

**Syllabus and Curriculum
of**

B.Tech in Engineering

Common to all branches

(Combined 1st and 2nd semesters)



APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Syllabus

**Life Skills
Business Economics
Principles of Management**

2016

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

CET CAMPUS, THIRUVANANTHAPURAM – 695016

KERALA, INDIA

Phone +91 471 2598122, 2598422

Fax +91 471 2598522 Web: ktu.edu.in

Email: university@ktu.edu.in

| Course No. | Course Name | L-T-P-Credits | Year of Introduction |
|--|-------------|---------------|----------------------|
| HS210 | LIFE SKILLS | 2-0-2 | 2016 |
| Course Objectives <ul style="list-style-type: none"> To develop communication competence in prospective engineers. To enable them to convey thoughts and ideas with clarity and focus. To develop report writing skills. To equip them to face interview & Group Discussion. To inculcate critical thinking process. To prepare them on problem solving skills. To provide symbolic, verbal, and graphical interpretations of statements in a problem description. To understand team dynamics & effectiveness. To create an awareness on Engineering Ethics and Human Values. To instill Moral and Social Values, Loyalty and also to learn to appreciate the rights of others. To learn leadership qualities and practice them. | | | |
| Syllabus Communication Skill: Introduction to Communication, The Process of Communication, Barriers to Communication, Listening Skills, Writing Skills, Technical Writing, Letter Writing, Job Application, Report Writing, Non-verbal Communication and Body Language, Interview Skills, Group Discussion, Presentation Skills, Technology-based Communication. Critical Thinking & Problem Solving: Creativity, Lateral thinking, Critical thinking, Multiple Intelligence, Problem Solving, Six thinking hats Mind Mapping & Analytical Thinking. Teamwork: Groups, Teams, Group Vs Teams, Team formation process, Stages of Group, Group Dynamics, Managing Team Performance & Team Conflicts. Ethics, Moral & Professional Values: Human Values, Civic Rights, Engineering Ethics, Engineering as Social Experimentation, Environmental Ethics, Global Issues, Code of Ethics like ASME, ASCE, IEEE. Leadership Skills: Leadership, Levels of Leadership, Making of a leader, Types of leadership, Transactions Vs Transformational Leadership, VUCA Leaders, DART Leadership, Leadership Grid & leadership Formulation. | | | |
| Expected outcome <ul style="list-style-type: none"> Communicate effectively. Make effective presentations. Write different types of reports. Face interview & group discussion. Critically think on a particular problem. Solve problems. Work in Group & Teams Handle Engineering Ethics and Human Values. Become an effective leader. | | | |

References:

- Barun K. Mitra; (2011), “*Personality Development & Soft Skills*”, First Edition; Oxford Publishers.
- Kalyana; (2015) “*Soft Skill for Managers*”; First Edition; Wiley Publishing Ltd.
- Larry James (2016); “*The First Book of Life Skills*”; First Edition; Embassy Books.
- Shalini Verma (2014); “*Development of Life Skills and Professional Practice*”; First Edition; Sultan Chand (G/L) & Company
- John C. Maxwell (2014); “*The 5 Levels of Leadership*”, Centre Street, A division of Hachette Book Group Inc.

Course Plan

| Module | Contents | Hours L-T-P | | Sem. Exam Marks |
|-----------|--|----------------|---|-----------------------|
| | | T | P | |
| I | Need for Effective Communication, Levels of communication; Flow of communication; Use of language in communication; Communication networks; Significance of technical communication, Types of barriers; Miscommunication; Noise; Overcoming measures, | 2 | | |
| | Listening as an active skill; Types of Listeners; Listening for general content; Listening to fill up information; Intensive Listening; Listening for specific information; Developing effective listening skills; Barriers to effective listening skills. | | 2 | |
| | Technical Writing: Differences between technical and literary style, Elements of style; Common Errors, Letter Writing: Formal, informal and demi-official letters; business letters, Job Application: Cover letter, Differences between bio-data, CV and Resume, Report Writing: Basics of Report Writing; Structure of a report; Types of reports. | | 4 | |
| | Non-verbal Communication and Body Language: Forms of non-verbal communication; Interpreting body-language cues; Kinesics; Proxemics; Chronemics; Effective use of body language | 3 | | |
| II | Interview Skills: Types of Interviews; Ensuring success in job interviews; Appropriate use of non-verbal communication, Group Discussion: Differences between group discussion and debate; Ensuring success in group discussions, Presentation Skills: Oral presentation and public speaking skills; business presentations, Technology-based Communication: Netiquettes: effective e-mail messages; power-point presentation; enhancing editing skills using computer software. | | 4 | |
| | Need for Creativity in the 21 st century, Imagination, Intuition, Experience, Sources of Creativity, Lateral Thinking, Myths of creativity | 2 | | |

| | | | | |
|------------|---|---|---|--|
| | <p>Critical thinking Vs Creative thinking, Functions of Left Brain & Right brain, Convergent & Divergent Thinking, Critical reading & Multiple Intelligence.</p> <p>Steps in problem solving, Problem Solving Techniques, Problem Solving through Six Thinking Hats, Mind Mapping, Forced Connections.</p> <p>Problem Solving strategies, Analytical Thinking and quantitative reasoning expressed in written form, Numeric, symbolic, and graphic reasoning, Solving application problems.</p> | 2 | 2 | |
| III | <p>Introduction to Groups and Teams, Team Composition, Managing Team Performance, Importance of Group, Stages of Group, Group Cycle, Group thinking, getting acquainted, Clarifying expectations.</p> <p>Group Problem Solving, Achieving Group Consensus.</p> <p>Group Dynamics techniques, Group vs Team, Team Dynamics, Teams for enhancing productivity, Building & Managing Successful Virtual Teams. Managing Team Performance & Managing Conflict in Teams.</p> <p>Working Together in Teams, Team Decision-Making, Team Culture & Power, Team Leader Development.</p> | 3 | 2 | |
| IV | <p>Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic Virtue, Respect for Others, Living Peacefully.</p> <p>Caring, Sharing, Honesty, Courage, Valuing Time, Cooperation, Commitment, Empathy, Self-Confidence, Character,</p> <p>Spirituality, Senses of 'Engineering Ethics', variety of moral issues, Types of inquiry, moral dilemmas, moral autonomy, Kohlberg's theory, Gilligan's theory, Consensus and controversy, Models of Professional Roles, Theories about right action, Self-interest, customs and religion, application of ethical theories.</p> <p>Engineering as experimentation, engineers as responsible experimenters, Codes of ethics, Balanced outlook on.</p> <p>The challenger case study, Multinational corporations, Environmental ethics, computer ethics,</p> <p>Weapons development, engineers as managers, consulting</p> | 3 | 2 | |

| | | | | |
|--------------------------|--|---|---|--|
| | engineers, engineers as expert witnesses and advisors, moral leadership, sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers(India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers(IETE), India, etc. | 3 | | |
| V | Introduction, a framework for considering leadership, entrepreneurial and moral leadership, vision, people selection and development, cultural dimensions of leadership, style, followers, crises. | 4 | | |
| | Growing as a leader, turnaround leadership, gaining control, trust, managing diverse stakeholders, crisis management | | 2 | |
| | Implications of national culture and multicultural leadership Types of Leadership, Leadership Traits. | 2 | | |
| | Leadership Styles, VUCA Leadership, DART Leadership, Transactional vs Transformational Leaders, Leadership Grid, Effective Leaders, making of a Leader, Formulate Leadership | | 2 | |
| END SEMESTER EXAM | | | | |

EVALUATION SCHEME

Internal Evaluation

(Conducted by the College)

Total Marks: 100

Part – A

(To be started after completion of Module 1 and to be completed by 30th working day of the semester)

1. Group Discussion – Create groups of about 10 students each and engage them on a GD on a suitable topic for about 20 minutes. Parameters to be used for evaluation is as follows;

- | | | | |
|-------|------------------------|---|----------|
| (i) | Communication Skills | – | 10 marks |
| (ii) | Subject Clarity | – | 10 marks |
| (iii) | Group Dynamics | - | 10 marks |
| (iv) | Behaviors & Mannerisms | - | 10 marks |

(Marks: 40)

Part – B

(To be started from 31st working day and to be completed before 60th working day of the semester)

2. Presentation Skills – Identify a suitable topic and ask the students to prepare a presentation (preferably a power point presentation) for about 10 minutes. Parameters to be used for evaluation is as follows;

- | | | | |
|-------|---------------------------|---|----------|
| (i) | Communication Skills* | - | 10 marks |
| (ii) | Platform Skills** | - | 10 marks |
| (iii) | Subject Clarity/Knowledge | - | 10 marks |

(Marks: 30)

* Language fluency, auditability, voice modulation, rate of speech, listening, summarizes key learnings etc.

** Postures/Gestures, Smiles/Expressions, Movements, usage of floor area etc.

Part – C

(To be conducted before the termination of semester)

3. Sample Letter writing or report writing following the guidelines and procedures.
Parameters to be used for evaluation is as follows;

- | | | | |
|-------|----------------------------|---|----------|
| (i) | Usage of English & Grammar | - | 10 marks |
| (ii) | Following the format | - | 10 marks |
| (iii) | Content clarity | - | 10 marks |

(Marks: 30)

External Evaluation

(Conducted by the University)

Total Marks: 50

Time: 2 hrs.

Part – A

Short Answer questions

There will be one question from each area (five questions in total) will be asked for the examination. Each question should be written in about maximum of 400 words. Parameters to be used for evaluation are as follows;

- (i) Content Clarity/Subject Knowledge
- (ii) Presentation style
- (iii) Organization of content

(Marks: 5 x 6 = 30)

Part – B

Case Study

The students will be given a case study with questions at the end the students have to analyze the case and answer the question at the end. Parameters to be used for evaluation are as follows;

- (i) Analyze the case situation
- (ii) Key players/characters of the case
- (iii) Identification of the problem (both major & minor if exists)
- (iv) Bring out alternatives
- (v) Analyze each alternative against the problem
- (vi) Choose the best alternative
- (vii) Implement as solution
- (viii) Conclusion
- (ix) Answer the question at the end of the case

*(Marks: 1 x 20 =
20)*

| Course Number | Course Name | L-T-P | Credits | Year of introduction |
|---------------|--------------------|-------|---------|----------------------|
| HS200 | Business Economics | 3-0-0 | 3 | 2016 |

Course Objectives

- To familiarize the prospective engineers with elementary Principles of Economics and Managerial Economics;.
- To acquaint the students with tools and techniques that are useful in their profession in Managerial Decision Making which will enhance their employability;
- To gain understanding of some Macroeconomic concepts to improve their ability to understand the business climate;
- To prepare and understand balance sheet at an elementary level.

Syllabus

Nature of economics. Demand and Supply Analysis, demand curve, supply curve and equilibrium price determination. Production economics, economies of Scale, optimal quantity determination, Production and Cost functions, the law of Diminishing Marginal Productivity, Costs, Break-Even Analysis Chart Preparation and Cost-Volume-Profit Analysis. Market Structure and Price-Output Decisions under various competition situations and Collusion/Cartel formations in the real life situation. Monetary theory, functions of RBI and NI. Computation and some aspects of macro economics. Capital Budgeting decisions, forecasting techniques and elementary Balance Sheet..

Expected Outcome

A student who has undergone this course

- *would be able to make investment decisions based on capital budgeting methods in alignment with microeconomic and macroeconomic theories.*
- *would be able to analyse the profitability of the firm, economy of operation, determination of price under various market situations with good grasp on the effect of trade cycles in business.*
- *would gain knowledge on Monetary theory, measures by RBI in controlling interest rate and emerging concepts like Bit Coin.*
- *would gain knowledge of elementary accounting concepts used for preparing balance sheet and interpretation of balance sheet*

| Course Plan | | | |
|-----------------------------|---|-----------------------|-------------------------|
| Unit | Topics | Hours Allotted | Percentage Marks |
| I | Nature of Economics Definitions of Economics and their limitations, Economic Problems (2 Hrs.), Economic Systems, meaning of Business or Managerial Economics (2 Hrs.) and its role and relevance in managerial decision making in an industrial setting (2 Hrs). | 6 | 15% |
| II | Demand and Supply Analysis Demand Curve, Demand function (2 Hrs.), Elasticity of demand and its estimation (2 Hrs.), Supply curve, equilibrium price and price mechanism (2 Hrs). | 6 | 15% |
| FIRST INTERNAL EXAM | | | |
| III | Production Economics Economies of Scale and Diseconomies of Scale (1 Hr.), Production and Cost Functions. Factors of Production (2 Hrs.), Law of Diminishing marginal Productivity. Construction and analysis of Break Even Charts (3 Hrs.) | 6 | 15% |
| IV | Market Structure and Price-Output Decisions Price and output determination under Perfect Competition, Monopoly and Monopolistic Competition (3 Hrs.). Collusion and Cartel, Nash Equilibrium (3 Hrs.). | 6 | 15% |
| SECOND INTERNAL EXAM | | | |
| V | Money, National Income and Taxation Money, Emerging Bit Coin concept, Quantity Theory of Money, Interest Rate Management (2 Hrs), Open Market Operations by RBI, Selective Credit Controls, SLR, CRR (2 Hrs), Definition & Measurement of National Income, methods, sectors of economy (3 Hrs), inflation, deflation, trade cycles- Value-Added Tax (2 Hrs). | 9 | 20% |
| VI | Investment Decisions and Balance Sheet Analysis Capital Budgeting, Investment Analysis – NPV, IRR, Profitability Index, ARR, Payback Period (3 Hrs), Depreciation, Time value of money. Business Forecasting– Elementary techniques (2 Hrs). Balance sheet preparation principles and interpretation (4 Hrs) | 9 | 20% |
| END SEMESTER EXAM | | | |

Text Book

Yogesh, Maheswari, *Management Economics* , PHI learning, NewDelhi, 2012

References

1. Dornbusch, Fischer and Startz, Macroeconomics, McGraw Hill, 11th edition, 2010.
2. Khan M Y, Indian Financial System, Tata McGraw Hill, 7th edition, 2011.
3. Samuelson, Managerial Economics, 6th edition, Wiley
4. Snyder C and Nicholson W, Fundamentals of Microeconomics, Cengage Learning (India), 2010.
5. Truett, Managerial Economics: Analysis, Problems, Cases, 8th Edition, Wiley
Welch, Economics: Theory and Practice 7th Edition, Wiley

| Course Number | Course Name | L-T-P | Credits | Year of introduction |
|---------------|--------------------------|-------|---------|----------------------|
| HS300 | Principles of Management | 3-0-0 | 3 | 2016 |

Course Objectives

- To develop ability to critically analyse and evaluate a variety of management practices in the contemporary context;
- To understand and apply a variety of management and organisational theories in practice;
- To be able to mirror existing practices or to generate their own innovative management competencies, required for today's complex and global workplace;
- To be able to critically reflect on ethical theories and social responsibility ideologies to create sustainable organisations.

Syllabus

Definition, roles and functions of a manager, management and its science and art perspectives, management challenges and the concepts like, competitive advantage, entrepreneurship and innovation. Early contributors and their contributions to the field of management Corporate Social Responsibility. Planning, Organizing, Staffing and HRD functions, Leading and Controlling form the core content of this course. Decision making under certainty, uncertainty and risk, creative process and innovation involved in decision making..

Expected Outcome

A student who has undergone this course

- would be able to manage people and organisations
- would be able to critically analyse and evaluate management theories and practices
- would be able to plan and make decisions for organisations
- would be able to do staffing and related HRD functions

| Course Plan | | | |
|-------------|---|----------------|------------------|
| Unit | Topics | Hours Allotted | Percentage Marks |
| I | Introduction to Management: definitions, managerial roles and functions; Science or Art perspectives- External environment-global, innovative and entrepreneurial perspectives of Management (3 Hrs.)– Managing people and organizations in the context of New Era- Managing for competitive advantage - the Challenges of Management (3 Hrs.) | 6 | 15% |
| II | Early Contributions and Ethics in Management: Scientific Management- contributions of Taylor, Gilbreths, | 6 | 15% |

| | | | |
|-----------------------------|--|---|-----|
| | Human Relations approach-contributions of Mayo, McGregor's Theory, Ouchi's Theory Z (3 Hrs.) Systems Approach, the Contingency Approach, the McKinsey 7-S Framework Corporate Social responsibility- Managerial Ethics. (3 Hrs) | | |
| FIRST INTERNAL EXAM | | | |
| III | Planning: Nature and importance of planning, -types of plans (3 Hrs.)- Steps in planning, Levels of planning - The Planning Process. – MBO (3 Hrs.). | 6 | 15% |
| IV | Organising for decision making: Nature of organizing, organization levels and span of control in management Organisational design and structure –departmentation, line and staff concepts (3 Hrs.) Limitations of decision making- Evaluation and selecting from alternatives- programmed and non programmed decisions - decision under certainty, uncertainty and risk-creative process and innovation (3 Hrs.) | 6 | 15% |
| SECOND INTERNAL EXAM | | | |
| V | Staffing and related HRD Functions: definition, Empowerment, staff – delegation, decentralization and recentralisation of authority – Effective Organizing and culture-responsive organizations –Global and entrepreneurial organizing (3 Hrs.) Manager inventory chart-matching person with the job-system approach to selection (3 Hrs.) Job design-skills and personal characteristics needed in managers-selection process, techniques and instruments (3 Hrs.) | 9 | 20% |
| VI | Leading and Controlling: Leading Vs Managing – Trait approach and Contingency approaches to leadership - Dimensions of Leadership (3 Hrs.) - Leadership Behavior and styles – Transactional and Transformational Leadership (3 Hrs.) Basic control process- control as a feedback system – Feed Forward Control – Requirements for effective control – control techniques – Overall controls and preventive controls – Global controlling (3 Hrs.) | 9 | 20% |
| END SEMESTER EXAM | | | |

Text Book

Harold Koontz and Heinz Weihrich, Essentials of Management, McGraw Hill Education, 10th Edition.

References

1. Daft, New era Management, 11th Edition, Cengage
2. Griffin, Management Principles and Applications, 10th Edition, Cengage
3. Heinz Weihrich, Mark V Cannice and Harold Koontz, Management: a Global, Innovative and Entrepreneurial Perspective, McGraw Hill Education, 14th Edition
4. Peter F Drucker, *The Practice of Management*, McGraw Hill, New York
5. Robbins and Coulter, Management, 13th Edition, 2016, Pearson Education



**APJ ABDUL KALAM TECHNOLOGICAL
UNIVERSITY**

**Modified
Syllabus
for
I & II Semester
B. Tech. Degree**

2016

Estd.



2014

| Course No. | Course Name | L-T-P-Credits | Year of Introduction |
|------------|---|---------------|----------------------|
| BE103 | INTRODUCTION TO SUSTAINABLE ENGINEERING | 2-0-1-3 | 2016 |

Course Objectives

- To have an increased awareness among students on issues in areas of sustainability
- To understand the role of engineering and technology within sustainable development;
- To know the methods, tools, and incentives for sustainable product-service system development
- To establish a clear understanding of the role and impact of various aspects of engineering and engineering decisions on environmental, societal, and economic problems.

Syllabus

Sustainability- need and concept, challenges, Environment acts and protocols, Global, Regional and Local environmental issues, Natural resources and their pollution, Carbon credits, Zero waste concept ISO 14000, Life Cycle Analysis, Environmental Impact Assessment studies, Sustainable habitat, Green buildings, green materials, Energy, Conventional and renewable sources, Technology and sustainable development, Sustainable urbanization, Industrial Ecology.

Expected outcome

The student will be

- Able to understand the different types of environmental pollution problems and their sustainable solutions
- Able to work in the area of sustainability for research and education
- Having a broader perspective in thinking for sustainable practices by utilizing the engineering knowledge and principles gained from this course

Reference Books:

- Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
- Bradley, A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning
- Environment Impact Assessment Guidelines, Notification of Government of India, 2006
- Mackenthun, K.M., Basic Concepts in Environmental Management, Lewis Publication, London, 1998
- ECBC Code 2007, Bureau of Energy Efficiency, New Delhi Bureau of Energy Efficiency Publications-Rating System, TERI Publications - GRIHA Rating System
- Ni bin Chang, Systems Analysis for Sustainable Engineering: Theory and Applications, McGraw-Hill Professional.
- Twidell, J. W. and Weir, A. D., Renewable Energy Resources, English Language Book Society (ELBS).

- Purohit, S. S., Green Technology - An approach for sustainable environment, Agrobios publication

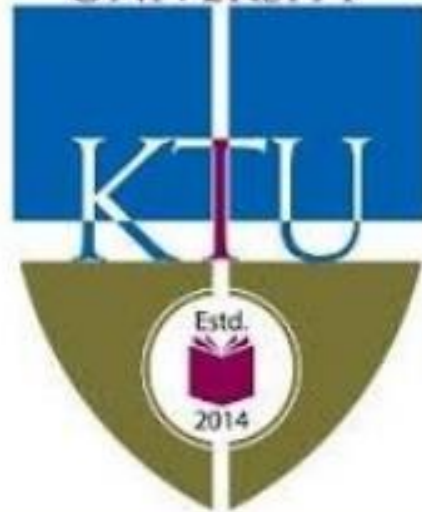
Course Plan

| Module | Contents | Hours | Sem. Exam Marks |
|----------------------------|---|-------|-----------------|
| I | Sustainability - Introduction, Need and concept of sustainability, Social-environmental and economic sustainability concepts. Sustainable development, Nexus between Technology and Sustainable development, Challenges for Sustainable Development. Multilateral environmental agreements and Protocols - Clean Development Mechanism (CDM), Environmental legislations in India - Water Act, Air Act. | L4 | 15% |
| | Students may be assigned to do at least one project eg: a) Identifying/assessment of sustainability in your neighbourhood in education, housing, water resources, energy resources, food supplies, land use, environmental protection etc. b) Identify the threats for sustainability in any selected area and explore solutions for the same | P1 | |
| II | Air Pollution, Effects of Air Pollution; Water pollution- sources, Sustainable wastewater treatment, Solid waste - sources, impacts of solid waste, Zero waste concept, 3 R concept. Global environmental issues- Resource degradation, Climate change, Global warming, Ozone layer depletion, Regional and Local Environmental Issues. Carbon credits and carbon trading, carbon foot print. | L6 | 15% |
| | Students may be assigned to do at least one project for eg: a) Assessing the pollution status of a small area b) Programmes for enhancing public environmental awareness c) Observe a pond nearby and think about the different measures that can be adopted for its conservation | P3 | |
| FIRST INTERNAL EXAM | | | |
| III | Environmental management standards, ISO 14000 series, Life Cycle Analysis (LCA) - Scope and Goal, Bio-mimicking, Environment Impact Assessment (EIA) - Procedures of EIA in India. | L4 | 15% |
| | Students may be assigned to do at least one project eg: a) Conducting LCA of products (eg. Aluminium cans, PVC bottles, cars etc. or activities (Comparison of land filling and open burning) b) Conducting an EIA study of a small project (eg. Construction of a building) | P2 | |

| | | | |
|----------------------|--|----|-----|
| IV | Basic concepts of sustainable habitat, Green buildings, green materials for building construction, material selection for sustainable design, green building certification, Methods for increasing energy efficiency of buildings. Sustainable cities, Sustainable transport. | L5 | 15% |
| | Students may be assigned to do at least one project eg: a) Consider the design aspects of a sustainable building for your campus b) Explore the different methods that can be adopted for maintaining a sustainable transport system in your city. | P2 | |
| SECOND INTERNAL EXAM | | | |
| V | Energy sources: Basic concepts-Conventional and non-conventional, solar energy, Fuel cells, Wind energy, Small hydro plants, bio-fuels, Energy derived from oceans, Geothermal energy. | L5 | 20% |
| | Students may be assigned to do at least one project eg: a) Find out the energy savings that can be achieved by the installation of a solar water heater b) Conduct a feasibility study for the installation of wind mills in Kerala | P2 | |
| VI | Green Engineering, Sustainable Urbanisation, industrialisation and poverty reduction; Social and technological change, Industrial Processes: Material selection, Pollution Prevention, Industrial Ecology, Industrial symbiosis. | L5 | 20% |
| | Students may be assigned to do a group project eg: a) Collect details for instances of climate change in your locality b) Find out the carbon credits you can gain by using a sustainable transport system (travelling in a cycle or car pooling from college to home) c) Have a debate on the topics like: Industrial Ecology is a Boon or Bane for Industries?/Are we scaring the people on Climate Change unnecessarily?/Technology enables Development sustainable or the root cause of unsustainability? | P3 | |

END OF SEMESTER EXAM

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TECHNOLOGICAL
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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

**Curriculum for B.Tech Degree
Semesters I and II 2019**

SEMESTER I

| SLOT | CATE GORY | COURSE CODE | COURSES | L-T-P | HOURS | CREDI T |
|--------------|--------------|----------------|---|-------|----------------|------------|
| A | BSC | MAT 101 | LINEAR ALGEBRA AND CALCULUS | 3-1-0 | 4 | 4 |
| B 1/2 | BSC | PHT 100 | ENGINEERING PHYSICS A | 3-1-0 | 4 | 4 |
| | | PHT 110 | ENGINEERING PHYSICS B | 3-1-0 | 4 | 4 |
| | BSC | CYT100 | ENGINEERING CHEMISTRY | 3-1-0 | 4 | 4 |
| C 1/2 | ESC | EST 100 | ENGINEERING MECHANICS | 2-1-0 | 3 | 3 |
| | ESC | EST 110 | ENGINEERING GRAPHICS | 2-0-2 | 4 | 3 |
| D 1/2 | ESC | EST 120 | BASICS OF CIVIL & MECHANICAL ENGINEERING | 4-0-0 | 4 | 4 |
| | ESC | EST 130 | BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING | 4-0-0 | 4 | 4 |
| E | MNC | HUN 101 | LIFE SKILLS | 2-0-2 | 4 | -- |
| S 1/2 | BSC | PHL 120 | ENGINEERING PHYSICS LAB | 0-0-2 | 2 | 1 |
| | BSC | CYL 120 | ENGINEERING CHEMISTRY LAB | 0-0-2 | 2 | 1 |
| T 1/2 | ESC | ESL 120 | CIVIL & MECHANICAL WORKSHOP | 0-0-2 | 2 | 1 |
| | ESC | ESL 130 | ELECTRICAL & ELECTRONICS WORKSHOP | 0-0-2 | 2 | 1 |
| TOTAL | | | | | 23/24 * | 17 |

SEMESTER II

| SLOT | COURSE NO. | COURSES | L-T-P | HOURS | CREDIT |
|----------|------------|---|-------|-------|--------|
| A | MAT 102 | VECTOR CALCULUS , DIFFERENTIAL EQUATIONS AND TRANSFORMS | 3-1-0 | 4 | 4 |
| B 1/2 | PHT 100 | ENGINEERING PHYSICS A | 3-1-0 | 4 | 4 |
| | CYT 100 | ENGINEERING CHEMISTRY | 3-1-0 | 4 | 4 |
| C 1/2 | EST 100 | ENGINEERING MECHANICS | 2-1-0 | 3 | 3 |
| | EST 110 | ENGINEERING GRAPHICS | 2-0-2 | 4 | 3 |
| D 1/2 | EST 120 | BASICS OF CIVIL & MECHANICAL ENGINEERING | 4-0-0 | 4 | 4 |
| | EST 130 | BASICS OF ELECTRICAL & ELECTRONICS ENGINEERING | 4-0-0 | 4 | 4 |
| E | HUN 102 | PROFESSIONAL COMMUNICATION | 2-0-2 | 4 | -- |
| F | EST 102 | PROGRAMMING IN C | 2-1-2 | 5 | 4 |
| S 1/2 | PHL 120 | ENGINEERING PHYSICS LAB | 0-0-2 | 2 | 1 |
| | CYL 120 | ENGINEERING CHEMISTRY LAB | 0-0-2 | 2 | 1 |
| T 1/2 | ESL 120 | CIVIL & MECHANICAL WORKSHOP | 0-0-2 | 2 | 1 |
| | ESL 130 | ELECTRICAL & ELECTRONICS WORKSHOP | 0-0-2 | 2 | 1 |
| TOTAL | | | | 28/29 | 21 |

SEMESTER III

| SLOT | COURSE NO. | COURSES | L-T-P | HOURS | CREDIT |
|--------------|------------|---|-------|------------|--------------|
| A | MAT 203 | DISCRETE MATHEMATICAL STRUCTURES | 3-1-0 | 4 | 4 |
| B | CST 201 | DATA STRUCTURES | 3-1-0 | 4 | 4 |
| C | CST 203 | LOGIC SYSTEM DESIGN | 3-1-0 | 4 | 4 |
| D | CST 205 | OBJECT ORIENTED PROGRAMMING USING JAVA | 3-1-0 | 4 | 4 |
| E (1/2) | EST 200 | DESIGN & ENGINEERING | 2-0-0 | 2 | 2 |
| | HUT 200 | PROFESSIONAL ETHICS | 2-0-0 | 2 | 2 |
| F | MCN 201 | SUSTAINABLE ENGINEERING | 2-0-0 | 2 | -- |
| S | CSL 201 | DATA STRUCTURES LAB | 0-0-3 | 3 | 2 |
| T | CSL 203 | OBJECT ORIENTED PROGRAMMING LAB (IN JAVA) | 0-0-3 | 3 | 2 |
| R/M | VAC | Remedial/Minor course | 3-1-0 | 4 | 4 |
| TOTAL | | | | 26* | 22/26 |

SEMESTER IV

| SLOT | COURSE NO. | COURSES | L-T-P | HOURS | CREDIT |
|------------|------------|--|-------|-------|--------|
| A | MAT 206 | GRAPH THEORY | 3-1-0 | 4 | 4 |
| B | CST 202 | COMPUTER ORGANIZATION AND ARCHITECTURE | 3-1-0 | 4 | 4 |
| C | CST 204 | DATABASE MANAGEMENT SYSTEMS | 3-1-0 | 4 | 4 |
| D | CST 206 | OPERATING SYSTEMS | 3-1-0 | 4 | 4 |
| E (1/2) | EST 200 | DESIGN & ENGINEERING | 2-0-0 | 2 | 2 |
| | HUT 200 | PROFESSIONAL ETHICS | 2-0-0 | 2 | 2 |
| F | MCN 202 | CONSTITUTION OF INDIA | 2-0-0 | 2 | -- |
| S | CSL 202 | DIGITAL LAB | 0-0-3 | 3 | 2 |
| T | CSL204 | OPERATING SYSTEMS LAB | 0-0-3 | 3 | 2 |
| R/M/ H | VAC | Remedial/Minor/Honors course | 3-1-0 | 4 | 4 |
| TOTAL | | | | 26* | 22/26 |

SEMESTER V

| SLOT | COURSE NO. | COURSES | L-T-P | HOURS | CREDIT |
|--------------|------------|---|-------|------------|--------------|
| A | CST 301 | FORMAL LANGUAGES AND AUTOMATA THEORY | 3-1-0 | 4 | 4 |
| B | CST 303 | COMPUTER NETWORKS | 3-1-0 | 4 | 4 |
| C | CST 305 | SYSTEM SOFTWARE | 3-1-0 | 4 | 4 |
| D | CST 307 | MICROPROCESSORS AND MICROCONTROLLERS | 3-1-0 | 4 | 4 |
| E | CST 309 | MANAGEMENT OF SOFTWARE SYSTEMS | 3-0-0 | 3 | 3 |
| F | MCN 301 | DISASTER MANAGEMENT | 2-0-0 | 2 | -- |
| S | CSL 331 | SYSTEM SOFTWARE AND MICROPROCESSORS LAB | 0-0-4 | 4 | 2 |
| T | CSL 333 | DATABASE MANAGEMENT SYSTEMS LAB | 0-0-4 | 4 | 2 |
| R/M/H | VAC | Remedial/Minor/Honors course* | 2-0-0 | 4 | 4 |
| TOTAL | | | | 29* | 23/27 |

| | | | | | | |
|--------------------|-----------------------------------|-----------------|----------|----------|----------|---------------|
| HUN 102 | PROFESSIONAL COMMUNICATION | CATEGORY | L | T | P | CREDIT |
| | | MNC | 2 | 0 | 2 | -- |

Preamble: Clear, precise, and effective communication has become a *sine qua non* in today's information-driven world given its interdependencies and seamless connectivity. Any aspiring professional cannot but master the key elements of such communication. The objective of this course is to equip students with the necessary skills to listen, read, write, and speak so as to comprehend and successfully convey any idea, technical or otherwise, as well as give them the

Module 1

Use of language in communication: Significance of technical communication Vocabulary Development: technical vocabulary, vocabulary used in formal letters/emails and reports, sequence words, misspelled words, compound words, finding suitable synonyms, paraphrasing, verbal analogies. Language Development: subject-verb agreement, personal passive voice, numerical adjectives, embedded sentences, clauses, conditionals, reported speech, active/passive voice.

Technology-based communication: Effective email messages, slide presentations, editing skills using software. Modern day research and study skills: search engines, repositories, forums such as Git Hub, Stack Exchange, OSS communities (MOOC, SWAYAM, NPTEL), and Quora; Plagiarism

Module 2

Reading, Comprehension, and Summarizing: Reading styles, speed, valuation, critical reading, reading and comprehending shorter and longer technical articles from journals, newspapers, identifying the various transitions in a text, SQ3R method, PQRS method, speed reading. Comprehension: techniques, understanding textbooks, marking and underlining, Note-taking: recognizing non-verbal cues.

Module 3

Oral Presentation: Voice modulation, tone, describing a process, Presentation Skills: Oral presentation and public speaking skills, business presentations, Preparation: organizing the material, self-Introduction, introducing the topic, answering questions, individual presentation practice, presenting visuals effectively.

Debate and Group Discussions: introduction to Group Discussion (GD), differences between GD and debate; participating GD, understanding GD, brainstorming the topic, questioning and clarifying, GD strategies, activities to improve GD skills

Module 4

Listening and Interview Skills Listening: Active and Passive listening, listening: for general content, to fill up information, intensive listening, for specific information, to answer, and to understand. Developing effective listening skills, barriers to effective listening, listening to longer technical talks, listening to classroom lectures, talks on engineering /technology, listening to documentaries and making notes, TED talks.

Interview Skills: types of interviews, successful interviews, interview etiquette, dress code, body language, telephone/online (skype) interviews, one-to-one interview & panel interview, FAQs related to job interviews

Module 5

Formal writing: Technical Writing: differences between technical and literary style. Letter Writing (formal, informal and semi formal), Job applications, Minute preparation, CV preparation (differences between Bio-Data, CV and Resume), and Reports. Elements of style, Common Errors in Writing: describing a process, use of sequence words, Statements of Purpose, Instructions, Checklists.

Analytical and issue-based Essays and Report Writing: basics of report writing; Referencing Style (IEEE Format), structure of a report; types of reports, references, bibliography.

Lab Activities

Written: Letter writing, CV writing, Attending a meeting and Minute Preparation, Vocabulary Building

Spoken: Phonetics, MMFS (Multimedia Feedback System), Mirroring, Elevator Pitch, telephone etiquette, qualities of a good presentation with emphasis on body language and use of visual aids.

Listening: Exercises based on audio materials like radio and podcasts. Listening to Song. practice and exercises.

Reading: Speed Reading, Reading with the help of Audio Visual Aids, Reading Comprehension Skills

Mock interview and Debate/Group Discussion: concepts, types, Do's and don'ts- intensive practice

Reference Books

1. English for Engineers and Technologists (Combined edition, Vol. 1 and 2), Orient Blackswan 2010.
2. Meenakshi Raman and Sangeetha Sharma, "Technical Communication: Principles and Practice", 2nd Edition, Oxford University Press, 2011
3. Stephen E. Lucas, "The Art of Public Speaking", 10th Edition; McGraw Hill Education, 2012.
4. Ashraf Rizvi, "Effective Technical Communication", 2nd Edition, McGraw Hill Education, 2017.
5. William Strunk Jr. & E.B. White, "The Elements of Style", 4th Edition, Pearson, 1999.
6. David F. Beer and David McMurrey, Guide to writing as an Engineer, John Wiley. New York, 2004.
7. Goodheart-Willcox, "Professional Communication", First Edition, 2017.
8. Training in Interpersonal Skills: Tips for Managing People at Work, Pearson Education, India, 6 edition, 2015.
9. The Ace of Soft Skills: Attitude, Communication and Etiquette for Success, Pearson Education; 1 edition, 2013.
10. Anand Ganguly, "Success in Interview", RPH, 5th Edition, 2016.
11. Raman Sharma, "Technical Communications", Oxford Publication, London, 2004.

| HUN 101 | LIFE SKILLS | CATEGORY | L | T | P | CREDIT | YEAR OF INTRODUCTION |
|------------|-------------|----------|---|---|---|--------|-------------------------|
| | | MNC | 2 | 0 | 2 | --- | 2019 |

Preamble: Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underly personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

Syllabus

Module 1

Overview of Life Skills: Meaning and significance of life skills, Life skills identified by WHO: Self-awareness, Empathy, Critical thinking, Creative thinking, Decision making, problem solving, Effective communication, interpersonal relationship, coping with stress, coping with emotion.

Life skills for professionals: positive thinking, right attitude, attention to detail, having the big picture, learning skills, research skills, perseverance, setting goals and achieving them, helping others, leadership, motivation, self-motivation, and motivating others, personality development, IQ, EQ, and SQ

Module 2

Self-awareness: definition, need for self-awareness; Coping With Stress and Emotions, Human Values, tools and techniques of SA: questionnaires, journaling, reflective questions, meditation, mindfulness, psychometric tests, feedback.

Stress Management: Stress, reasons and effects, identifying stress, stress diaries, the four A's of stress management, techniques, Approaches: action-oriented, emotion-oriented, acceptance-oriented, resilience, Gratitude Training,

Coping with emotions: Identifying and managing emotions, harmful ways of dealing with emotions, PATH method and relaxation techniques.

Morals, Values and Ethics: Integrity, Civic Virtue, Respect for Others, Living Peacefully. Caring, Sharing, Honesty, Courage, Valuing Time, Time management, Co operation, Commitment, Empathy, Self-Confidence, Character, Spirituality, Avoiding Procrastination, Sense of Engineering Ethics.

Module 3

21st century skills: Creativity, Critical Thinking, Collaboration, Problem Solving, Decision Making, Need for Creativity in the 21st century, Imagination, Intuition, Experience, Sources of Creativity, Lateral Thinking, Myths of creativity, Critical thinking Vs Creative thinking, Functions of Left Brain & Right brain, Convergent & Divergent Thinking, Critical reading & Multiple Intelligence.

Steps in problem solving: Problem Solving Techniques, Six Thinking Hats, Mind Mapping, Forced Connections. Analytical Thinking, Numeric, symbolic, and graphic reasoning. Scientific temperament and Logical thinking.

Module 4

Group and Team Dynamics: Introduction to Groups: Composition, formation, Cycle, thinking, Clarifying expectations, Problem Solving, Consensus, Dynamics techniques, Group vs Team, Team Dynamics, Virtual Teams. Managing team performance and managing conflicts, Intrapreneurship.

Module 5

Leadership: Leadership framework, entrepreneurial and moral leadership, vision, cultural dimensions. Growing as a leader, turnaround leadership, managing diverse stakeholders, crisis management. Types of Leadership, Traits, Styles, VUCA Leadership, Levels of Leadership, Transactional vs Transformational Leaders, Leadership Grid, Effective Leaders.

Lab Activities

Verbal

Effective communication and Presentation skills.

Different kinds of communication; Flow of communication; Communication networks, Types of barriers; Miscommunication

Introduction to presentations and group discussions.

Learning styles: visual, aural, verbal, kinaesthetic, logical, social, solitary; Previewing, KWL table, active listening, REAP method

Note-taking skills: outlining, non-linear note-taking methods, Cornell notes, three column note taking.

Memory techniques: mnemonics, association, flashcards, keywords, outlines, spider diagrams and mind maps, spaced repetition.

Time management: auditing, identifying time wasters, managing distractions, calendars and checklists; Prioritizing - Goal setting, SMART goals; Productivity tools and apps, Pomodoro technique.

Non Verbal:

Non-verbal Communication and Body Language: Forms of non-verbal communication; Interpreting body-language cues; Kinesics; Proxemics; Chronemics; Effective use of body language, Communication in a multi cultural environment.

| Code. | Course Name | L | T | P | Hrs | Credit |
|---------|---------------------|---|---|---|-----|--------|
| HUT 200 | Professional Ethics | 2 | 0 | 0 | 2 | 2 |

Preamble: To enable students to create awareness on ethics and human values.

Mark distribution

| Total Marks | CIE | ESE | ESE Duration |
|-------------|-----|-----|--------------|
| 150 | 50 | 100 | 3 hours |

Syllabus

Module 1 – Human Values.

Morals, values and Ethics – Integrity- Academic integrity-Work Ethics- Service Learning- Civic Virtue- Respect for others- Living peacefully- Caring and Sharing- Honestly- courage-Cooperation commitment- Empathy-Self Confidence -Social Expectations.

Module 2 - Engineering Ethics & Professionalism.

Senses of Engineering Ethics - Variety of moral issues- Types of inquiry- Moral dilemmas –Moral Autonomy – Kohlberg's theory- Gilligan's theory- Consensus and Controversy-Profession and Professionalism- Models of professional roles-Theories about right action –Self interest-Customs and Religion- Uses of Ethical Theories.

Module 3- Engineering as social Experimentation.

Engineering as Experimentation – Engineers as responsible Experimenters- Codes of Ethics- Plagiarism- A balanced outlook on law - Challenges case study- Bhopal gas tragedy.

Module 4- Responsibilities and Rights.

Collegiality and loyalty – Managing conflict- Respect for authority- Collective bargaining- Confidentiality- Role of confidentiality in moral integrity-Conflicts of interest- Occupational crime- Professional rights- Employee right- IPR Discrimination.

Module 5- Global Ethical Issues.

Multinational Corporations- Environmental Ethics- Business Ethics- Computer Ethics -Role in Technological Development-Engineers as Managers- Consulting Engineers- Engineers as Expert witnesses and advisors-Moral leadership.

Text Book

1. M Govindarajan, S Natarajan and V S Senthil Kumar, Engineering Ethics, PHI Learning Private Ltd, New Delhi, 2012.
2. R S Naagarazan, A text book on professional ethics and human values, New age international (P) limited, New Delhi, 2006.

