# NATIONAL INSTITUTE OF TECHNOLOGY WARANGAL




# Mandatory Non-Credit Courses

## Second Year

**B.Tech. Program**

**(Effective from 2021-22)**

## Scheme of Instruction

## Mandatory Non-Credit Courses

| S.No. | Course Code | Name of the Course | L | T | P | Credits | Sem |
|---|---|---|---|---|---|---|---|
| 1 | IC201 | Personality Development Through Life Enlightenment Skills | 1 | 0 | 0 | 0 | III/IV |
| 2 | IC202 | Universal Human Values | 1 | 0 | 0 | 0 | III/IV |
| 3 | IC203 | Professional Ethics | 1 | 0 | 0 | 0 | III/IV |
| 4 | IC204 | Gender Sensitization | 1 | 0 | 0 | 0 | III/IV |
| 5 | IC205 | Indian Culture and Heritage | 1 | 0 | 0 | 0 | III/IV |
| 6 | IC206 | Indian Knowledge Systems | 1 | 0 | 0 | 0 | III/IV |
| 7 | IC207 | Constitution of India | 1 | 0 | 0 | 0 | III/IV |
| 8 | IC208 | History of Science and Technology | 1 | 0 | 0 | 0 | III/IV |
| 9 | IC209 | Sanskrit for Technical Knowledge | 1 | 0 | 0 | 0 | III/IV |

| Course Code: IC201 | PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS | Credits 1-0-0: 0 |
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## Course Outcomes:

At the end of the course, the student will be able to

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| CO1 | Develop personality with stable mind, pleasing manners and determination |
| CO2 | Demonstrate peace and prosperity as depicted in Geeta |
| CO3 | Develop versatile personality after studying Neetishatakam |

## Syllabus:

**Neetisatakam-Holistic development of personality:** Verses- 19,20,21,22 (wisdom); Verses- 29,31,32 (pride & heroism); Verses- 26,28,63,65 (virtue); Verses- 52,53,59 (don'ts); Verses- 71,73,75,78 (do's)

**Approach to day to day work and duties:** Shrimad Bhagwad Geeta: Chapter 2 - Verses 41, 47, 48; Chapter 3 - Verses 13, 21, 27, 35; Chapter 6 - Verses 5,13,17,23, 35; Chapter 18 - Verses 45, 46, 48.

**Statements of basic knowledge:** Shrimad Bhagwad Geeta: Chapter2-Verses 56, 62, 68; Chapter 12 -Verses 13, 14, 15, 16,17, 18; Personality of Role model. Shrimad Bhagwad Geeta: Chapter2-Verses 17, Chapter 3-Verses 36,37,42; Chapter 4-Verses 18, 38,39; Chapter18 – Verses 37, 38, 63

## Learning Resources:

### Text Books:

1. Srimad Bhagavad Gita, Swami Swarupananda, Advaita Ashram (Publication Department), Kolkata
2. Bhartrihari's Three Satakam (Niti-sringar-vairagya), P. Gopinath,
3. Rashtriya Sanskrit Sansthanam, New Delhi.

| Course Code: IC202 | UNIVERSAL HUMAN VALUES | Credits 1-0-0: 0 |
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## Course Outcomes:

At the end of the course, the student will be able to

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| CO1 | Understand the importance of Human values |
| CO2 | Identify the role of value education in overall personality development |
| CO3 | Interpret the important values that need to be cultivated |
| CO4 | Develop character and competence |

## Syllabus:

**Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education:** Self-Exploration; 'Natural Acceptance' and Experiential Validation; Basic Human Aspirations; Right understanding, Relationship and Physical Facility; fulfilment of aspirations; Understanding Happiness and Prosperity, Harmony at various levels.

**Module 2: Understanding Harmony in the Human Being - Harmony in Myself:** Understanding human being; Understanding the harmony of Self with the Body: Harmony in Self; Health; Program for Self and Health.

**Module 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship:** Understanding values in human-human relationship; meaning of Justice (universal values in relationships); mutual happiness; Harmony in the society; Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

**Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence:** Understanding the harmony in the Nature; Interconnectedness and mutual fulfilment among the four orders of nature- recyclability and self-regulation in nature; Understanding Existence as Co-existence of mutually interacting units in all- pervasive space; Holistic perception of harmony at all levels of existence.

**Module 5: Professional Ethics:** Professional ethics: people friendly and eco-friendly production systems, appropriate technologies and management patterns. Case studies of typical holistic technologies, management models and production systems

## Learning Resources:

### Text Books:

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

### Reference Books:

1. Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
2. The Story of My Experiments with Truth, Mohandas Karamchand Gandhi
3. Small is Beautiful - E. F Schumacher.

| Course Code: IC203 | PROFESSIONAL ETHICS | Credits 1-0-0: 0 |
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## Course Outcomes:

At the end of the course, the student will be able to

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| CO1 | Explain how to deal with complex situations arising out of interaction with people |
| CO2 | Identify the basic tenets of leadership and to become a worthy professional. |
| CO3 | Review theories of moral autonomy. |
| CO4 | Understand the responsibilities and rights of engineers |

## Syllabus:

**PROFESSIONAL AND ENGINEERING ETHICS:** Why Engineering ethics? Moral issues encountered by professional engineers during their day-to-day operations both at home and office/workplace- Moral problems that frequently arise in ones' Profession.

**MORAL AUTONOMY:** Moral integrity and social and professional behaviour; Different theories proposed under moral autonomy-Kohlberg's and Gilligan's Theory; Heinz's Dilemma- Motive behind aggression

**THEORY ABOUT MORALITY:** Virtue ethics, Utilitarianism, Duty ethics, Right ethics based on the concepts of Virtues and vices, most good for most people, Duties to respect for persons, Human rights respectively; Responsibility and accountability while dealing with public issues such as safety, risk, hazards, Risk Analysis and assessment-a brief discussion

**RESPONSIBILITIES AND RIGHTS OF ENGINEERS:** Collegiality (Ones attitude) towards other engineers working in the same Organization or outside) and Loyalty ( to the Employer), obligation of Loyalty and misguided loyalty, Respect for authority and its limitations, Bootlegging, Collective bargaining, Commitments and Convictions; Confidentiality while changing jobs, Conflicts of interests, Gifts, bribes, kickbacks -case studies related, Occupational Crime and industrial espionage Whistle blowing and moral guide line, Discrimination, preferential treatment and harassment; Rights of Engineers

## Learning Resources:

### Text Books:

1. Ethics in Engineering, Mike W Martin and Ronald Schinzinger, 3rd Edition, Tata McGraw Hill Education Pvt. Ltd., 2003.
2. Indian Culture, Values and Professional Ethics, P S R Murthy, 2nd Edition, B S Publications, 2013.

### Reference Books:

1. Engineering Ethics and Human Values, M. Govindarajan, S Natarajan and V.S. Senthil Kumar, 1st Edition, PHI Publications, 2013.
2. Professional Ethics & Human Values, A. Alavudden, R. Kalil Rahaman & M. Jayakumaran, 1st Edition, University Science Press, 2008.
3. Leadership-Education in Human Values, Lieunt Gen Dr. M. L. Chibber, Sri Sathya Sai Books and Publications Trust, 1st Edition, 2009.
4. Wings of Fire, Kalam A P J, Universities Press Publications, 2013.
5. Engineering Ethics, Charles B. Fleddermann, 4th Edition, PHI, 2012.

| Course Code: IC204 | GENDER SENSITIZATION | Credits 1-0-0: 0 |
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## Course Outcomes:

At the end of the course, the student will be able to

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| CO1 | Understand important issues related to gender in contemporary India |
| CO2 | Identify measures for countering gender discrimination in our society |
| CO3 | Understand the gendered division of labour and its relation to politics and economics |
| CO4 | Respond to put an end to gender violence |
| CO5 | Practice egalitarian interactions between men and women. |

## Syllabus:

**Unit 1:** Introduction to Gender; Definition of Gender; Basic Gender Concepts and Terminology; Exploring Attitudes towards Gender; Social Construction of Gender

**Unit 2:** Gender Roles and Relations; Types of Gender Roles; Gender Roles and Relationships Matrix; Gender-based Division and Valuation of Labour

**Unit 3:** Gender Development Issues; Identifying Gender Issues; Gender Sensitive Language; Gender, Governance and Sustainable Development; Gender and Human Rights; Gender and Mainstreaming

**Unit 4:** Gender-based Violence; The concept of violence; Types of Gender-based violence; The relationship between gender, development and violence; Gender-based violence from a human rights perspective

**Unit 5:** Gender and Culture; Gender and Film; Gender and Electronic Media; Gender and Advertisement; Gender and Popular Literature;

**Unit 6:** Gender and Studies; Knowledge: Through the Lens of Gender Point of View, Gender and the Structure of Knowledge;

## Learning Resources:

### Text Books:

1. Towards a World of Equals: A Bilingual Textbook on Gender, A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu, Telugu Akademi, Telangana Government, 2015

| Course Code: IC205 | INDIAN CULTURE AND HERITAGE | Credits 1-0-0: 0 |
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## Course Outcomes:

At the end of the course, the student will be able to

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| CO1 | Discuss the cultural achievements of Mauryas, Guptas, Satavahanas, Pallavas and Cholas. |
| CO2 | Explain Chaturvidha Purusharthas, Chaturvarna and Cheturasrama Theories |
| CO3 | Demonstrate the art and architecture in ancient kingdoms |
| CO4 | Analyse the cultures depicted in Ramayana, Mahabharatha, Jainism and Buddism |

## Syllabus:

**UNIT I:** Fundamental Unity of India – Harappan and Vedic Culture- evolution of Caste system – Jainism and Buddhism Gandhara Art. Political unification of India under Mauryas and Guptas – Cultural achievements; Cultural condition under the Satavahanas – Contribution of Pallavas and Cholas to Art and Letters. Cholas Administrative System. Influence of Islam on the India Culture. The Sufi Bhakti and Vishnavite movements; Cultural achievements of Vijayanagara rulers Contribution of Shershah and Akbar to the evolution of Administrative system in India-Cultural Developments under Mughals.

**UNIT II:** Western Impact on India – Introduction of Western Education Social and Cultural awakening and social reform movements. Raja Rama Mohan Roy – Dayananda Saraswathi – Theosophical Society – Ramakrishna Paramahamsa and Vivekananda – Iswara Chandra Vidyasagar and Veeresalingam; Emancipation of women and struggle against caste – Rise of Indian Nationalism – Mahatma Gandhi – Nonviolence and Satyagraha – Education of untouchability – Legacy of British Rule.

**UNIT III:** a) On the nature of Culture: Meaning, Definition and various inter relations of Culture; b) Culture and its salient features: The Vedic – Upanishadic Culture and society, Human aspirations in those societies Values – Chaturvidha Purusharthas – Chaturvarna Theory – Cheturasrama Theory; The Culture in Artha Sastra, Kautilyan conception of the function of Philosophy, State, Religion and king.

**UNIT IV:** Culture in Ramayana and Mahabharata: The Ideal Man and Woman, Concepts Maitri, Karuna, Seela, Vinaya, Kshama, Santi, Anuraga – as exemplified in the stories and anecdotes of the Epics; The Culture of Jainism: Jaina conception of Soul, Karma and liberation, Buddhism as a Humanistic culture. The four Noble truths of Bhuddhism; Vedanta and Indian Culture. Religion and Ethical Practices: The Hindu View.

## Learning Resources:

### Text Books:

1. Indian Heritage and Culture, P R Rao, Sterling Publishers Pvt. Ltd
2. Indian Heritage and Culture, D. Singh, APH Publishing Corporation

| Course Code: IC206 | INDIAN KNOWLEDGE SYSTEMS | Credits 1-0-0: 0 |
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## Course Outcomes:

At the end of the course, the student will be able to

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| CO1 | Understand the structure of Indian Knowledge |
| CO2 | Differentiate between the major traditions of India |
| CO3 | Enumerate the major contributions of India to various branches of science. |
| CO4 | Understand the Indian contributions to medicine, engineering and warfare |

## Syllabus:

**Introduction:** Indian knowledge as a unique system, Place of Indian knowledge in mankind's evolution, Relevance of Indian knowledge to present day and future of mankind, Nature of Indian Knowledge

**Structure of Indian Knowledge:** Types of knowledge (para, apara), The scientific and the unscientific, Instruments for gaining and verifying knowledge, Knowledge traditions: Lineages, Instruments - debate, epistemology and pedagogy, The inverted tree – axiomatic, deductive, empirical knowledge, and evolution of knowledge

**Abodes:** Description of various subjects, their nature and scope, their relative position in the knowledge system of the major traditions of India: 18 Mahāsthānas and 32 Vidyas, Buddhist System, Jain System

**Spiritual Sciences:** Darsanas/worldviews – theories of causation and liberation, Approaches to liberation, Schools of practice

**Disciplines of Study:** A brief outline of the subjects, the major contributions and theories along with timelines where relevant: Mathematics; Astronomy; Physical Sciences; Cosmogony; Language studies; Astrology; Moral studies/righteousness; Statecraft and political philosophy

**Aesthetics:** Introduction to the nature and theory of Indian aesthetics, description of major art forms: Theory of happiness, purpose of life and origin of Art; List of art forms; Art and Science; Enactment and Dance; Music; and Sculpture

**Technology:** Major areas of technology, the major advances and contributions with timelines: Medicine and surgery; Engineering and architecture; Metallurgy; Alchemy; Information management; and Warfare

## Learning Resources:

### Text Books:

1. Renaissance in India and other Essays on Indian culture, Sri Aurobindo, Sri Aurobindo Ashram, 2004
2. Treasure Trove of Indian knowledge, Sri Prashant Pole, Prabhat Prakashan, 2021
3. Sources of our cultural heritage, Sri Suresh Soni, Prabhat Prakashan, 2018
4. Universal Ethics and Moral Conduct, Swami Vivekananda, Min of Education Govt of India.

### Reference Books:

1. A Concise History of Science *in* India - D M Bose; S N Sen; B V Subbarayappa, Universities Press; 2nd edition, 2009

2. The Origins of Mathematics - A Seidenberg, Archive for History of Exact Sciences, Vol. 18, No. 4 (21.VI.1978), pp. 301-342, Springer
3. The Vedas - Chandrasekharendra Saraswati, Bhavan's Book University, 8th edition, 2009
4. The Beautiful Tree – Dharampal, RASHTROTTHANA SAHITYA, 2021
5. Computation in Ancient India – Subhash Kak , TRN Rao, Mount Meru Publishing, 2016
6. A brief history of Time – Stephen Hawking, Bantam; Updated and Expanded Tenth Anniversary edition, 1998
7. The Dance of Shiva – Ananda Coomaraswamy, Rupa Publications India, 2013
8. The Tao of Physics – Fritjof Capra, Harpercollins; 2007

| Course Code: IC207 | CONSTITUTION OF INDIA | Credits 1-0-0: 0 |
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## Course Outcomes:

At the end of the course, the student will be able to:

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| CO1 | Identify the fundamental rights and duties |
| CO2 | Review the growth of the demand for civil rights in India |
| CO3 | List the functionaries involved in local administration and their hierarchy |
| CO4 | Discuss the role of election commission and its role |
| CO5 | Illustrate the composition, powers and functions of the parliament |

## Syllabus:

**History of Making of the Indian Constitution:** History; Drafting Committee, (Composition & Working)

**Philosophy of the Indian Constitution:** Preamble; Salient Features

**Contours of Constitutional Rights & Duties:** Fundamental Rights: Right to Equality, Right to Freedom, Right against Exploitation, Right to Freedom of Religion, Cultural and Educational Rights, Right to Constitutional Remedies, Directive Principles of State Policy; Fundamental Duties.

**Organs of Governance:** Parliament; Composition; Qualifications and Disqualifications; Powers and Functions; Executive; President; Governor; Council of Ministers; Judiciary, Appointment and Transfer of Judges; Qualifications; Powers and Functions

**Local Administration:** District's Administration head: Role and Importance; Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation; Panchayati raj: Introduction, PRI: Zila Panchayat; Elected officials and their roles, CEO Zila Panchayat: Position and role; Block level: Organizational Hierarchy (Different departments); Village level: Role of Elected and Appointed officials; Importance of grass root democracy

**Election Commission:** Election Commission: Role and Functioning; Chief Election Commissioner and Election Commissioners; State Election Commission: Role and Functioning; Institute and Bodies for the welfare of SC/ST/OBC and women.

## Learning Resources:

### Text Books:

1. The Constitution of India, 1950 (Bare Act), Government Publication.
2. Dr. B. R. Ambedkar framing of Indian Constitution, Dr. S. N. Busi, 1st Edition, 2015.
3. Indian Constitution Law, M. P. Jain, 7th Edn., Lexis Nexis, 2014.
4. Introduction to the Constitution of India, D.D. Basu, Lexis Nexis, 2015.

| Course Code: IC208 | HISTORY OF SCIENCE AND TECHNOLOGY | Credits 1-0-0: 0 |
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## Course Outcomes:

At the end of the course, the student will be able to

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| CO1 | Identify the role of five-year plans in promoting science and technology |
| CO2 | Review the science and technological developments in major areas |
| CO3 | Demonstrate methods and mechanisms of Technology transfer |

## Syllabus:

**Historical Perspective:** The nature of science and technology, Roots of science and technology in India, Science and society, Scientists and society, Science and Faith and the rise of applied sciences.

**Policies and Plans after Independence:** Nehru's vision of science for independent India, Science and technology developments in the new era science and technology developments during the Five-Year Plan Periods and science and technology policy resolutions.

**Research and Development (R&D) in India:** Expenditure in R&D, Science and Technology Education, Research activities and promotion of technology development, Technology mission, Programs aimed at technological self-reliance, activities of council of scientific and industrial research (CSIR).

**Science and Technological Developments in Major Areas:** Space Geostationary Satellite Services – INSAT system and INSAT services remote sensing applications, Launch Vehicle Technology; Ocean Development: Biological and mineral resources, Marine research and capacity building; Defence Research – Spin-off technologies for civilian use, Biotechnology – Applications of biotechnology in medicine, Biocatalysts, Agriculture, Food, Fuel and Fodder; Energy – Research and development in conservation of energy, India's nuclear energy program, technology spin-offs.

**Nexus between Technology Transfer and Development:** Transfer of Technology – Types, Methods, Mechanisms, Process, Channels and Techniques, Appropriate technology, Technology assessment, Technological forecasting, Technological innovations and barriers of technological change.

## Learning Resources:

### Text Books:

1. Science and Technology in India, Kalpana Rajaram, Published and Distributed by Spectrum Books (P) Ltd., New Delhi – 58.
2. Management of Science and Technology (Problems & Prospects), Srinivasan, M., East-West Press (P) Ltd., New Delhi.

### Reference Books:

1. Science, Technology and education for Development, Ramasamy, K.A., and Seshagiri Rao, K., (Eds), K., Nayudamma Memorial Science Foundation, Chennai – 8.
2. The Role and Impact of Science and Technology in the Development of India, Kohili, G.R., Surjeet Publications.
3. Five Year Plans, Government of India, Planning Commission, New Delhi.

| Course Code: IC209 | SANSKRIT FOR TECHNICAL KNOWLEDGE | Credits 1-0-0: 0 |
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## Course Outcomes:

At the end of the course, the student will be able to

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| CO1 | Develop working knowledge of Sanskrit |
| CO2 | Review the knowledge of science and technology through Sanskrit literature |
| CO3 | Develop logic and memory power by learning Sanskrit |

## Syllabus:

**UNIT-1:** Alphabets in Sanskrit; Past/Present/Future Tense; Simple Sentences

**UNIT-2:** Order; Introduction of roots; Technical information about Sanskrit Literature

**UNIT-3:** Technical concepts of Engineering: Electrical, Mechanical, Architecture, Mathematics

## Learning Resources:

### Text Books:

1. Abhyas Pustakam, Dr. Vishwas, Samskrita, Bharti Publication, New Delhi
2. Teach Yourself Sanskrit - Prathama Deeksha, Vempati Kutumb Shastri, Rashtriya Sanskrit Sansthanam, New Delhi Publication
3. India's Glorious Scientific Tradition, Suresh Soni, Ocean books (P) Ltd., New Delhi.

### Reference Books:

1. Pride of India: A Glimpse Into India's Scientific Heritage, Samskrita Bharati, 2006
2. Vijaya Patham, B S Sarma, Pragnabharathi, 2020