning, including land mapping, land-use planning, mapping food resources, and non-timber forest products (NTFP) and their value chain.
CO2	Analyze watershed management concepts, including watershed characteristics, development challenges and opportunities, management objectives, integrated watershed management components, and participatory watershed management involving user groups and self-help groups.
CO3	Explore sustainable agriculture and animal husbandry practices, including organic farming techniques, sustainable soil management, adaptive pest management, sustainable field crop production, and conservation of livestock species.
CO4	Understand biodiversity and its ecological restoration, including the principles and techniques of ecological restoration, the role of government policy and local communities, the role of NGOs, gene banks and germplasm, and biodiversity policy and legislation in India.
CO5	Analyze natural resource processing and marketing, including sustainable packaging practices, marketing strategies for promoting tribal products, and e-marketing and branding for tribal development.
CO6	Evaluate appropriate technology and its economic appraisal, including examples of appropriate technology solutions for tribal communities, economic appraisal methods, cost-benefit analysis, and sustainability assessment in tribal regions.

2. Course Content

Module 1: Role of GIS and database management system (DBMS) in Natural Resourceplanning Introduction to Geographic Information Systems (GIS): Components, Data structure and formats, Understanding data and DBMS, Database management systems (DBMS), Applications in land mapping, food resource mapping, and NTFP value chains.	**(8 Hours)**
Module 2: Watershed Management Watershed characteristics and development issues, Watershed management concepts and objectives, Integrated watershed management: agriculture, forestry, fishery, Participatory management and role of community groups	**(8 Hours)**
Module 3: Sustainable Agriculture and Animal Husbandry Practices Importance of sustainable management, Organic farming techniques suitable for tribes, Soil management: conservation tilling, cover cropping, composting, Integrated pest management and sustainable crop production, Animal husbandry for sustainable livelihoods, Seed banks and livestock species conservation	**(8 Hours)**
Module 4: Biodiversity and its Ecological Restoration Significance of biodiversity and indicators, Principles of ecological restoration, Government policies and community integration, Role of NGOs and gene banks, Biodiversity legislation in India	**(8 Hours)**
Module 5: Natural Resources Processing and marketing Processing techniques for natural resources, Sustainable packaging practices, Marketing strategies and e-marketing for tribal products	**(8 Hours)**
Module 6: Appropriate Technology and their economic appraisal Role of appropriate technology in development, Case studies of technology solutions Economic appraisal methods, Cost-benefit analysis in tribal regions	**(5 Hours)**
	(Total Lecture Hours:45)

3. Reference Book:

1	Watershed Based Development: A Source Book by Paranjpe, Suhas et al (1998), Pune: Bharat Gyan Vigyan Samidhi.
2	Indigenous Agricultural Practices for Sustainable Farming by Sundaramari M , Ranganathan TT (2016).
3	Mark Maslin (2014), Climate Change: A Very Short Introduction, Oxford University Press.
4	R. Craig Lefebvre (2013), Social Marketing and Social Change: Strategies and Tools for Improving Health, Well-Being, and the Environment, Wiley
5	Dave Chaffey and Fiona Ellis-Chadwick, (2013), Digital Marketing: Strategy, Implementation and Practice.

MTT401	:	Sustainable Agricultural Practices	L	T	P	Credits
			3	0	0	03

1. Course Outcome:

At the end of the course the students will be able to:

CO1	Understand the concepts, philosophies, principles, and need for agriculture, including indigenous agriculture, and analyze the tribal history of agriculture and the differences between intensive and peasantry agriculture.
CO2	Identify and evaluate different agricultural methods, including Jhum cultivation, mixed cultivation, wet paddy cultivation, dry cultivation, terrace fields, and the Benvar agriculture system, focusing on their principles, practices, benefits, challenges, and ecological considerations.
CO3	Analyze the importance of seed selection in indigenous agriculture, including traditional seed preparation, storage, and treatment methods, with a case study on tribal woman Pujari and paddy seed collection.
CO4	Explore tribal water management and irrigation systems, including the Zabo system of Nagaland, bamboo irrigation system of Meghalaya, and Bodo irrigation system, and understand weed management methods used by different tribes, with a case study on Jhabua water management.
CO5	Understand soil nutrient and pest management practices used by tribes, including nutrient cycling, soil conservation, manure and composting methods, and traditional pest management approaches.
CO6	Evaluate traditional harvesting methods and rituals, post-harvest processing and storage methods, and analyze interventions in agriculture such as lemongrass cultivation by Kuttia Kodha and Sabai grass cultivation by Lodha Tribes, including a financial and socio-economic analysis of agriculture.

2. Course Content

Module 1: Introduction to Indigenous Agriculture Concepts and need for indigenous agriculture, Tribal history of agriculture, Intensive vs. peasantry agriculture	**(8 Hours)**
Module 2: Traditional Agriculture Method Types of tribal agriculture, Jhum cultivation principles, Mixed cultivation, wet and dry paddy techniques, Terrace fields and Benvar agriculture system.	**(8 Hours)**
Module 3: Seed Selection, Treatment, and Storage Importance in indigenous agriculture, Traditional seed preparation and storage, Seed treatment practices, Case study: Pujari and paddy seed collection	**(8 Hours)**
Module 4: Irrigation and Weed Management Tribal water management systems: Zabo, bamboo irrigation, Bodo systems, Weed management methods among tribes, Case study: Jhabua water management	**(8 Hours)**
Module 5: Soil Nutrient and Pest Management Nutrient cycling and slash-and-burn methods, Soil conservation practices, Manure and composting methods, Traditional pest management approaches	**(8 Hours)**
Module 6 Harvest method and Intervention in agriculture Harvesting methods and rituals, Post-harvest processing and storage, Agricultural interventions: lemongrass and Sabai grass cultivation, Financial and socio-economic analysis of agriculture	**(5 Hours)**
	(Total Lecture Hours:45)

3. Reference Book:

1	Kella L , Ramaiah PV , Rao PP, (2007) Indigenous Tribal Farming For Sustainable Agriculture. M/s AGROBIOS.
2	M. Sundaramari, (2003), Indigenous Agricultural Practices: A Supreme Key to Maintaining Biodiversity
3	Jeeva, Solomon Retna Dhas Nadar, Roytre Christopher Laloo, and Bhanu Prakash Mishra, (2006), "Traditional agricultural practices in Meghalaya, North East India."
4	Deep Chandra Suyal, Ravindra Soni, Reeta Goel, (2020), "Microbiological Advancements for Higher Altitude Agro-Ecosystems & Sustainability" Springer Nature Singapore.
5	Jharna Pathak, (2011) "Agroforestry in Tribal Areas of Gujarat." Gujarat Institute of Development Research

MTT403	:	Mini Project	L	T	P	Credits
			0	0	4	02

1. **Course Outcome:**

At the end of the course the students will be able to:

CO1	Develop solutions that combine tribal knowledge with modern technology to address local challenges sustainably.
CO2	Design technology to improve the needs of tribal communities like livelihood, agriculture, and infrastructure.
CO3	Create technologies for sustainable resource management, such as water, renewable energy, or soil conservation.
CO4	Design technologies that improve traditional crafts, enhancing efficiency, preserving techniques, and expanding market access.
CO5	Develop projects that document, preserve, and promote the sustainable use of traditional medicinal plants in tribal communities, integrating them with modern healthcare practices.
CO6	Design projects that promote the use of traditional food habits and practices, enhancing nutrition and food security while preserving tribal culinary heritage.

A report of minimum 30 to 50 pages has to be submitted in one of the thrust area of the tribal problems.