**ANNAMACHARYA INSTITUTE OF TECHNOLOGY AND SCIENCES, TIRUPATI
(AUTONOMOUS)**

Year: III   Semester: VI   Branch of Study: EEE

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC0216	ELECTRICAL MEASUREMENTS AND INSTRUMENTATION	3	0	0	3

Course outcomes:
1. Understand different types of measuring instruments, their construction, operation and characteristics.
2. Identify the instruments suitable for typical measurements.
3. Apply the knowledge about transducers and instrument transformers to use them effectively.

UNIT- I INTRODUCTION TO MEASURING INSTRUMENTS:
Classification – deflecting, control and damping torques – Ammeters and Voltmeters – PMMC, moving iron type instruments – expression for the deflecting torque and control torque – Errors and compensations, extension of range using shunts and series resistance. Electrostatic Voltmeters-electrometer type and attracted disc type – extension of range of E.S. Voltmeters.

UNIT– II POTENTIOMETERS & INSTRUMENT TRANSFORMERS:
Principle and operation of D.C. Crompton's potentiometer – standardization – Measurement of unknown resistance, current, voltage. A.C. Potentiometers: polar and coordinate type's standardization – applications. CT and PT – Ratio and phase angle errors

UNIT –III MEASUREMENT OF POWER & ENERGY:
Single phase dynamometer wattmeter, LPF and UPF, Double element and three element dynamometer wattmeters, expression for deflecting and control torques – Measurement of active and reactive powers in balanced and unbalanced systems. Single phase induction type energy meter – driving and braking torques – errors and compensations – testing by phantom loading using R.S.S. meter. Three phase energy meter – tri-vector meter, maximum demand meters.

UNIT – IV DC & AC BRIDGES:
Method of measuring low, medium and high resistance – sensitivity of Wheat-stone's bridge – Carey Foster's bridge, Kelvin's double bridge for measuring low resistance, measurement of high resistance – loss of charge method.
Measurement of inductance- Maxwell's bridge, Hay's bridge, Anderson's bridge - Owen's bridge.
Measurement of capacitance and loss angle –Desaunty's Bridge - Wien's bridge – Schering Bridge.

UNIT-V TRANSDUCERS:
Definition of transducers, Classification of transducers, Principle operation of LVDT and capacitor transducers; LVDT Applications, Strain gauge and its principle of operation, gauge factor, Thermistors, Thermocouples, Piezo electric transducers, photovoltaic, photo conductive cells, and photo diodes.
Measurement of Non-Electrical Quantities: Measurement of strain, Displacement, Velocity, Angular Velocity, Acceleration, Force, Torque, Temperature, Pressure, Vacuum, Flow and Liquid level.

TEXT BOOKS:

1. "G. K. Banerjee", "Electrical and Electronic Measurements", PHI Learning Pvt. Ltd., 2nd Edition, 2016
2. "S. C. Bhargava", "Electrical Measuring Instruments and Measurements", BS Publications, 2012.

REFERENCE BOOKS:

1. "A. K. Sawhney", "Electrical & Electronic Measurement & Instruments", Dhanpat Rai & Co. Publications, 2005.
2. "R. K. Rajput", "Electrical & Electronic Measurement & Instrumentation", S. Chand and Company Ltd., 2007.
3. "Buckingham and Price", "Electrical Measurements", Prentice – Hall, 1988.
4. "Reissland, M.U", "Electrical Measurements: Fundamentals, Concepts, Applications", New Age International (P) Limited Publishers, 1st Edition 2010.
5. "E.W. Golding and F. C. Widdis", "Electrical Measurements and measuring Instruments", fifth Edition, Wheeler Publishing, 2011.

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering knowledge	1.3	1.3.1
CO2	PO1: Engineering knowledge	1.3	1.3.1
CO3	PO2: Problem analysis	2.4	2.4.1

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Year: III	Semester: VI			Branch of Study: EEE	
COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**CREDITS**
20APC0217	**POWER SYSTEM ANALYSIS**	**3**	**0**	**0**	**3**

COURSE OUTCOMES:
The student should be able to do the following:
1. Remember and understand the concepts of per unit values, Y_{Bus} and Z_{bus} formation.
2. Apply the concepts of good algorithm for the given power system network and obtain the converged load flow solution.
3. Analyse the symmetrical faults and unsymmetrical faults and carry out the fault calculations.
4. Design and select efficient Circuit Breakers to improve system stability.

UNIT-I P.U. system and Y_{bus} formation
Per-Unit representation of Power system elements - Per-Unit equivalent reactance network of a three phase Power System - Graph Theory: Definitions, Bus Incidence Matrix, Y_{Bus} formation by Direct and Singular Transformation Methods (Numerical Problems).

UNIT-II Formation of Z_{bus}
Formation of Z_{Bus} - Partial network, Algorithm for the Modification of Z_{Bus} Matrix for addition element for the following cases: Addition of element from a new bus to reference, Addition of element from a new bus to an old bus, Addition of element between an old bus to reference and Addition of element between two old busses - Modification of Z_{Bus} for the changes in network (Numerical Problems)

UNIT –III Power flow Analysis
Static load flow equations – Load flow solutions using Gauss Seidel Method: Algorithm and Flowchart - Acceleration Factor, Load flow Solution for Simple Power Systems (Max. 3-Buses) - Newton Raphson Method in Polar Co-Ordinates Form: Load Flow Solution- Jacobian Elements, algorithm and flowchart - Decoupled and Fast Decoupled Methods – Comparison of Different Methods.

UNIT – IV Short Circuit Analysis
Symmetrical fault Analysis: Short Circuit Current and MVA Calculations, Fault levels, Application of Series Reactors. Symmetrical Component Theory: Positive, Negative and Zero sequence components: Positive, Negative and Zero sequence Networks. Unsymmetrical Fault Analysis: LG, LL, LLG and LLLG faults with and without fault impedance, Numerical Problems.

UNIT –V Stability Analysis
Elementary concepts of Steady State, Dynamic and Transient Stabilities. Derivation of Swing Equation, Power Angle Curve and Determination of Steady State Stability. Determination of Transient Stability by Equal Area Criterion, Application of Equal Area Criterion, Critical Clearing Angle Calculation. Numerical methods for solution of swing equation - Methods to improve Stability - Application of Auto Reclosing and Fast Operating Circuit Breakers.

TEXT BOOKS:

1. Hadi Saadat, "Power System Analysis", McGraw Hill, 1998.
2. I.J.Nagrath & D.P.Kothari, "Modern Power system Analysis", 4th Edition, Tata McGraw-Hill Publishing Company, 2011.

REFERENCE BOOKS:

1. Grainger and Stevenson, "Power System Analysis", McGraw Hill, 1994.
2. G.W.Stagg and A.H.El "Computer Methods in Power System Analysis", Abiad, Mc Graw-Hill, 2006.
3. B.R.Gupta, "Power System Analysis and Design", S. Chand & Company, 2005.

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1
CO2	PO1: Engineering knowledge	1.4	1.4.1
	PO2: Problem analysis	2.3	2.3.1
			2.3.2
CO3	PO1: Engineering knowledge	1.3	1.3.1
	PO4: Conduct investigations of complex problems	4.3	4.3.1
CO4	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1

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Year: III	Semester: VI		Branch of Study: EEE			

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC0218	SWITCHGEAR AND PROTECTION	3	0	0	3

COURSE OUTCOMES:

At the end of the course the student should be able to:
1. Acquire knowledge on various types of fuses, breakers and relays used for power system protection.
2. Design protection system for generators and transformers.
3. Identify various types of the relays in protecting feeders, lines and bus bars.
4. Demonstrate the protection of a power system from over voltages.

UNIT – I SWITCHGEAR FOR PROTECTION
Fuses: Definitions, characteristics, types, HRC fuses.
Circuit Breakers: Elementary Principles of Arc Interruption, Restriking Voltage and Recovery Voltage - Restriking Phenomenon, Average and Maximum RRRV, Current Chopping and Resistance Switching - CB Ratings and Specifications – Auto Reclosures - Types of Circuit Breakers: Air blast, Air break, Oil, SF6, Vacuum circuit breakers, Minimum Oil Circuit Breakers and Earth leakage circuit breakers - Difference between circuit breakers and isolators– making and breaking capacity.

UNIT – II RELAYS
Electromagnetic Relays - Basic Requirements of Relays – Primary and Backup Protection - Construction Details of – Attracted Armature, Balanced Beam, Inductor Type and Differential Relays – Universal Torque Equation – Characteristics of Over Current, Direction and Distance Relays. Static Relays – Advantages and Disadvantages – Definite Time, Inverse and IDMT.
Static Relays – Comparators – Amplitude and Phase Comparators. Microprocessor Based Relays – Advantages and Disadvantages – Block Diagram for Over Current (Definite, Inverse and IDMT) and Distance Relays.

UNIT – III PROTECTION OF GENERATORS & TRANSFORMERS
Principles and need for protective schemes – Equipment earthing and neutral grounding - Protection of Generators against Stator Faults, Rotor Faults and Abnormal Conditions. Restricted Earth Fault and Inter-Turn Fault Protection – calculation of percentage winding
unprotected. Protection of Transformers: Percentage Differential Protection, Numerical Problems on Design of CT Ratio, Buchholtz Relay Protection, Numerical Problems.

UNIT – IV PROTECTION OF FEEDERS & LINES
Protection of Feeder (Radial & Ring Main) Using Over Current Relays. Protection of Transmission Line – 3 Zone Protection Using Distance Relays. Carrier Current Protection.
Protection of Bus Bars.

UNIT – V OVER VOLTAGES IN POWER SYSTEMS
Generation of Over Voltages in Power Systems - Protection against Lightning over Voltages - Valve Type and Zinc-Oxide Lighting Arresters - Insulation Coordination – Surge arresters – Special earthing for lightning arresters.

TEXT BOOKS:
1. Badri Ram, D.N Viswakarma, "Power System Protection and Switchgear", TMH Publications, 2011.
2. Sunil S Rao, "Switchgear and Protection", Khanna Publishers, 1992.

REFERENCE BOOKS:
1. C.L.Wadhwa, "Electrical Power Systems", New Age international (P) Limited, Publishers, 2012.
2. Y.G. Paithankar , "Transmission network Protection", Taylor and Francis,2009.
3. Bhuvanesh Oza, "Power system protection and switch gear", TMH, 2010.

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1
CO2	PO1: Engineering knowledge	1.4	1.4.1
CO3	PO1: Engineering knowledge	1.3	1.3.1
CO4	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1

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B. Tech III Year   **VI Semester**   **EEE**

Course Code	Course Title	L	T	P	Credits
20APC0418	**MICROPROCESSORS AND MICROCONTROLLERS**	3	0	0	3

Course Outcomes:
Upon completion of the course students will be able to
CO1: Understand architecture details of 8085
CO2: Review and analyze details of 8085 and 8086 architecture
CO3: Illustrate brief details of 8086 operations
CO4: Determine Importance of low power MSP 430 and its advancements
CO5: Analyze Inbuilt peripherals of MSP 430 also Power management features.

UNIT-1
OVERVIEW OF 8085 MICROPROCESSOR
Overview of microcomputer systems and their building blocks, Introduction to 8-bit microprocessor (8085) Architecture, Addressing modes, Instruction set, Machine cycles, instruction cycle and timing states.

UNIT-II
INTRODUCTION TO 8086
Introduction-8086 Architecture-Block Diagram, Register Organization, Flag Register, Pin Diagram, Timing and Control Signals, System Timing Diagrams, Memory Segmentation, Interrupt structure of 8086 and Interrupt Vector Table. Memory organization and memory banks accessing.

UNIT-III
PROGRAMMING OF 8086
Instruction Formats -Addressing Modes-Instruction Set of 8086, Assembler Directives- Macros and Procedures.- Sorting, Multiplication, Division and multi byte arithmetic code conversion. String Manipulation instructions-Simple ALPs.

UNIT-IV
INTRODUCTION TO LOW POWER RISC MSP 430
Low power RISC MSP430 – block diagram, features and architecture, Variants of the MSP430 family viz. MSP430x2x, MSP430x4x, MSP430x5x and their targeted applications, MSP430x5x series block diagram, Addressing modes, Instruction set Memory address space, on-chip peripherals (analog and digital), and Register sets. Sample embedded system on MSP430 microcontroller.

UNIT-V
PERIPHERAL DEVICES OF MSP 430
I/O ports pull up/down resistors concepts, Interrupts, Watchdog timer. System clocks. Low Power aspects of MSP430: low power modes, Active Vs Standby current consumption. Timer & Real Time Clock (RTC), timing generation and measurements. Analog interfacing and data acquisition: ADC and Comparator in MSP430, data transfer using DMA.

Text Books:

1. R. S. Gaonkar, Microprocessor Architecture: Programming and Applications with the 8085/8080A, Penram International Publishing, 1996.
2. Douglas V. Hall, "Microprocessors and interfacing: Programming and hardware", 2nd Edition. Tata McGraw Hill, 1991.
3. "Microprocessor and Microcontrollers", N. Senthil Kumar, M. Saravanan, S. Jeevanathan, Oxford Publishers. 1st Edition, 2010
4. "The X86 Microprocessors, Architecture, Programming and Inerfacing", Lyla B. Das, Pearson Publications, 2010
5. MSP430 microcontroller basics. John H. Davies, Newnes Publication, I st Edition, 2008

Reference Books:

1. Carl Hamacher, ZvonksVranesic, SafwatZaky, "Computer Organization" 5th Edition, McGraw Hill, 2002.
2. Andrew S.Tanenbaum, "Structured Computer Organization",4th Edition PHI/Pearson
3. John L.Hennessy and David A.Patterson, "Computer Architecture a quantitative approach", Fourth Edition Elsevier
4. Joseph D. Dumas II, "Computer Architecture: Fundamentals and Principals of Computer Design", BS Publication.

CO No.	PO No. and Keyword	Competency Indicator	Performance Indicator
CO1	PO 1: Engineering knowledge	1.4	1.4.1
	PO 3: Design/Development of solutions	3.1	3.1.1
CO2	PO 1: Engineering knowledge	1.4	1.4.1
	PO 3: Design/Development of solutions	3.4	3.4.1
	PO 4: Conduct investigations of complex problems	4.1	4.1.1
	PO 5: Modern tool usage	5.1	5.1.1
CO3	PO 1: Engineering knowledge	1.3	1.3.1
	PO 2: Problem analysis	2.2	2.2.3
	PO 3: Design/Development of solutions	3.2	3.2.1
CO4	PO 1: Engineering knowledge	1.3	1.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
	PO 4: Conduct investigations of complex problems	4.1	4.1.3
	PO 5: Modern tool usage	5.1	5.1.1
CO5	PO 1: Engineering knowledge	1.3	1.3.1
	PO 3: Design/Development of solutions	3.3	3.3.1
	PO 4: Conduct investigations of complex problems	4.2	4.2.1

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Year: III	Semester: VI		Branch of Study: EEE		
COURSE CODE	**COURSE TITLE**	**L**	**T**	**P**	**CREDITS**
20APC0219	**ELECTRICAL MEASUREMENTS LAB**	**0**	**0**	**3**	**1.5**

Course outcomes:

1. Understand calibration of various electrical measuring instruments.
2. Accurately determine the values of inductance and capacitance using AC bridges.
3. Analyze coefficient of coupling between two coupled coils.
4. Accurately determine the values of very low resistances.
5. Understand the working principles of displacement transducers.

The following experiments are required to be conducted as compulsory experiments:

1. Calibration and Testing of single-phase energy Meter
2. Calibration of dynamometer power factor meter
3. Calibration of D.C. Potentiometer: PMMC ammeter and PMMC voltmeter.
4. Kelvin's double Bridge - Measurement of low resistance - Determination of Tolerance.
5. Determination of Coefficient of coupling between two mutually coupled coils
6. Schering Bridge & Anderson bridge
7. Measurement of 3-phase reactive power with single-phase wattmeter
8. Measurement of parameters of a choke coil using 3-voltmeter and 3-ammeter methods

In addition to the above eight experiments, at least any two of the experiments from the following list are required to be conducted:

9. Maxwell's bridge and DeSauty bridge
10. Calibration of LPF wattmeter - by Phantom loading
11. Wheatstone bridge - measurement of medium resistances
12. LVDT and capacitance pickup - characteristics and Calibration
13. Resistance strain gauge - strain measurement and Calibration
14. Measurement of Earth Resistance by Megger.

Reference Books:

1. Patranabis, 'Sensors and Transducers', Prentice Hall of India, 2004
2. Cooper W.D., "Electronic Instrumentation and Measurement Techniques", Prentice Hall of India, New Delhi, 2003.Joseph J Carr, Elements of Electronic Instrumentation & Measurement, Pearson, 3rd Edition 1995.

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering knowledge	1.3	1.3.1
CO2	PO1: Engineering knowledge	1.4	1.4.1
	PO2: Problem analysis	2.4	2.4.2
CO3	PO1: Engineering knowledge	1.3	1.3.1
	PO4: Conduct investigations of complex problems	4.3	4.3.1
CO4	PO1: Engineering knowledge	1.3	1.3.1
	PO4: Conduct investigations of complex problems	4.3	4.3.1
CO5	PO1: Engineering knowledge	1.4	1.4.1
	PO2: Problem analysis	2.4	2.4.2

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Year: III   **Semester: VI**   **Branch of Study: EEE**

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC0220	**POWER SYSTEM ANALYSIS LAB**	**0**	**0**	**3**	**1.5**

Course Outcomes:

1. Acquire practical knowledge on calculation of sequence impedance, fault currents, voltages and sub transient reactance's. Get the practical knowledge on how to draw the equivalent circuit of three winding transformer.
2. Acquire knowledge on development of MATLAB program for formation of Y and Z buses.
3. Acquire knowledge on development of MATLAB programs for Gauss-Seidel and Fast Decouple Load Flow studies.
4. Acquire knowledge on development of SIMULINK model for single area load frequency problem.

List of Experiments
Conduct any 8 experiments (4 from S.Nos.1 to 7 & 4 from Sl.Nos.8 to 12)

1. Determination of Sequence Impedances of Cylindrical Rotor Synchronous Machine.
2. LG Fault Analysis on an un loaded alternator.
3. LL Fault Analysis on conventional phases.
4. LLG Fault Analysis.
5. LLLG Fault Analysis.
6. Determination of Sub transient reactance of silent pole synchronous machine
7. Equivalent circuit of three winding transformer.
8. Y_{Bus} formation using MATLAB
9. Z_{Bus} formation using MATLAB
10. Gauss-Seidel load flow analysis using MATLAB
11. Fast decoupled load flow analysis using MATLAB
12. Develop a Simulink model for a single area load frequency problem and simulate the same.

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering knowledge	1.3	1.3.1
		1.4	1.4.1
CO2	PO1: Engineering knowledge	1.4	1.4.1
	PO2: Problem analysis	2.3	2.3.1
			2.3.2
CO3	PO1: Engineering knowledge	1.3	1.3.1
	PO4: Conduct investigations of complex problems	4.3	4.3.1
CO4	PO5: Modern tool usage	5.1	5.1.1
		5.2	5.2.1

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Year: III　　　　　　　　**Semester: VI**　　　　　　**Branch of Study: EEE**

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20APC0221	SWITCHGEAR AND PROTECTION LAB	0	0	3	1.5

COURSE OUTCOMES:

1. Understand the operation and characteristics of switch gear used in protection of power systems.
2. Analyze the protection of parallel, radial feeders & over voltage induction relay.
3. Analyze the functioning of various protection schemes using MATLAB.

Conduct any 10 from the following:

1. Study the characteristics of miniature circuit breaker.
2. Study the characteristics of fuse and thermal overload protection.
3. Study the operation and characteristics of over voltage, over current relays.
4. Obtain the ABCD parameters of a given power system.
5. Modeling of Differential Relay using MATLAB.
6. Radial Feeder Protections.
7. Parallel Feeder Protections.
8. Principle of Reverse Power Protection.
9. Differential Protection of Transformer.
10. To the study time Vs voltage characteristics of over voltage induction relay.
11. Characteristics of single, combined and lightning earth pits.
12. Study of efficiency and regulation of a transmission line.
13. Study of string efficiency of insultors.

Text books:
1. A.G.Phadkeand J.S.Thorp, "Computer Relaying for Power Systems", Wiley/Research studies Press, 2009
2. A.T. Johns and S. K. Salman, "Digital Protection of Power Systems", IEEE Press, 1999

Reference Books:
1. Gerhard Zeigler, "Numerical Distance Protection", Siemens Publicis Corporate Publishing, 2006
2.S.R. Bhide "Digital Power System Protection" PHI Learning Pvt. Ltd. 2014

CO No.	PO No. and keyword	Competency Indicator	Performance Indicator
CO1	PO1: Engineering knowledge	1.4	1.4.1
	PO2: Problem analysis	2.3	2.3.1
			2.3.2
CO2	PO1: Engineering knowledge	1.3	1.3.1
	PO4: Conduct investigations of complex problems	4.3	4.3.1
CO3	PO5: Modern tool usage	5.1	5.1.1
		5.2	5.2.1

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Year: III   **Semester: VI**   **Branch of Study: EEE**

COURSE CODE	COURSE TITLE	L	T	P	CREDITS
20ASC0203 (Skill oriented course)	NUMERICAL TECHNIQUES USING MATLAB	1	0	2	2

COURSE OUTCOMES:
1. Learn fundamental computer programming concepts used for numerical analysis.
2. Solve linear equations, difference equations and differential equations in MATLAB.
3. Determination of roots for polynomials.
4. Determination of polynomials using Euler, Runge-Kutta and LSC fitting methods.

LIST OF EXPERIMENTS:

1. Study of Introduction to numerical techniques.

2. Study of basic matrix operations.

3. Solve linear equation using MATLAB.

4. Solution of Linear equations for Underdetermined and Overdetermined cases.

5. Determination of Eigen values and Eigen vectors of a square matrix.

6. Solution of Difference Equations.

7. Solution of Difference Equations using Euler Method.

8. Solution of differential equation using 4th order Runge- Kutta method.

9. Determination of roots of a polynomial.

10. Determination of polynomial using method of Least Square Curve Fitting.

11. Determination of polynomial fit, analyzing residuals, exponential fit and error bounds from the given data.

12. Determination of time response of an R-L-C circuit.

Text Books:

1. Grewal, B.S., and Grewal, J.S., Numerical Methods in Engineering and Science, Khanna Publishers, 10th Edition, New Delhi, 2015.

2. Johnson, R.A., Miller, I and Freund J., Miller and Freundâ Probability and Statistics for Engineers, Pearson Education, Asia, 8th Edition, 2015.

References:

1. Burden, R.L and Faires, J.D, Numerical Analysis, 9th Edition, Cengage Learning, 2016.

2. Gerald. C.F. and Wheatley. P.O. Applied Numerical Analysis Pearson Education, Asia, New Delhi, 7th Edition, 2007.

3. Gupta S.C. and Kapoor V. K., Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi, 12th Edition, 2020.

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B.Tech III Year: **Semester: VI**   **MANDATORY COURSE**

Subject code: 20AMC9904	Subject Name: Professional Ethics And Human Values	L 2	T 0	P 0	Credits: 0

Course Outcome:

1. It ensures students sustained happiness through identifying the essentials of human values and skills.

2. The students will understand the importance of Values and Ethics in their personal lives and professional careers.

3. The students will learn the rights and responsibilities as an employee, team member and a global citizen.

4. Students understand practically the importance of trust, mutually satisfying human behavior and enriching interaction with nature.

5. Students can able to develop appropriate technologies and management patterns to create harmony in professional and personal life.

Syllabus:

UNIT - I:

Introduction to Human Values: Need, basic Guidelines, Content and Process for Value Education, Self Exploration - 'Natural Acceptance' and Experiential Validation. Continuous Happiness and Prosperity - A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities. Understanding Happiness and Prosperity correctly.

UNIT - II:

Understanding Harmony in the Family and Society: Harmony in Human - Human Relationship: Understanding harmony in the Family the basic unit of human interaction. Understanding values in human - human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; Trust (Vishwas) and Respect (Samman) as the foundational values of relationship. Understanding the harmony in the society (society being an extension of family). Visualizing a universal harmonious order in society - Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha) - from family to world family!

UNIT – III:

Introduction to Professional Ethics: Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.

UNIT – IV:

Professional Practices in Engineering: Work Place Rights & Responsibilities, Professions and Norms of Professional Conduct, Norms of Professional Conduct vs. Profession; Responsibilities, Obligations and Moral Values in Professional Ethics, Professional codes of ethics, the limits of predictability and responsibilities of the engineering profession. Central Responsibilities of Engineers – The Centrality of Responsibilities of Professional Ethics; lessons from 1979 American Airlines DC-10 Crash and Kansas City Hyatt Regency Walk away Collapse.

UNIT – V:

Global issues in Professional Ethics: Introduction – Current Scenario, Technology Globalization of MNCs, International Trade, World Summits, Issues, Business Ethics and Corporate Governance, Sustainable Development Ecosystem, Energy Concerns, Ozone Depletion, Pollution, Ethics in Manufacturing and Marketing, Media Ethics, War Ethics, Bio Ethics, Intellectual Property Rights.

TEXT BOOKS:

1.R. R. Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

2.Professional Ethics: R. Subramanian, Oxford University Press, 2015.

3.Ethics in Engineering Practice & Research, Caroline Whit beck, Cambridge University Press 2015.

REFERENCE BOOKS:

1. Prof. K. V. Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.