<table>
<thead>
<tr>
<th>National Institute of Technology-Arunachal Pradesh (Established by Ministry of Human Resource development, Govt. of India)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Structure &amp; Syllabus</td>
<td></td>
</tr>
<tr>
<td>For M. Tech in Appropriate Technology &amp; Entrepreneurship Practice</td>
<td></td>
</tr>
<tr>
<td>In GOD's own land, a fusion of scholastic students, innovative &amp; motivated researchers &amp; teachers and fast moving visionary leaders.</td>
<td></td>
</tr>
<tr>
<td>NIT Arunachal Pradesh</td>
<td></td>
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<tr>
<td>PO- Yupia, Dist. – Papum Pare, Arunachal Pradesh, Pin – 791 112</td>
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</tr>
<tr>
<td>Ph No : 0360-2284801/2001582</td>
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<tr>
<td>Fax No : 0360-2284972</td>
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<tr>
<td>Email – <a href="mailto:nitarunachal@gmail.com">nitarunachal@gmail.com</a></td>
<td></td>
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<tr>
<td>Education</td>
<td>Ethics</td>
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<td></td>
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<tr>
<td>Research</td>
<td>Service to Society</td>
</tr>
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</table>
FORWARD

To achieve the target of being a global leader in the field of Technical Education, there is some sort of time bound urgency to work quickly, massively and strongly, in respect of National Institute of Technology, Arunachal Pradesh being an “Institute of National Importance” (by an Act of Parliament) and being established only in three years back in 2010. I have therefore adopted a ‘B’ formula as stated below to achieve the primary goal of producing World Class Visionary Engineers and exceptionally brilliant Researchers and Innovators:

**B-FORMULA**
- Best for Teaching
- Best for Research
- Best for Entrepreneurship & Innovation
- Best for Services to Society

In implementing the ‘B’ formula in letter and spirit, the framing of syllabi has been taken as an important legitimate parameter. Therefore, extraordinary efforts and dedications were directed for the last one year to frame syllabi in a framework perhaps not available in the country as of today.

Besides attention on ‘B’ formula institute has given considerable importance to the major faults of current Technical Education while framing the syllabus. The major stumbling blocks in Technical Education today are:

(I) The present system is producing “Academic Engineers” rather than “Practical Engineers”.

(II) The present system of education makes the students to run after jobs rather than making them competent to create jobs.

(III) There is lack of initiative to implement the reality of “Imagination is more important than knowledge”.

2
Taking due consideration of the findings made above, to my mind credible syllabi has been framed in the institute in which the major innovations are introduction of:

(I) I- course (Industrial Course) one in each semester at least one, which is targeted to be taught by the Industrial expert at least upto 50% of its component.

(II) Man making and service to society oriented compulsory credit courses of NCC/ NSS, values & ethics.

(III) Compulsory audit course on Entrepreneurship for all branches.

(IV) Many add-on courses those are (non-credit courses) to be offered in vacation to enhance the employability of the students.

(V) Many audit courses like French, German, and Chinese to enhance the communication skill in global scale for the students.

(VI) Research and imagination building courses such as Research Paper Communication.

(VII) Design course as “Creative Design”.

Further, the syllabus has been framed not to fit in a given structure as we believe structure is for syllabus and syllabus is not for structure. Therefore, as per requirement of the courses, the structure, the credit and the contact hours have been made available in case to case.

The syllabus is also innovative as it includes:

(I) In addition to the list of text and reference books, a list of journals and magazines for giving students a flexible of open learning.

(II) System of examination in each course as conventional examination, open book examination and online examination.

Each course has been framed with definite objectives and learning outcomes. Syllabus has also identified the courses to be taught either of two models of teaching:

(i) J.C. Bose model of teaching where practice is the first theory.

(ii) S.N. Bose model of teaching where theory is the first practice.

Besides the National Institute of Technology, Arunachal Pradesh has initiated a scheme of simple and best teaching in which for example:

(i) Instead of teaching RL, RC and RLC circuit separately, only RLC circuit will be taught and with given conditions on RLC circuits, RL and RC circuits will be derived and left to the students as interest building exercise.

(ii) Instead of teaching separately High Pass filter, Band Pan filter and Low Pass filter etc; one circuit of filter will be taught to derive out other circuits, on conditions by the students.
I am firmly confident that the framed syllabus will result in incredible achievements, accelerated growth and pretty emphatic win over any other systems and therefore my students will not run after jobs rather jobs will run after my students.

For the framing of this excellent piece of syllabus, I like to congratulate all members of faculty, Deans and HODs in no other terms but “Sabash!”

Prof. C.T.Bhunia
Director, NIT,(A.P.)
# M. Tech in Appropriate Technology & Entrepreneurship Practice

## Course Structure & Syllabus

### First Semester

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Course Code</th>
<th>Course Title</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>Hours/Week</th>
<th>Credits</th>
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<tbody>
<tr>
<td>1</td>
<td>ATEP 901</td>
<td>Production Engineering and Workshop Technology</td>
<td>2</td>
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<td>Entrepreneurship Development &amp; Micro Enterprise Management</td>
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<td>Values and Ethics in Business</td>
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### Second Semester

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<th>Course Code</th>
<th>Course Title</th>
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<td>7</td>
<td>ATEP 914</td>
<td>Enterprise Opportunities / Options</td>
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</tr>
</tbody>
</table>
Name of the Module: Production Engineering and Workshop Technology  
Module Code: ATEP 901  
Semester: 1st  
Credit Value: 3 [P=1, T=0, L=2]  

A. Objectives:  
The course is designed to meet with the following objectives:  
1. Competently employ broad-based analytical tools and computers for decision-making and system design, analysis and performance.  
2. Assume managerial and leadership roles in their chosen professional careers while working in multidisciplinary teams.  
3. Engage in continuous learning by seeking out opportunities for higher education or ongoing training related to their employment.  
4. Effectively adapt to the changing demands in workplace and are able to perform increasingly complex tasks, and tasks outside their field of expertise.  

B. Learning Outcome:  
Upon completion of the subject students will be able to:  
1. Design and conduct experiments, as well as to analyse and interpret data.  
2. Design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.  
3. Function on multi-disciplinary teams.  
4. Identify, formulate and solve engineering problems.  
5. Understand the professional and ethical responsibility.  
6. Understand the impact of engineering solutions in a global, economic, environmental, and societal context.  
7. Recognize the need for, and an ability to engage in life-long learning.  
8. Develop knowledge of contemporary issues.  
9. Use the techniques, skills, and modern engineering tools necessary for engineering practice.  

C. Subject Matter:  
Unit I:  
**Evolution of Management:** Management functions, Theory, Management approach to Planning, Analysis and Control functions involved in a Production System, Production cycles, planning functions.  
**Types of industry:** Job, Batch, Continuous, Mass and Flow Productions, Organization and policies in respect of production planning and control, Product design and development.  
**Forecasting techniques:** Scheduling, Sequencing and plant loading for optimal utilization, Queuing models and line balancing, Materials Planning and Control, Inventory Management, Value Analysis, Productivity Analysis, Mechanics of production control.  

Unit II:  
**Types of production and production processes:** Product configuration and manufacturing requirements.  
**Casting:** Pattern making, allowances and core making, casting processes of Ferrous and Non-Ferrous metals including Die Casting, Investment casting, Centrifugal casting, Loam molding, Transfer molding. Solidification principles, design of molds, rising, spurs and gating system,
casting defects, Production planning & Control, Maintenance and material Management, Quality control certification & six sigma.

**Unit III:**

**Metal joining processes:** soldering, brazing, fusion and non-fusion welding processes, various modern welding processes like TIG, MIG, Submerged Arc Welding, Friction Welding and Welding defects.

**Unit IV:**

**Metal Forming:** Fundamentals of hot and cold working processes – forging, extrusion and rolling. Thermal treatment Surface cooling CAT & CAM, application of CNC lathe, cold extrusion.

**D. List of Practical:** Practical

1. To practice Gas welding using a 3mm thick mild steel plate. (Welding Shop).
2. To prepare a Lap joint and Butt joint by Gas Welding from 3mm thick mild steel plate (Welding Shop).
3. To practice Manual metal arc welding using a 5mm thick mild steel plate (Welding Shop).
4. To practice Metal Inert Gas Welding (MIG welding) on a 5mm thick mild steel plate and differentiate between TIG and MIG welding processes.
5. To perform specific operations like turning, facing, chamfering and knurling on a cylindrical job using Centre Lathe.

**E. Teaching/ Learning/ Practice Pattern:**

- Teaching: 60%
- Learning: 40%
- Practice: 0%

**F. Examination Pattern:**

1. Theoretical Exam.

**G. Reading List:**

**Books:**

5. J. S. Campbell, *Principles of Manufacturing Materials and Processes*, MGH.

**Magazine:**

1. Material Today.
2. Production Engineering Solutions.
3. The Magazine Manager.

**Journals:**

2. *Journal of Manufacturing Science and Engineering*.
3. *Journal of Manufacturing Technology and Research*.
4. *International Journal of Industrial Engineering and Production Management*.
5. *International Journal of Industrial Engineering & Production Research*.
**Name of the Module: Environmental Engineering**

**Module Code: ATEP 902**

**Semester: 1st**

**Credit Value: 3 [P=3, T=0, L=0]**

---

**A. Objectives:**

The course is intended to meet the following objectives:

1. Imparting the knowledge to the students in the area of Environmental Engineering.
2. Providing teaching and learning to make students acquainting with advanced science and technology in Environmental Science.
3. Injecting the future scope and the research direction in the discipline of Environmental Engineering.
4. Making students competent to the research and development in Environmental Engineering.

**B. Learning Outcomes:**

Upon completion of the subjects:

1. Students will be adequately trained to become Scientist, trainers and Engineers.
2. Students will be skilled both to control and maintenance in Environmental pollution, waste water treatment and other related activities in Environmental Engineering.
3. Students will be substantially prepared to take up prospective research assignments.

**C. Subjects Matters:**

**Unit-1**
Concepts of Environment, Environmental gradients, Tolerance levels of environment factor, EU, US and Indian Environmental Law. Chemistry in Environmental Engineering: Chemistry of the atmosphere, combustion related air pollution, global environmental problems - ozone depletion, greenhouse effect, acid rain etc.

**Unit – II**
Water resources, characteristics of water, water pollutants, oxygen demanding wastes, surface water quality, groundwater quality, water treatment systems, biomedical wastes treatment technologies and disposal options, Rainwater harvesting, recharging of underground water.

**Unit – III**

**Unit-IV**
Environmental Impact Assessment

**D. Teaching/ Learning/ Practice Pattern:**
Teaching: 40%
Learning: 10%
Practice: 50%

**E. Examination Pattern:**
Theoretical Examination

**F. Reading List:**

**Books:**
2. Arcadio P. Sincero & Gregoria A. Sincero , Environmental Engineering , PHI
4. Curringham & Saigo , Environmental Science, TMH.
5. Gilbert M. Masters & Wendell P. Ela ,An Introduction to Environmental Engineering and Science , PHI Publication.
6. Gilbert M Masters , Introduction to Environmental Engineering and Science
7. J. G. Henry and G. W Heinke ,Environmental Science and Engineering
8. M.L. Davis and D.A. cornwell ,Introduction to Environmental Engineering

**Magazine:**
1. Applied Environmental Research Foundation
2. Environmental Science and Engineering
3. Climate Wire
4. Down to Earth
5. The Green Economist
6. Green Wire
A. Objectives:

The course is intended to meet the following objectives:
1. Students will be able to involved themselves in the business activities
2. Students will be able to start innovative practices in their entrepreneurial activities.
3. Students will be able to develop their skills on the traits that they want to carry forward
4. To explain about the role of entrepreneur towards society and appropriate approach for self motivation while working with the society.
5. To determine the needed approach for nation building as well as creation of National Wealth and challenges required to.

B. Learning Outcomes:

Students successfully completing this module will be able to:
1. Students will be able to start their venture more scientifically.
2. Students will be able to start their venture by linking with the financial institutions
3. Mobilize resources (both human and material) for future growth, development and protection of their enterprise

C. Subject Matters:

Unit-1

Introduction to Entrepreneurship: Meaning, Role of Entrepreneur, Entrepreneur Process: different approaches, Motivation for becoming an Entrepreneur. SME Concept, its role, status, prospects and policies for promotion of SMEs

Unit-II

Importance of Entrepreneurship: innovations, Qualities of successful Entrepreneur, Functions of an Entrepreneur, Types of Entrepreneur, Issues & Problems Entrepreneurial Practices,
Contribution of Entrepreneurs: Towards R&D, creates Wealth of Nation & Self prospect with Challenge, Entrepreneur Carrier: Different Stages, Entrepreneur Development Programmers (EDPs).

Unit-III


Unit-IV

Factors & Models of Entrepreneurial Development, Social Entrepreneurial Initiative: Solving social Problems, Business plan, Strategic Plan vs Business Plan, Forest based Industries: Mobilization of resources from NTFP products, Processing units, Technical and Financial Feasibility study and analysis of projects under self employment scheme including small entrepreneur. The World of Opportunity, Business Plan and Entrepreneurial Support System The opportunity, Idea versus Opportunity, sources of ideas and idea generation techniques, sources of opportunities, identification and selection of opportunities, the Business Plan, Components of a business plan, How to develop a good business plan?, Role of Entrepreneurial Institutions in Entrepreneurship Development, Director of Industries; DIC; SIDO; SIDBI; Small Industries Development Corporation (SIDC); SISI; NSIC; NISBUD; State Financial Corporation SIC, Various Schemes and Incentives.

Unit-V


Unit-VI

resource development for enterprise growth; delegation, motivation and leadership in microenterprises

D. **Teaching/ Learning/ Practice Pattern:**
   - Teaching: 40%
   - Learning: 10%
   - Practice: 50%

E. **Examination Pattern:**
   - Theoretical Examination

G. **Reading List:**

   **Books:**
   2. Frank Martin and Marcus Thompson Palgrave, Social Enterprise Developing Sustainable Businesses Macmillan

**Magazine :**
   1. Longe Magazine
   2. Home Business Magazine
   3. Entrepreneur
Journals:
1. Review of Economics and Statistics
2. Small Business Economics
3. Business Week
4. Journal of Labour Research
5. Entrepreneur
7. Journal of Business Venturing

Name of the Module: Design and Layout of Plants
Module Code: ATEP-904
Semester: 1st
Credit Value: 3 [P=0, T=0, L=3]

A. Objectives:
The course is designed to meet with the objectives of:
1. Different facility design technique
2. Design and Layout of Plants
3. Computer aided design technique
4. Different parts of plant

B. Learning Outcomes:
Students successfully completing this module will be able to:
1. Design and Layout of Plants
2. Able to control different part of plants.

C. Subject Matter:
Unit I:
Objectives of Facility Design: Introduction to facility layout, Types of layout problems, the layout function; Organization of layout: Product, process, Group Layout. Computerized handling of layout algorithms. Comfortable working environment and layouts utilities.

Unit II:
Introduction to various Mechanical Handling Systems and equipment for handling unit load and bulk materials, namely pulley blocks, cranes, belt conveyor, Bucket elevator, Screw conveyor and pneumatic conveyor. Kinematic analysis and design procedures of their component mechanisms.

Unit III:
Analysis and design of Material flow: Systems approach to flow cycle, flow possibilities, process charts, flow process chart; quantitative analysis of material flow; line balancing techniques, optimal material
flow configuration. Process design, product analysis, Computerized process planning. Space and area allocation for production and physical plant service. System dynamics, computer applications in Plant Location and Layout.

Unit IV:
Analogue and computer aided models. for physical path analysis of production program/project activity; digital network analysis and optimization; product quality planning and control system analysis.
Design concept of warehouse facilities commensurate with adopted kind of handling and transfer devices; Concepts of AGVs, AS/RS and other automated materials handling devices. Automated packaging devices; design of Integrated Plant Layout for Product Handling Systems different control system design and analysis.

D. List of Practical: Not applicable as per credit
E. Teaching/ Learning/ Practice Pattern:
   Teaching: 50%
   Learning: 50%

F. Examination Pattern:
   1. Theoretical Examination

G. Reading List:
Books:
1. James M. Apple, Plant Layout and Material Handling, John Wiley & Sons
4. Kroemer, KHE Lewis, Ergonomic Design of Material Handling Systems
5. Allegri, T.H, Materials Handling (Principles & Practice), CBS

Magazines:
2. Athletic Facility Design www.athleticfacilitydesign.com
3. EcoHawks Research Facility www.architectmagazine.com/design/buildings/ecohawks-research-facility

Journals:
1. Design of flexible plant layouts - Springer
4. International Journal of Scientific Research and Reviews
Name of the Module: Alternate Energy Resources
Module Code: ATEP-905
Semester: 1st
Credit Value: 3 \([P=0, \ T=0, \ L=3]\)

A. Objectives:
The course is designed to meet with the objectives of:

1. To introduce and apply advanced concepts of thermodynamics to engineering systems
2. To understand types and applications of various form of energy sources and its environmental impacts
3. To outline division aspects and utilization of renewable energy sources for both domestics and industrial applications
4. To analysis the environmental and cost economics of using renewable energy sources compared to fossil fuels.

B. Learning Outcomes:
Students successfully completing this module will be able to:

1. Understand and analyze the pattern of renewable energy resources Suggest methodologies / technologies for its utilization
2. Economics of the utilization and environmental merits

C. Subject matter:
Unit-I
New Renewable Energy Sources: Solar, biomass, wind, tidal, geothermal, microhydel, etc. –their availability & potential. Conversion of solar energy into various forms of energy (heat, electricity, mechanical etc.)

Unit - II
Geothermal & Tidal Energy: Basic principles, systems used in practice and applications, resource assessment criteria, status in India.

Unit-III
Solar Thermal Energy: Solar thermal devices: Radiation geometry, various types of solar collectors, flat plate & concentrating collectors, their construction working & application, hot water & hot air systems, industrial hot water systems, low pressure steam generation, solar dryers, solar pond, space heating & space conditioning, design criteria and methodologies for solar thermal applications.

Solar concentrator and their applications, solar thermal power generation. use of solar thermal systems with existing systems, economic analysis of solar thermal systems, example of hybrid systems.
Unit-IV

Solar Photovoltaic: Solar photovoltaic conversion: Basic principle of SPV conversion, types of solar cells, fabrication of SPV cells, modules. SPV systems: Different configurations, SPV system components and their characteristics, applications, hybrid SPV system. SPV system designing: Block diagram of general SPV system, load estimation, selection of inverter, battery sizing, array sizing, wiring for SPV system. Grid synchronized inverter system.

Unit-V

Wind Energy: Wind energy conversion technologies, aerodynamics of wind turbine rotor, site selection. Wind resource assessment, various models to predict wind pattern and their analysis, concept of wind farms, various aspects of wind turbine design, hybrid wind energy systems – Wind + diesel power, wind + conventional grid, wind + photovoltaic system etc.

Unit-VI


D. Teaching/ Learning/ Practice Pattern:
   Teaching: 50%
   Learning: 50%

E. Examination Pattern:
   1. Theoretical Examination

F. Reading List:
Books:
7. R.S. Kholyangbam, Biogas Technology,
8. V.V.Kishore (ed) Renewable Energy Engineering and Technology

16
Magazines:

1. Terra Green
2. Energy Future (Formerly The Solar Quarterly)

Journals:

1. Journal of Energy Resources Technology
2. Journal of Resources, Energy, and Development
4. International Journal of Energy Technology
5. Journal of energy and natural resources

Name of the Module: Disaster Management
Module Code: ATEP-906
Semester: 1st
Credit Value: 2 [P=0, T=0, L=2]

A. Objectives:
The course is designed to meet with the objectives of:
1. to provide an insight into immensely significant area of common welfare.
2. enable a student to understand the major types of natural and man-made disasters and also methods of mitigating their ill-effects on the human race.
3. Making students aware about the importance of this subject in the future prospect

B. Learning Outcomes:
Students successfully completing this module will be able to :
1. understand disasters, disaster preparedness, role of IT, remote sensing, GIS and GPS,
2. understand Rehabilitation, Reconstruction And Recovery,
3. Apply knowledge Disaster Response And Management, Risk Assessment and Vulnerability Analysis,
4. Understand Disaster Mitigation.

C. Subject Matter

Unit – 1 Understanding the Basic Concepts : Disaster, Risk Vulnerability, Hazard.
Disaster - Definition and it’s Interpretation, Understanding Risk, Hazard, Vulnerability, Understanding Community in the context of disaster, Disaster – It’s relationship with other branches of knowledge - in Physical sciences, Bio-sciences and Social sciences.
Unit – 2  Disaster and Development
Defining Development – Theories and Interpretation, Relationship between development and disaster, Disaster and Climate Change, Disaster and Poverty

Unit – 3  Disaster Management
D.M. Act 2005, Comparison with Acts of other countries. Disaster Management - A Paradigm Shift -- Relief Centric to Pro-active, Holistic and an Integrated approach Hyogo Framework of Action – Mainstreaming DRR through Development Programmes. Mainstreaming DRR through Flagship Programmes and India’s march towards MDG.

Unit - 4  Disaster Profile
World Disaster Profile, Disaster Timeline, Indian Disaster Profile with specific emphasis on Flood, Cyclone, Drought, Earthquake, Tsunami, Landslides, Snow Avalanches, Fire Incidents, NIDM Guidelines on various disasters :- (a) Biological Disaster (b) Chemical Terrorism Disaster (c) Nuclear and Radiological Disaster , (d) Urban Flooding (e) Incident Response System, Use of statistics in Disaster Management,

Unit – 5  Disaster and Governance
Role and Responsibilities of Government Machinery in all phases of disaster (Mitigation, Preparedness, Response and Recovery Phases), Role of N.G.O and Civil Society. (NIDM Guidelines for NGO), Role of Media (Audio, Video, and Print), Early Warning System Training and Capacity Building for Disaster Management, Psycho-social Support System and Mental Health Services in disasters, Disaster in course curriculum (National School Safety Programmes), Disaster and Indigenous Knowledge system, Disaster and financial Institutions (Role of Banking, Insurance, Microfinance and Corporate Sector)

D. Teaching/ Learning/ Practice Pattern:
  Teaching: 50%
  Learning: 50%

E. Examination Pattern:
  Theoretical Examination

F. Reading List:
Books:
1. Solanki, S.P ( 2013), Disaster Management, Astha Publisher, New Delhi
2. Gustin Joseph , Disaster and Recovery Planning ( 5th Ed. ) : A guide for facility Managers, CRC Press,
10. MHA, GOI-UNDP, Disaster Management in India, 2009

Magazines
1. Yojana magazine on disaster management
2. Emergency Management
3. Crisis and Disaster Magazine

Journals
1. Asian Journal of Environment and Disaster Management
2. International Journal of Disaster management
3. Crises and Disaster Management Magazine
4. Journal of Disaster Risk Studies
5. Emergency Management Review

Name of the Module: Values and Ethics in Business
Module Code: ATEP-907
Semester: 1st
Credit Value: 2 [P=0, T=0, L=2]

A. Objectives:
The course is designed to meet with the objectives of:
1. Enabling students to acquire and cultivate ethical practices in terms of business, engineering and life in general.
2. Developing a sense of moral responsibility in business and enterprise.
3. Emphasizing the importance of values and ethics in modern life.

B. Learning Outcomes:
Students successfully completing this module will be able to:
1. Understand the importance of values and ethics in business and work places.
2. Understand the benefits of managing ethics at work place.
C. Subject Matter:

Unit-I

Effects of Technological Growth:

Unit-2

Ethics of Profession:
Engineering profession: Ethical issues in Engineering practice, Conflicts between business demands and professional ideals. Social and ethical responsibilities of Technologists. Codes of professional ethics. Whistle blowing and beyond, Case studies.

Unit-3

Profession and Human Values:
Values Crisis in contemporary society, Nature of values: Value Spectrum of a good life, Psychological values: Integrated personality; mental health, Societal values: The modern search for a good society, justice, democracy, secularism, rule of law, values in Indian Constitution. Aesthetic values: Perception and enjoyment of beauty, simplicity, clarity, Moral and ethical values: Nature of moral judgements; canons of ethics; ethics of virtue; ethics of duty; ethics of responsibility.

Unit-4

Business Ethics:
CSR, Negotiation, Conflict Resolution, Organisational Ethics, Human Resource Management

D. Teaching/ Learning/ Practice Pattern:
  Teaching: 60%
  Learning: 30%
  Practice : 10%

E. Examination Pattern: Theoretical Examination

F. Reading List:
  Books:
Magazines:
1. Ethisphere
2. Business Ethics: The Magazine of Corporate Responsibility

Journals:
1. Journal of Business Ethics
2. Journal of Academic and Business Ethics
3. International Journal of Business Governance and Ethics
4. Journal of Management Values and Ethics
5. ISEE- International Society for Environmental Ethics

Second Semester Syllabus on the M.Tech Course on Appropriate Technology and Entrepreneurship Practices

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Course Code</th>
<th>Course Title</th>
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<th>Hours/Week</th>
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**Name of the Module:** Development Communication  
**Module Code:** ATEP-908  
**Semester:** 2nd  
**Credit Value:** 2 [P=0, T=0, L=2]

**A. Objectives:**  
The course is designed to meet with the objectives of:  
1. Defining and elucidating the concept of Development Communication.  
2. Explaining how different forms of media are used for development and social change.  
3. Enlisting some of the core areas of development and explaining development campaigns.
B. Learning Outcomes:
Students successfully completing this module will be able to:
1. Realize the importance of communication as an empowering tool.
2. Understand that knowledge and information are essential for people to effectively respond to the challenges posed by social, economic and technological changes.

C. Subject Matter:

Unit-I

Unit-II
Development Communication- Industry, Agriculture, Health and Sanitation, Environment Protection and Socioeconomic Development

Unit-III
Theories of Development Communication : Dominant Theory , Self Reliance Theory, Diffusion Theory, Dependent and Inter-dependence theory

Unit-IV
Background of Development Programs : Social Development, Economic Development, Political Development, Cultural Development, Good Governance

Unit-V
Role of Development Agencies in Communication : Planning Development Communication Campaign by Government, NGO and UN Agencies

D. Teaching/ Learning/ Practice Pattern:
Teaching: 60%
Learning: 30%
Practice : 10%

E. Examination Pattern: Theoretical Examination

Reading List:
Books:
4. UNESCO, Different Theories and Practice, 1982

Magazines:
1. Glocal Times
2. Success
3. Communication: Journalism Education Today

Journals:
1. Development Communication
2. Communication for Development
3. Communication for Development and Change
4. International Journal of Information Communication and Technologies
5. The Journal of Development Communication

Name of the Module: Managerial and Political Economics
Module Code: 104
Semester: 1st
Credit Value: 3 [ P = 0, T = 0, L = 3]

A. Objectives
1. The course is designed to meet with the objectives of:
2. to make the students aware of the various economic issues that they are expected to face as managers at the firm level and to equip them with the tools and techniques of economic analysis for improving their decision-making skills.
3. seeks to explain how politics and economics interact to shape international relations.
4. To explore questions and concepts in international economic relations, specifically as they relate to flows of trade, capital, people, and problems across borders.
5. to understand the impact of world political economy on the political process of the world.
6. acquainting the students to the significant political economy issues such as liberalization / changing configuration of class / patterns of development in influencing the Politics.

B. Learning Outcomes:
Students successfully completing this module will be able to:
1. The basic objective of this course is to make the students aware of the various economic issues that they are expected to face as managers at the firm level and to equip them with the tools and techniques of economic analysis for improving their decision-making skills.
2. learn to identify and distinguish the major theoretical approaches that seek to explain the IPE.
3. learn to identify and analyze the basic characteristics and mechanics of substantive issue areas within the IPE.
4. learn to apply and assess the merits of theoretical approaches in seeking to understand patterns of international economic relations

C. Subject Matter

UNIT I
Basic Concepts, Scope, Importance and Definitions Relevant to Managerial Economics-Factors Influencing Managerial Decision – Managerial Economics and other Disciplines

UNIT II

UNIT III
Objectives of the Firm – Managerial Decisions-Meaning of Demand- Types of Demand – Determinants of Demand – Demand Functions – Demand Elasticity – Demand Forecasting Methods – Accuracy of Forecasting

UNIT IV

UNIT V
Determinants of Price- Pricing under Different Objectives- Pricing under Different Market Structures- Price Discrimination- Pricing of Joint Products

Unit-VI

UNIT VII

D. Teaching/Learning/Practice pattern
Teaching: 70%
Learning: 30%
Practice: 0%
E. Examination Pattern:
Theoretical Examination

F. Reading List:

Books
3. Dean Joel : Managerial Economics, Prentice-Hall
5. Koutsoyiannis A : Modern Microeconomics. Macmillan,
6. Diwedi D. N. : Managerial Economics, Pearson Education India
7. Petersen, Lewis and Jain : Managerial Economics. Pearson Education India
9. Varshney & Maheshwari: Managerial Economic, Sultan Chand & Sons
11. Mankiw : Economics-Principles and Application, Cengage Learning,

B. Magazines
1. www.economicsnetwork.ac.uk
5. Business Line
6. The Economic Times
7. Forbes India

C. Journals
1. International Journal of Managerial Economics
2. European Journal of Economics
4. Business Economics
5. Decisions in Economics and Finance
6. Journal of Economic Structures
7. The IUP Journal of Managerial Economics
8. Applied Econometrics and International Development
10. American Economic Review
11. American Economic Journal
12. American Journal of Agricultural Economics
13. Annual Review of Economics
15. Brookings Papers on Economic Activity
16. Business Economics
17. Cambridge Journal of Economics
Name of the Module: Project and Financial Management
Module Code: ATEP-910
Semester: 2ND
Credit Value 3 \( P=0, T =0 L=3 \)

A. Objectives
The course is designed to meet the following objectives:
1. To introduce the concept of Project Management.
2. To define and list the characteristics of a Project.
3. To understand the Criteria used for selecting a project and discuss about the project plan.
4. To study the process of scheduling in a project.
5. Problem Analysis
6. To deal with some of the best practices in Project Management.

B. Learning Outcomes:
Students successfully completing this module will be able to:
1. Select the project correctly and implement the same with proper planning.
2. Evaluate the project with PME technique.
3. Some of the best practices in Project Management

C. Subject Matter
UNIT I
Introduction : Purpose, life cycle and Uniqueness

Unit-II
Project Selection : Profitability, Competitive Necessity and Operating Necessity

Unit-III
Project Planning : Overview: Goals, Scope and the schedule to be followed, Background: The reasons for the project and gives some identification of main reasons for initiating the project, Objectives: Detailed statement of the general goals mentioned in the background, Approach: Broadly points at the way in which the project aims to accomplish its objectives, Schedule: Various task for the preparation of cost effective master schedule, Resources: The task wise
budget and aggregated to form the project budget. Other resources, like capital equipment and rented machines are also budgeted and scheduled, Staffing: List of the Personnel requirements (specialized skills/any training to be imparted, Monitoring: Control, Procedures. Various techniques of collecting and evaluating information on project performances including finance, Risk: Plan for unforeseen problems for unanticipated crisis, including anticipated disasters.

Unit-IV
Role of Project Managers: Responsibility, Acquiring Resources, Staffing Project, Dealing with Obstacles, Communication, Negotiations, Scheduling, Project Evaluation and Review Technique (PERT), Networking Techniques

Unit-V
Problem and Project Control: Human and Mechanical Problems, Budgeting, Labour unrest etc., Performance, Cost and Time, Post Performance Control: after completion of the Project, Recording of Good and Bad Practices from scheduling to budgeting to control.

D. Teaching/ Learning/ Practice Pattern:
Teaching: 60%
Learning: 30%
Practice: 10%

E. Examination Pattern: Theoretical Examination

F. Reading lists:
Books:

Magazine
1. Project Manager Today
2. Project Manager Magazine
3. Project magazine

Journals:
1. Project Management Journal
2. Management Today
A. Objectives:
The course is designed to meet with the objectives of:

1. The core aspect of process orientation in business and implementation of these aspects to achieve competitive advantage can be realized only by accepting the concept of Enterprises Resource Planning (ERP).
2. With the help of this module is intended for the wide spectrum of students who wish to understand the concepts underlying Enterprises Resource Planning (ERP).
3. The module provides a comprehensive reference for ERP and has broad application for business and consultants.
4. This module has witnessed remarkable advances in the availability of information and speed communication.
5. In this module the advantage of matured IT infrastructure and the urgent needs of business to go global.

B. Learning Outcome:
Students successfully completing this module will be able to

1. The business leaders- either those already involved in business or about to be involved in new business design and ERP implementation the module will help address the various issues of implantation and ERP solution while at the same time allay their fears of switching over from the current system to a more business oriented solution.
2. In respect of international/global market to globalization and technological change students are witnessed a power shift from manufacturers to giant retailers and growing consumer price and value sensitivity.
3. The orientation of this module in advancement in the internet technologies, telecommunications and computer technologies has enabled the enterprise to reach to the global partners for creating value in their business.
4. The module is not only explains the concepts, strategies and issues involving in planning, implementation of strategies for decision making for global market.
5. The module is helps in respect of management under the ages of HR, International Business, Supply chain management, Customer Relation Management etc.
6. By this module to implement the project Management in Industries.

C. Subject Matter :
Unit-I
Introduction-ERP Solution and Its Utility, Usability, Security

Unit-II
Management structure of ERP: Team Structure: Centralized, Decentralized and Tree Structure
Domain Specialized

Unit -III
ERP Solution and Its utility: ERP Solution in Practice, User’s suggestions from Manual to ERP Transformation

Unit-IV
Implementation of ERP: Fragmentation of ERP, Types of User with their data accessibility, Proposal for more user friendly interface and abilities, Configuration ,Customization, Extension, Data flow diagram process for different segments

Unit-V
Purposes : Advantages & Purposes, Disadvantages, Benefits; Future Prospect of ERP : Obstacles of ERP, Testing and Maintenance of ERP

D. Teaching/ Learning/ Practice Pattern:
Teaching: 60%
Learning: 30%
Practice : 10%

E. Examination Pattern: Theoretical Examination

F. Reading lists
Books:
1. Shields, Mureell, E Business and ERP, John Wiley and Sons Inc.
2. Shields, Mureell, Rapid implementation and project planning, John Wiley and Sons Inc
3. Sandeep Desai and Abhishek Srivastava, ERP to E2RP, PHI
5. Bhushan Jairamdas Mamtani, SAP(R) ERP Financials and FICO Handbook, Jones and Bartlett Publishers, Inc; Pap/Cdr edition
Magazine
1. Quality Magazine
2. The End Of ERP - Forbes
3. Latest ERP Insight Magazine

Journals:
1. Industrial Management & Data Systems
2. Strategic Finance
3. MIS Quarterly Executive
4. Information Systems Management
5. Harvard Business Review
6. Enterprise Information System

Name of the module: Appropriate Technology
Module code: 912
Semester: 2nd
Credit Value: 4 [P=1, T=0, L=3]

A. Objectives:
The course is designed to meet with the objectives of:
1. To impart the information and knowledge on appropriate technology in the context of rural development/regional development
2. To developing an aptitude of exploring technology in practice and improvisation of the same
3. To strengthening skill for appropriate technology design, development and appropriate technology based business entrepreneurial venture
4. To augmenting engineering knowledge and skill in the context harnessing natural resources for rural development on the principle of sustainable development

B. Learning Outcomes:
Students successfully completing this module will be able to:
1. Explore, understand the contemporary Indigenous technological Knowledge base practices and identification of scope for its improvisation, design and development of appropriate technology;
2. Carry out research in the area of Appropriate Technology development and technology transfer;
3. Communicate about the role of Appropriate Technology and its application to/for - mobilizing masses/developing public understanding/ advocacy/ rural developmental planning/policy formulation;
4. Develop entrepreneurial venture based on Appropriate Technology
5. Technology developer/ Strategic Engineering planer for business houses/company working in the rural economic sector/ particularly in agriculture/forestry/water resource management/rural industry/construction etc
C. Subject Matter:

Unit-I

**Introduction**: Concepts, Background and meaning, Movement of Appropriate Technology, Practical Implications and Theoretical issues

Unit-II

**Application of Appropriate Technologies**: Alternate energy sources: Solar energy, Wind energy, Bio-fuels, Bio-gas, Tidal energy, Stem energy

Unit-III

**Disaster Mitigation**: Earthquake/ Cyclone Resistant housing design with appropriate Materials, Landslide, Flood Resistant Habitation, Fire resistant Houses

Unit-IV

**Water and Sanitation**: Rain Water Harvesting, Designing Dams and Pipelines, Appropriate Technique for construction and design of Sanitation, Sewerage, Water Recycling, Solid and Liquid Waste Management,

Unit-V


Unit-VI

**Documentation on Appropriate Technologies and Indegenous Knowledge system**: Regional Specific Technologies and Knowledge, Preparation of Human and Material Resources, Transfer and Exchange of Appropriate Technologies.

Unit-VII

**The Products of Appropriate Technologies**: Demonstration and sale of the Products, Development of Appropriate Technology Park, Role of Entrepreneurs towards Promotion of Such Products, Role of technology park in technology transfer, Role of business incubation centre in technology transfer, Role of trade fair in technology transfer

Unit-VIII

**R & D on Appropriate Technology and Indegenous Knowledge**: Stimulating R&D activities in small organization for rapid dissemination of Technological advances, Small Business
Innovation Research Programme, Small Business Technology Transfer Programme, Subsidies for upgradation of small venture Business Incubation

D. List of Practical:
    (As a part of practical)
    - Exposure trip
    - Field visit
    - Project report

E. Teaching/ Learning/ Practice Pattern:
   Teaching: 40%
   Learning: 10%
   Practice: 50%

F. Examination Pattern:
   1. Theoretical Examination

G. Reading List:

Books
9. Richard Heeks, Technology and Developing Countries: Practical Applications Theoretical Issues

Magazine:
   1. New Internationalist magazine on Appropriate technology.
2. *Appropriate Technology for the Developing World*
3. “Appropriate” Technology *Communities* Magazine

**Journals:**

1. *Indian Journal of Traditional Knowledge (IJTK),*
2. *International Journal of Emerging Technologies in Learning (iJET),*
3. *International Journal of Rural Management, Sage*
4. *International Journal of Rural Studies (IJRS),*
5. *International Journal of Sociotechnology and Knowledge Development (IJSKD),*
7. *International Journal of Technology,*
8. *Journal of Developing Societies, Sage*
9. *Journal of Rural Development, NIRD*
11. *Quarterly Journal of Economics/ Oxford journal*

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**Name of the Module: Resource Management**  
**Module Code: 913**  
**Semester: 2nd**  
**Credit Value: 4 [P=0, T=0, L=4]**

**A. Objectives:**  
The course is designed to meet with the objectives of:  
5. To understand the meaning of different types of Resources and especially, importance of Information Resources for an entrepreneur.
6. To learn how an entrepreneur does inventouring exercises using participatory techniques / tools in his/her interest at local level with stakeholders, especially for appropriate technology of a locality.
7. To learn the approaches/methods of classifying/typing the information resources available at local, regional (state/government) or global level and to organize & maintain those to use whenever required at ease.
8. To learn the role of ICT in Information Resource Management with emphasis on different tools, techniques and methods in spatial technology like GIS, Remote Sensing, GPS/GNSS.

B. Learning Outcomes:
Students successfully completing this module will be able to:

1. Understand and learn the importance of building an Information Resource Management (IRM) of his/her enterprise for better decision making and alternative approaches for saving time and money.
2. Learn how to do classify or do typing exercises for capturing, storing and managing information resources at different levels i.e. local, regional (state/government) or global level and apply information resources for his/her own enterprise

C. Subject Matter:
Unit I:

Unit II:
RESOURCE INVENTORY
The Preparation of Resource Inventory would be through Participation of the Stakeholders.

Unit III:
RESOURCE TYPING: Purpose of Resource Typing, Maintenance of Inventory – State/ Local Government level

Unit IV:
RESOURCE MAPING: Tools, techniques and Methodology, Application of Geographical Information System (GIS), Remote-sensing, Global positing System (GPS), and ICT for mapping of Natural Resources.

D. List of Practical: Case study, Field survey

E. Teaching/ Learning/ Practice Pattern:
   i. Teaching: %
   ii. Learning: %
   iii. Practice: %

F. Examination Pattern:
   i. Theoretical Examination

G. Reading List:
Books:
4. Stan Morain. GIS Solutions in Natural Resource Management

Magazines:

HRM Asia Magazine
Human Capital Magazine
Resource Management and Recovery
Resource Magazine

Journals:

1. Resource Conservation and Recycling Journal
2. Information Resources Management
3. Resource Management Materials

Name of the Module: Enterprise Opportunities/options ATEP 914

Module Code: ATEP 914
Semester: 2nd
Credit Value: 4 [P=1, T=0, L=3]

A. Objectives:
The course is designed to meet with the objectives of:
1. To produce more ‘job creators’ than ‘job seekers’
2. Encourage the spirit of entrepreneurship
3. Exposure to opportunities for creating enterprises in India
4. Holistic knowledge for creation of an enterprise

B. Learning Outcomes:
Students successfully completing this module will be able to:
1. Create own enterprise
2. Exploit opportunities available in the country today

C. Subject Matter:

Unit-I
Opportunities of Enterprise: Location and Types of Enterprise: Rural, Agro based Forest based, Community based, others –Urban. Small, Medium, Large, others

Unit-II
Capacity based Enterprise: Manufacturing, Trades & Services, Skill up-gradation initiative based on activities/capabilities, Opportunity Cost: Definition, Opportunity costs in Production: Explicit costs, Implicit costs, Opportunity cost of Capital, Cost- benefit analysis, Time value of money

Unit-III
Growth of business: New Business Idea, Advantages, Disadvantages, Selection Process, Knowledge(Technical & Domain) and experience, Goals & Aspirations
Buying a Business: Introduction, Challenges in buying a business: Advantages, Disadvantages
Process of Buying: Information Collection, Site visit, Assessment, additional information, Negotiation.

Unit-IV
Setting up a Business : Description of the Business, Writing a Business Plan, Uses of a Business Plan, Data collection for Business Plan, Kinds of Business Plan, Preparation of business Budget, Start-up funding sources

Unit- V
General Principles of Communication and Oral Communication: The Process of Communication,

D. List of Practical:
E. Teaching/ Learning/ Practice Pattern:
   Teaching: 40%
   Learning: 10%
   Practice: 50%

F. Examination Pattern:
   1. Theoretical Examination

G. Reading Lists:
Books:

**Magazine**
1. *Enterprise & Industry Magazine*
2. *Black Enterprise Magazine*

**Journals:**
1. *Strategic Management Journal*
2. *Journal of Business Venturing*
3. *International Small Business journal*