

**DETAILED SYLLABUS OF ALL COURSES  
OF B Tech First Year**

(Common to all branches)

5/27/2020

**NEW SCHEME**

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

Name of Program	B.Tech.	Semester-I	Session 2020-21
Name of Course	Mathematics-1		
Course Code	MTH-111		
Core / Elective / Other	Core		
Prerequisite: JEE Mathematics			
Course Outcomes: At the end of the course, the student will be able to:			
1.	Understand and interpret the concepts of differential calculus, integral calculus, vector calculus.		
2.	Compute the solution of high dimensional homogeneous and non-homogeneous differential equations.		
3.	Integrate higher dimension and vector calculus problems.		
4.	Design and find the analytical solution of their engineering problems.		
Description of Contents in brief:			
1.	Curve Tracing, Singular points, Asymptotes, Expansion of Functions: Taylor's and Maclaurin's theorem.		
2.	Partial differentiation: Euler's theorem, Differentiation of composite functions, Taylor's Series. Maximum and Minima of functions of two or more variables, Lagrange method of undetermined multipliers.		
3.	Multiple Integral: Double and triple integral, Change of order of integration, Beta and Gamma functions, length of curves, Area, Volume and Surfaces of solids of revolution.		
4.	Vector Calculus: Vector Differentiation, Gradient, Directional Derivative, Divergence & Curl of Vector point function, Line Integral, Surface Integral, Gauss Divergence Theorem, Stokes theorem & Green's Theorem.		
5.	Ordinary Differential Equation: Differential Equation of First Order and Higher Degree, Linear Differential Equation with Constant Coefficient of Higher Order, Cauchy's Differential Equation, Method of Variation of Parameter, Simultaneous Differential Equation, Second Order Differential Equation.		
List of Text Books:			
1.	R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 5 <sup>th</sup> Edition, CRC Press, Narosa Publishing House, New Delhi, 2016.		
2.	E. Kreyszig, Advanced Engineering Mathematics, 10 <sup>th</sup> Edition, John Wiley & Sons, Inc., New York, 2016.		
List of Reference Books:			
1.	B.V. Ramana, Higher Engineering Mathematics, 1 <sup>st</sup> Edition, Tata McGraw-Hill Education, New Delhi, 2017.		
2.	G. B. Thomas, Jr., M. D. Weir and J. R. Hass, Thomas' Calculus, 13 <sup>th</sup> Edition, Pearson Education, Inc., New York, 2014.		

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

<b>URLs:</b>	
<b>1.</b>	<a href="https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma49/">https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma49/</a>
<b>2.</b>	<a href="https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma37/">https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma37/</a>
<b>3.</b>	<a href="https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma27/">https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma27/</a>
<b>4.</b>	<a href="https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-ma12/">https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-ma12/</a>
<b>Lecture Plan (about 40-50 Lectures):</b>	
<b>Lecture No.</b>	<b>Topic</b>
<b>1-2</b>	Singular points: definition, problems and significance
<b>3-4</b>	Asymptotes in Cartesian and polar coordinate systems: definition, problems and importance
<b>5-6</b>	Expansion of functions using Taylor's and Maclaurin's theorem.
<b>7-10</b>	Curve Tracing using Cartesian, polar and parametric coordinate systems
<b>11</b>	Partial differentiation: definition, simple derivatives and based problems
<b>12-13</b>	Homogeneous functions, Euler's theorem with proof and its extension up to second order
<b>14-15</b>	Differentiation of composite functions
<b>16-17</b>	Maxima and minima of functions of two or more variables
<b>18</b>	Lagrange method of undetermined multipliers
<b>19</b>	Beta and gamma functions and their applications in real integration
<b>20-22</b>	Multiple integral: double and triple integral in cartesian, polar and parametric coordinates, change of order of integration
<b>23-26</b>	Length of curves, Area, Volume and Surfaces of solids of revolution
<b>27-28</b>	Vector differentiation, gradient, directional derivative: Applications and physical significance
<b>29-30</b>	Divergence & curl of vector point functions: Problems and physical significance
<b>31-32</b>	Line integral, surface integral and their applications
<b>33-35</b>	Gauss divergence theorem, Stokes theorem, Green's theorem and their applications
<b>36</b>	Introduction to ordinary differential equations: Applications, examples and significance
<b>37-39</b>	Solution of differential equations of first order and higher degree including variable separable, homogeneous and reducible to homogeneous, linear and exact
<b>40-41</b>	Solution of linear differential equation with constant coefficient and higher orders
<b>42</b>	Euler-Cauchy differential equations
<b>43</b>	Method of variation of parameters
<b>44</b>	simultaneous differential equations
<b>45-46</b>	Solution of second order differential when C.F is known and change of independent variables

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

Name of Program		B.Tech.	Semester-I & II	Year: 2020-21
Name of Course		Physics		
Course Code		PHY-112		
Core / Elective / Other		Core		
Prerequisite:				
1.	The knowledge of physics with special reference to concept of light, types of static / dynamic forces, Newton's laws of motions, Ohms Law, basic semiconductor, structure of atoms and knowledge of mathematics involving differentiation and integration.			
Course Outcomes: Upon successful completion of the course the student will be able to:				
1.	Understand basic physical fundamentals and the key vocabulary to describe them: Interference and Diffraction of light, Energy band gaps, Quantum effect, Particle accelerator, Fission & Fusion, LASER, Fiber optics communication, Theory of Relativity and Electron ballistics.			
2.	Apply an understanding of these concepts to various systems and devises.			
3.	Acquire problem solving skills, mathematical techniques, and the ability to apply conceptual understanding of the Physics to general real-world situations.			
Description of Contents in brief:				
1.	Wave Optics: Interference and Diffraction, Michelson's interferometer			
2.	Solid State and Semi-Conductor Physics: Energy bands in solids, Electron and hole mobility, Hall effect, PN junction transistor, Transistor parameters, Photo cell and Solar cell			
3.	Quantum Mechanics: Schrodinger wave equation, Particle in a box, Harmonic oscillator, Tunnel effect			
4.	Nuclear Physics: Nuclear properties, Nuclear models, Particle accelerator, Fission & Fusion, Chain reaction, Nuclear reactor, Particle detectors			
5.	Laser and Fiber Optics: Laser phenomena, Ruby and He-Ne laser and applications, laser holography, Types of optical fibers, Attenuation, Fiber losses, Fiber optics communication			
6.	Theory of Relativity: Transformation equations, Time dilation mass energy equation			
7.	Electron ballistics: Motion of charged particles in electric and magnetic field, Electron microscope, Mass spectrographs			
List of Text Books:				
1.	Engineering Physics: M.N. Avadhanulu, P.G.Kshirsagar, T V S Arun Murthy, (S. Chand)			
2.	Engineering Physics: Hitendra K Malik, A. K. Singh, (Tata McGraw-Hill)			
3.	Concepts of Modern Physics: ArtherBeiser (McGraw-Hill)			
4.	Principles of Optics: Brijlal Subramanyam (S. Chand)			
5.	Engineering Physics: Majneet Singh			
List of Reference Books:				
1.	Modern Physics: Kenneth Krane, (John Wiley Eastern)			
2.	Modern Physics: Paul A. Tipler & Ralph A. Llewellyn, (W. H. Freeman)			
3.	Quantum Mechanics Concepts and Applications: NouredineZettili (Wiley)			

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

4.	Optics: AjoyK. Ghatak, (Tata McGraw-Hill Education)
5	Fiber Optics & Lasers The Two Revolutions: AjoyGhatak & K. Thyagarajan, (Macmillan India Limited)
6.	Fundamental of Physics: Resnick, Walker & Halliday, (John Wiley and Sons. Inc)
7.	Modern Physics by Mani & Mehta (East-West Press)
8.	Essentials of Quantum Mechanics by Fozia Z. Haque (Asian Books)
9.	University Physics: H.D. Young, Roger A Freedman, (Pearson)
10.	Solid State Electronics: B. G. Streetman, (Prentice Hall India)
11.	Solid State Physics: S. O. Pillai, (New Age International Publishers)
12.	A Textbook of Optics: N Subrahmanyam, Brij Lal & M N Avadhanulu, (S. Chand)
<b>URLs:</b>	
1.	<a href="https://nptel.ac.in/courses/122107035/#">https://nptel.ac.in/courses/122107035/#</a>
2.	<a href="https://nptel.ac.in/course.html">https://nptel.ac.in/course.html</a>
3.	<a href="http://www.tndte.gov.in/site/wp-content/uploads/2016/08/Engineering-physics.pdf">http://www.tndte.gov.in/site/wp-content/uploads/2016/08/Engineering-physics.pdf</a>
4.	<a href="https://physicstoday.scitation.org">https://physicstoday.scitation.org</a>
<b>Lecture Plan (about 40-50 Lectures):</b>	
Lecture No.	Topic
Lecture 1	Introduction to syllabus, Interference: Introduction, Coherence, Types of Interference, Interference in thin (parallel surfaced) films
Lecture 2	Wedge shaped film, Newton's rings Experiment, Numerical Problems
Lecture 3	Michelson's Interferometer: Theory and applications, Numerical Problems
Lecture 4	Diffraction: definition, types and diffraction, Single slit diffraction
Lecture 5	Double slit diffraction p, missing order
Lecture 6	Diffraction through n-slit, Transmission Grating, Numerical Problems
Lecture 7	Tutorial of wave optics
Lecture 8	Semiconductor Physics: Free electron theory, Band theory of solids
Lecture 9	Fermi Energy and Fermi Energy level in Intrinsic and Extrinsic Semiconductors
Lecture 10	Charge carrier concentration in intrinsic semiconductor, electron hole mobility and conductivity, Numerical Problems
Lecture 11	P- N junction diode, Photocell
Lecture 12	Solar cell and its applications
Lecture 13	Hall effect and its applications, Numerical Problems
Lecture 14	Introduction to transistor: CE, CB and CC mode.
Lecture 15	Transistor parameters ( $\alpha$ , $\beta$ , $\gamma$ and their relation), Numerical Problems
Lecture 16	Tutorial of semiconductor Physics
Lecture 17	Quantum Mechanics: Introduction to Quantum Mechanics, de-Broglie hypothesis, Concept of wave packet, Heisenberg's uncertainty principle, Postulates of Quantum Mechanics
Lecture 18	Properties of matter wave, Probabilistic interpretation of wave function
Lecture 19	Schrodinger's time dependent and time independent wave equation.
Lecture 20	Particle in a box (1D and 3D), Tunnel effect ( $\alpha$ -decay)
Lecture 21	Harmonic Oscillator, Zero-point energy, Numerical Problems
Lecture 22	Tutorial of quantum mechanics
Lecture 23	Nuclear Physics: Nuclear properties, Mass defect, Semi-empirical mass formula, binding energy and Numerical Problems
Lecture 24	Nuclear Models: Liquid drop model and its success & failure

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

Lecture 25	Shell model
Lecture 26	Particle accelerators: Cyclotron, synchro-cyclotron, Numerical Problems
Lecture 27	Betatron and Numerical Problems
Lecture 28	Nuclear fission and fusion, Chain reaction and Nuclear reactor
Lecture 29	Nuclear particle detectors (GM counter), Numerical problems
Lecture 30	Mass Spectrographs (Bainbridge and Aston)
Lecture 31	Tutorial of Nuclear Physics
Lecture 32	LASER: Absorption and Emission process, Einstein's A & B coefficient
Lecture 33	Pumping Scheme and its types, component of LASER
Lecture 34	Ruby laser and He-Ne Laser
Lecture 35	Laser Holography and applications
Lecture 36	Fibre Optics: Introduction to optical fibre, Acceptance angle.
Lecture 37	Types of fibre, V-number, Losses in optical fibre, Uses & applications of fibre
Lecture 38	Tutorial of LASER and optical fibre
Lecture 39	Theory of Relativity: Introduction, Michelson-Morley Experiment, Postulates of special theory of relativity
Lecture 40	Galilean transformation and Lorentz transformation equation
Lecture 41	Length contraction and time dilation
Lecture 42	Theorem of addition of velocities, Principle of simultaneity
Lecture 43	Mass energy equivalence relation, Relativistic mass, Numerical problems
Lecture 44	Tutorial of theory of relativity
Lecture 45	Electron Ballistic: Motion of charged particle (electron) in uniform electric field when the field is parallel, perpendicular and at an angle to velocity of electron
Lecture 46	Motion of charged particle (electron) in uniform magnetic field when the field is parallel, perpendicular and at an angle to velocity of electron
Lecture 47	Electron Optics: Bethe's law, electrostatic lens
Lecture 48	CRT, Electron microscope and Numerical Problems
Lecture 49	Tutorial of electron ballistic

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

Name of Program		B.Tech.	Semester- I & II	Year: 2020-21
Name of Course		Communication Skills		
Course Code		HUM-113		
Core / Elective / Other		Core		
Prerequisite:				
1.	In order to succeed in this course, the students should have basic knowledge of English grammar			
2.	They should be able to frame sentences in English using appropriate vocabulary and grammar and apply them in societal and professional life			
3.	The students should also have the ability to analyse communication behaviours			
Course Outcomes:				
1.	On successful completion of this course, undergraduate students will be able to comprehend and communicate in English through exposure to theory and practice of communication skills.			
2.	They will be able to apply the basic grammatical skills of English Language through intensive practice.			
3.	The students will also be able to write, organise, comprehend, and present short and long forms technical work effectively.			
Description of Contents in brief:				
1.	<b>Unit I: Communication</b> Communication: a vital necessity for good management, Communication process, Barriers to communication viz, organizational, individual, and interpersonal, Dealing with these barriers. Effective communication and modern techniques of spoken and written communication. Electronic devices in communication: computers (LAN,WAN, MAN), Facsimile, Telephone, Teleconferencing, Internet, E-Commerce			
2.	<b>Unit II: Oral Communication Skills</b> Oral communication skills – verbal and non-verbal communication. Executive speaking and listening skills, Presentation skills, Body language, Voice modulation, Negotiation skills, Development of positive personal attitudes, Personal SWOT analysis and development of career plan, Identifying the job, Selection process, Written test- structural, situational, and psychological analysis, Principles of interviewing, Reducing stress, Retaining control, Setting objectives for the interview, Planning and preparation – the challenge of face to face skills			
3.	<b>Unit III: Written Communication Skills</b> Written communication skills – writing techniques and guidelines, Letter writing- basic principle and purpose, Body language of business letter, Tone of business letter, Types of business correspondence: inviting quotations, answering quotations, orders, tenders, sales letters, claim and adjustment letters, Writing smart e-mail, credit/collection letters, job application and writing resume, Report writing: types of reports, Parts of a report, Qualities of good report, Drafting reports-preparation, Analysis and interpretation of reports			
4.	<b>Unit IV: Developing Other Skills- I</b> Developing other skills: interpersonal and human skills, Reading skills, Time management skills: avoiding time wasters and identification of prime time, Choosing an appropriate leadership style, Development of an ideal mix of skills			

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

<b>5.</b>	<b>Unit V: Developing Other Skills-II</b> Communication roadblocks, Dealing with those roadblocks, Writing persuasive proposals, Memorandum, Public speaking, Group communication: kinds of discussions-forum discussion, Panel discussions, Symposium discussion and group discussions, Planning and meetings, Setting agendas for meetings, Writing and circulating minutes, Notices, Reading comprehension skills
<b>List of Text Books:</b>	
<b>1.</b>	Business Communication strategies – Monipally, (Tata McGraw Hill)
<b>2.</b>	Personal Development for Life and Work – Wallace & Masters, (Thomson Publishing)
<b>3.</b>	The Essence of Effective Communication – Ron Ludlow & Fergus Panton,(PHI)
<b>List of Reference Books:</b>	
<b>1.</b>	Communication in Organisations - Dalmar Fisher (Jayco Publishing)
<b>2.</b>	Effective Business Communication - Murphy, (Allied pub.)
<b>3.</b>	Effective Technical Communication – A Ashraf Rizvi (Tata McGraw Hill)
<b>URLs:</b>	
<b>1.</b>	<a href="https://nptel.ac.in/courses/109/105/109105110">https://nptel.ac.in/courses/109/105/109105110</a>
<b>2.</b>	<a href="https://nptel.ac.in/courses/109/105/109105117">https://nptel.ac.in/courses/109/105/109105117</a>
<b>3.</b>	<a href="https://nptel.ac.in/courses/109/104/109104115">https://nptel.ac.in/courses/109/104/109104115</a>
<b>Lecture Plan (about 40-50 Lectures):</b>	
<b>Lecture No.</b>	<b>Topic</b>
<b>1</b>	Communication: a vital necessity for good management
<b>2-3</b>	Communication process, Barriers to communication viz, organizational, individual, and interpersonal, Dealing with these barriers
<b>4-5</b>	Electronic devices in communication: computers (LAN,WAN, MAN), Facsimile, Telephone, Teleconferencing, Internet, E-Commerce
<b>6</b>	Oral communication skills – verbal and non-verbal communication
<b>7-8</b>	Executive speaking and listening skills
<b>9-11</b>	Presentation skills
<b>12-13</b>	Body language, Voice modulation
<b>14</b>	Negotiation skills
<b>15</b>	Development of positive personal attitudes
<b>16</b>	Personal SWOT analysis and development of career plan
<b>17-18</b>	Identifying the job, Selection process, Written test- structural, situational, and psychological analysis
<b>19</b>	Principles of interviewing
<b>20</b>	Reducing stress, Retaining control
<b>21-24</b>	Setting objectives for the interview, Planning and preparation – the challenge of face to face skills
<b>25</b>	Written communication skills – writing techniques and guidelines
<b>26-27</b>	Letter writing- basic principle and purpose, Body language of business letter, Tone of business letter
<b>28-30</b>	Types of business correspondence: inviting quotations, answering quotations, orders, tenders, sales letters, claim and adjustment letters
<b>31</b>	Writing smart e-mail, credit/collection letters



**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

<b>32-33</b>	Job application and writing resume
<b>34</b>	Report writing: types of reports, Parts of a report, Qualities of good report, Drafting reports-preparation
<b>35</b>	Analysis and interpretation of reports
<b>36</b>	Developing other skills: interpersonal and human skills
<b>37</b>	Reading skills
<b>38</b>	Time management skills: avoiding time wasters and identification of prime time
<b>39</b>	Choosing an appropriate leadership style
<b>40</b>	Development of an ideal mix of skills
<b>41</b>	Communication roadblocks, Dealing with those roadblocks
<b>42</b>	Writing persuasive proposals, Memorandum
<b>43</b>	Public speaking
<b>44</b>	Group communication: kinds of discussions-forum discussion, Panel discussions
<b>45-47</b>	Symposium discussion and group discussions
<b>48</b>	Planning and meetings, Setting agendas for meetings
<b>49</b>	Writing and circulating minutes, Notices
<b>50</b>	Reading comprehension skills

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

Name of Program		B. Tech.	Semester: First/Second	Year: 2020-21
Name of Course		Computer Programming and Problem Solving		
Course Code		CSE-114		
Core / Elective / Other		Core		
Prerequisite:				
1.	There are no prerequisites to learn C programming.			
2.	Just a bit of logical skills should be enough.			
Course Outcomes:				
1.	Identify situations where computational methods and computers would be useful			
2.	Given a computational problem, identify and abstract the programming task involved.			
3.	Design algorithm and illustrate flowchart for a given problem.			
4.	Write the program on a computer, edit, compile, debug, correct, recompile and run it.			
5.	Identify tasks in which the numerical techniques learned are applicable and apply them to write programs, and hence use computers effectively to solve the task.			
6.	Learn the basics of the Internet of Things and its applications. Understand Arduino Architecture, programming and interfacing with sensors.			
Description of Contents in brief:				
1.	Introduction to Computer and its organization.			
2.	Problem solving using Computers by Flowchart and Algorithms.			
3.	Developing a running computer program in C.			
4.	C programming using conditions, loop, array, functions, pointers and structures.			
5.	Introduction to IoT using Arduino.			
List of Textbooks:				
1.	E. Balaguruswamy, "Programming in ANSI C", Tata McGraw-Hill.			
2.	Suresh Kumar Srivastava, "C in Depth", BPB Publication.			
3.	R. G. Dromey, "How to Solve It By Computer", Pearson			
4.	K R Venugopal, "Mastering C", Tata McGraw-Hill.			
List of Reference Books:				
1.	Yashavant P. Kanetkar, "Let us C", BPB Publication			
2.	A.R. Bradley, "Programming for Engineers", Springer			
3.	Schildt Herbert, "C- The Complete Reference" ,Tata McGraw-Hill.			
4.	Dan Gookin,"Begin programming with C for Dummies", Wiley			
URLs:				
1.	<a href="https://nptel.ac.in/courses/106/105/106105171/">https://nptel.ac.in/courses/106/105/106105171/</a>			
2.	<a href="https://www.nptel.ac.in/courses/106/104/106104128/">https://www.nptel.ac.in/courses/106/104/106104128/</a>			
Lecture Plan (about 40-50 Lectures):				
Lecture No.	Topic			

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

1.	Fundamentals of Computing
2.	Evolution of Computer Hardware and Moore's Law
3.	Organization of Computing Systems - Input/Output devices, Memory, Instructions, Program
4.	Software, Operating System, Program execution
5.	Problem solving using Computers- Flow charting technique,
6.	Writing algorithms
7.	Generation of programming languages
8.	Assembler, Compiler, Interpreter, Debugger, Editor
9.	Phases of developing a running computer program in C
10.	Constants, Variables, Expressions, Operators, Operator precedence in C
11.	Data types, size and values, Char, Unsigned and Signed data types, Overflow
12.	Number systems and representations.
13.	Statements: Declarations, Input-Output Statements, Compound statements
14.	Selection Statements, Conditions -I
15.	Selection Statements, Conditions -II
16.	Repetitive statements - While loop -I
17.	While loop-II
18.	Do-while loop -I
19.	Do-while loop -II
20.	For loop -I
21.	For loop -II
22.	Arrays
23.	Sorting problem: Bubble Sort
24.	Search problem: Linear search
25.	Multidimensional Arrays and Matrices -I
26.	Multidimensional Arrays and Matrices -II
27.	Functions: The prototype declaration, Function definition
28.	Function call: Passing arguments to a function by value
29.	Pointers: Pointer variables, Declaring and dereferencing pointer variables
30.	Function call: Passing arguments to a function by reference
31.	Accessing arrays through pointers
32.	Scope of variable
33.	Recursive function call -I
34.	Recursive function call -II
35.	Pointer arithmetic
36.	Pointer Types
37.	Strings: String operations in C
38.	Structures and Union in C
39.	Typedef Structures.
40.	File input-output in C. Opening, closing and reading from files
41.	Introduction to Internet of Things and Arduino
42.	Sensors
43.	Interfacing with LED with an Arduino board and ON/OFF the LED.
44.	Interfacing with different sensors with an Arduino board and displaying their reading -I
45.	Interfacing with different sensors with an Arduino board and displaying their reading -II

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

Name of Program	B.Tech	Semester I & II	Year: 2020-21
Name of Course	Engineering Graphics		
Course Code	ME-115		
Core / Elective / Other	Core		
Prerequisite:			
1.	Basic knowledge of drawing concepts and drawing instruments		
2.	Basic skills of making free hand sketches		
3.	Capability to visualize the objects in different orientations		
Course Outcomes:			
1.	Learner will be able to understand the language of engineering graphics so that they can write it clearly for those familiar with it and read it readily when written by another.		
2.	Learner will know the basic theory and be familiar with its accepted conventions and abbreviations.		
3.	Learner will be able to work on various plate forms of CAD softwares using the basic knowledge of this subject.		
Description of Contents in brief:			
1.	Basic Concepts-introduction to drawing and engineering drawing, lines, dimensioning, title block, drawing instruments etc., Engineering Scales		
2.	Theory of Projections, reference planes, types of projection methods, orthographic projection		
3.	Projection of points in different angles, projection of lines, projection of planes, projections using auxiliary planes method.		
4.	Projection of solids- Projection of polyhedrons, Prism and pyramids, Projection of solids of revolution in different positions.		
5.	Section of solids- cutting planes, auxiliary planes, frustum and truncated parts of solids, Development of solids- principle of development, parallel line method, radial line method.		
List of Text Books:			
1.	Engineering Graphics By P.I. Vargheese		
2.	Engineering Drawing By N.D. Bhatt		
3.	Engineering Drawing by R.K. Dhawan		
List of Reference Books:			
1.	Engineering Drawing By Dhananjay A. Jolhe		
2.	Engineering Drawing By P.S. Gill		
3.	Engineering Drawing and Graphic Technology By French, Vierch, Foster		
URLs:			
1.	<a href="https://nptel.ac.in/courses/112104172/">https://nptel.ac.in/courses/112104172/</a>		
2.			
3.			
Lecture Plan (about 40-50 Lectures):			
Lecture No.	Topic		
1.	Introduction to engineering drawing Introduction to drawing instruments and sheet layout		

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

	List of drawing instruments
<b>2.</b>	Title block Introduction to line, letter writing and dimensioning Configuration, drafting and types of lines Lettering
<b>3.</b>	Dimensioning; placement, methods and general rules Introduction to geometrical construction Methods of drawing lines, perpendicular, bisections, line division, tangents etc.
<b>4.</b>	Methods for construction of regular polygons using general and special methods. Inscribing and circumscribing regular polygons in circle and square.
<b>5.</b>	Introduction to engineering scales Types and representation of scales Representative fraction
<b>6.</b>	Method for the construction of plain scale and diagonal scale
<b>7.</b>	Method for the construction of comparative scale and vernier scale
<b>8.</b>	Method for the construction of scale of chords
<b>9.</b>	Introduction to conic sections Methods for the construction of following conic sections; Ellipse, Parabola, Hyperbola, Tangents and normal,
<b>10.</b>	Methods for the construction of following conic sections; Hyperbola, Tangents and normal
<b>11.</b>	Introduction to engineering curves Methods for the construction of following engineering curves; Cycloid, Epicycloids, Hypocycloids, Involute, Spiral, Tangents and normal
<b>12.</b>	Methods for the construction of following engineering curves; Hypocycloids, Involute, Spiral, Tangents and normal
<b>13.</b>	Methods for the construction of following engineering curves; Involute, Spiral, Tangents and normal
<b>14.</b>	Types of projections Introduction to orthographic projections Four angles of projections
<b>15.</b>	Methods of construction of multi views Introduction to projection of points
<b>16.</b>	Location of a point in various quadrants Method of representation
<b>17.</b>	Introduction to projections of straight lines Orientation of straight lines using rotation method
<b>18.</b>	Trapezoidal method Traces of straight lines
<b>19.</b>	Lines parallel to reference planes Line perpendicular to reference planes
<b>20.</b>	Line incline to one reference planes
<b>21.</b>	Line inclined to both the reference planes
<b>22.</b>	Line contained in the reference planes Summary
<b>23.</b>	Introduction to projections of planes Types of regular planes
<b>24.</b>	Orientation of planes
<b>25.</b>	Rotation and auxiliary plane methods

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

	Traces of planes
<b>26.</b>	planes parallel to reference planes planes perpendicular to reference planes
<b>27.</b>	planes incline to one reference planes
<b>28.</b>	planes inclined to both the reference planes
<b>29.</b>	planes contained in the reference planes Summary
<b>30.</b>	Introduction to projections of solids Classification of solids Orientations of solid
<b>31.</b>	Axis parallel to reference planes
<b>32.</b>	Axis perpendicular to reference planes
<b>33.</b>	Axis inclined to one reference planes
<b>34.</b>	Axis inclined to both reference planes
<b>35.</b>	Solid resting on its edge
<b>36.</b>	Solid resting on its corner Summary
<b>37.</b>	Introduction to sections of solids Types of section planes
<b>38.</b>	Sections of prisms
<b>39.</b>	Sections of pyramids
<b>40.</b>	Sections of cones
<b>41.</b>	Sections of cylinders
<b>42.</b>	Section of composite solids
<b>43.</b>	Anti- section of solid Summary
<b>44.</b>	Introduction to development of surfaces Classification of surfaces
<b>45.</b>	Methods of development; parallel line method and radial line method
<b>46.</b>	Development of prisms
<b>47.</b>	Development of pyramid
<b>48.</b>	Development of cone
<b>49.</b>	Development of cylinders Development of composite objects
<b>50.</b>	Anti- development of object summary

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

Name of Program		B.Tech.	Semester: I & II	Year: 2020-21
Name of Course		Physics Laboratory		
Course Code		PHY-117		
Core / Elective / Other		Core		
Prerequisite:				
1.	The knowledge of physics with special reference to concept of light, types of static/dynamic forces, Newton's law of motions, basic semiconductor devices and knowledge of Engineering mathematics involving differentiation and integration.			
Course Outcomes:				
Upon successful completion of the course the student will be able:				
1.	To design and conduct simple experiments as well as analyze and interpret data.			
2.	Develop skills in observation, interpretation, reasoning, synthesis, generalizing, predicting, and questioning as a way to learn new knowledge.			
3.	To apply conceptual understanding of the physics to general real-world situations.			
Description of Contents in brief:				
1.	To plot the characteristics curves of a p-n junction diode and calculate its resistance.			
2.	To plot the characteristics curves of PNP transistors in CE mode.			
3.	To perform Melde's Experiment in transverse and longitudinal modes and determine the frequency of an electrically maintained tuning fork.			
4.	To determine frequency of AC mains using an electrical vibrator.			
5.	To determine the radius of curvature of a lens by Newton's ring method.			
6.	To determine the refractive index of the material of the prism for various colors of mercury light using prism and spectrometer.			
7.	To determine the dispersive power of the material of the prism using spectrometer.			
8.	To determine the wavelength of different colors of mercury light using a plane transmission grating.			
9.	To determine percentage of transmission of light for a semitransparent film using Lummer-Brodhum photometer.			
10.	To study diffraction at a single slit using He-Ne laser.			
11.	To determine the wavelength of He-Ne laser by Michelson Interferometer.			
12.	To determine Hall Potential and Hall Coefficient.			
13.	To study the characteristic of Photo Cell.			
14.	To verify the formula for the combination of lenses and to determine the cardinal points of the combination using Nodal Slide assembly.			
15.	To measure resistivity of a semiconductor by Four Probe method at different temperatures and determine the Band-gap.			
16.	To determine the Plank's Constant using LED			
17.	To study the characteristic of Photoconductive material.			
List of Text Books:				
1.	Engineering Physics: M.N. Avadhanulu, P.G.Kshirsagar, T V S Arun Murthy, (S. Chand)			
2.	Concepts of Modern Physics: ArtherBeiser (McGraw-Hill)			

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

3.	Principles of Optics: Brijlal Subramanyam (S. Chand)
<b>List of Reference Books:</b>	
1.	Concepts of Modern Physics: ArtherBeiser (McGraw-Hill)
2.	Text Book on Advanced Practical Physics by Chauhan &Singh
3	Laboratory Manual of MANIT Physics Lab
<b>URLs:</b>	
1.	<a href="http://www.vlab.co.in/broad-area-physical-sciences">http://www.vlab.co.in/broad-area-physical-sciences</a>
2.	<a href="https://nptel.ac.in/courses/115/105/115105121/">https://nptel.ac.in/courses/115/105/115105121/</a>
3.	<a href="https://en.wikipedia.org/wiki/Engineering_physics">https://en.wikipedia.org/wiki/Engineering_physics</a>
<b>Lab Plan (about 45 Lectures):</b>	
<b>Lecture No.</b>	<b>Topic</b>
15x3=45 Periods	15 Labs of 3 periods



**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

Name of Program	B.Tech.	Semester-II	Session 2020-21
Name of Course	Mathematics-2		
Course Code	MTH-121		
Core / Elective / Other	Core		
Prerequisite: JEE Mathematics			
Course Outcomes: At the end of the course, the student will be able to:			
1.	Understand and interpret the concepts of PDE, integral transform, matrix algebra and complex numbers		
2.	Find the analytical and series solution of ordinary and partial differential equations		
3.	Apply various mathematical transformations on their engineering problems		
4.	Use the basic idea of complex analysis in evaluating real integrals		
5.	Solve different boundary value real-life problems		
Description of Contents in brief:			
1.	Matrices: Matrix Algebra, Rank of a Matrix, Solution of a system of Linear Equation. Eigen Values & Eigen Vectors, Cayley Hamilton Theorem, LU Decomposition		
2.	Laplace Transforms, Inverse Laplace Transforms, Solution of differential equation by using Laplace transforms, Fourier Series and Fourier Transforms		
3.	Partial Differential Equation: Linear & Non-Linear P.D.E of First Order, Homogeneous & Non-Homogeneous Linear P.D.E with constant coefficient of Higher Order, Separation of Variables, Boundary Value Problems of P.D.E: Wave equation & Heat Equation		
4.	Function of Complex variables: Calculus of Complex Function and its Applications for the Evaluation of Real Definite Integral		
5.	Series solution of Differential Equations, Bessel function and Legendre's Polynomial		
List of Text Books:			
1.	R. K. Jain and S. R. K. Iyengar, Advanced Engineering Mathematics, 5 <sup>th</sup> Edition, CRC Press, Narosa Publishing House, New Delhi, 2016.		
2.	E. Kreyszig, Advanced Engineering Mathematics, 10 <sup>th</sup> Edition, John Wiley & Sons, Inc., New York, 2016.		
List of Reference Books:			
1.	B.V. Ramana, Higher Engineering Mathematics, 1 <sup>st</sup> Edition, Tata McGraw-Hill Education, New Delhi, 2017.		
2.	G. B. Thomas, Jr., M. D. Weir and J. R. Hass, Thomas' Calculus, 13 <sup>th</sup> Edition, Pearson Education, Inc., New York, 2014.		
URLs: None			
1.	<a href="https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma34/">https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma34/</a>		
2.	<a href="https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma41/">https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma41/</a>		
3.	<a href="https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma31/">https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma31/</a>		
4.	<a href="https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma49/">https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma49/</a>		
5.	<a href="https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma50/">https://nptel.ac.in/noc/courses/noc20/SEM2/noc20-ma50/</a>		

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

<b>6.</b>	<a href="https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-ma12/">https://nptel.ac.in/noc/courses/noc20/SEM1/noc20-ma12/</a>
<b>Lecture Plan (about 40-50 Lectures):</b>	
<b>Lecture No.</b>	<b>Topic</b>
<b>1-3</b>	Types of Matrices, Matrix Algebra, Rank of a Matrix,
<b>4</b>	Solution of a system of Linear Equation.
<b>5-7</b>	Eigen Values & Eigen Vectors, Cayley Hamilton Theorem, LU Decomposition
<b>8-9</b>	Laplace Transform: definition, conditions, Laplace transform of some standard functions, Shifting theorems, Laplace transform of derivatives and integrals
<b>10-11</b>	Inverse Laplace Transform: definition, conditions, Inverse Laplace transform of some standard functions, Convolution theorem
<b>12-13</b>	Applications: Solution of differential equation by using Laplace transforms
<b>14-16</b>	Fourier Series: Trigonometric Fourier series and its convergence, Fourier series of even and odd functions, Fourier half-range series
<b>17-19</b>	Fourier sine and cosine transforms and their elementary properties
<b>20</b>	Partial Differential Equation: Formation of first and second order partial differential equations
<b>21-23</b>	Solution of first order partial differential equations: Lagrange's equation, Four standard forms of non-linear first order equations
<b>24-27</b>	Homogeneous & Non-Homogeneous Linear P.D.E with constant coefficient of Higher Order
<b>28</b>	Separation of Variables method for PDE
<b>29-31</b>	Boundary Value Problems of P.D.E: Wave equation & Heat Equation
<b>32-33</b>	Function of Complex variables: analyticity of functions, C-R equations, necessary and sufficient conditions
<b>34</b>	Harmonic functions, Harmonic conjugates, Milne's method
<b>35-36</b>	Complex integration: contours, complex line integration, Cauchy's theorem for simply and multiply connected domains, Cauchy's integral formula for the derivatives of an analytic function, Morera's theorem
<b>37-38</b>	Taylor series, Laurent series, Zeros and poles of a function
<b>39-41</b>	Residue Calculus: residue at a singularity, Residue theorem, evaluation of a real integrals,
<b>42-43</b>	Introduction to series solution method: ordinary and regular singular point
<b>44-45</b>	Legendre differential equation: solution and properties
<b>46-47</b>	Bessel differential equation: solution and properties

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

Name of Program	B.Tech.	Semester: I and II	Year 2020-21
Name of Course	Engineering Chemistry		
Course Code	CH-122		
Core / Elective / Other	Core		
Prerequisite:			
1.	Student should have sound knowledge of basics of chemistry, like atomic structure, bonding , chemical reactions, periodic table, their properties etc.		
2.	Student should have the capability to understand how chemistry can explain various concepts of technology.		
3.	Basic mathematics for doing calculations and numerical problems is desired.		
Course Outcomes:			
Upon successful completion of the course the student will be able to:			
1.	Select lubricants for various purposes and can apply accordingly.		
2.	Understand the importance of fuel in modern world scenario.		
3.	Describe impurities present in water, boiler troubles, removal of impurities.		
4.	Apply corrosion technology methods that are useful to know about the protection of metals from corrosion by various technologies.		
5.	Describe advanced polymer materials and their industrial applications.		
Description of Contents in brief:			
1.	<b>LUBRICANTS-</b> Introduction, Role and Effects of Friction, Functions of Lubricants, Mechanism of Lubrication – Thick Layer, Thin layer and Extreme Pressure Lubrication. Liquid Lubricants: Detailed classification of Vegetable Oils, Animal Oils, Mineral Oils, Blended and Synthetic Oils, Physical and Chemical Properties, Their Importance and Testing; Semi-solid Lubricants: Examples, Physical and Chemical Properties, Their Importance and Testing; Solid Lubricants: Examples and Their Structures; Biodegradable Lubricants; Lubricating Emulsions; Cutting Fluids; Selection of Lubricants.		
2.	<b>FUELS-</b> Introduction, Classification, Calorific value, Characteristic of a Good Fuel, Comparison between Solid, Liquid and Gaseous Fuels, Bomb Calorimeter. Coal: Classification, Selection Criteria, Proximate and Ultimate Analysis, Pulverized Coal. Petroleum: Classification, Types of Cracking, Knocking, Octane and Cetane Number, LPG, Natural Gas, Producer Gas, Water Gas, Bio Gas. Numerical Problems based on Calorific Value, Bomb Calorimeter, Proximate and Ultimate Analysis.		
3.	<b>WATER-</b> Introduction, Sources of water, Specifications of Drinking Water, Steps for Purification of water, Screening Process, Sedimentation, Sedimentation with Coagulation, Filtration and Disinfection. Difference between Disinfection and Sterilization, Break Point Chlorination. Hardness: Units and Disadvantages. Scale and Sludge formation: Disadvantages, Prevention (Internal & External Treatments), Caustic Embrittlement, Boiler Corrosion, Priming and Foaming. Softening Methods: Lime-Soda Processes (cold and hot both), Zeolite Process, Ion-Exchange Process. Numerical problems based on Lime-Soda Processes and water analysis.		

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

<b>4.</b>	<p><b>MATERIALS</b>  <b>Polymer:</b> Introduction, Nomenclature, Functionality, Types of Polymerization, Mechanism of Addition Polymerization, Thermosetting &amp; Thermoplastic Polymers, Methods of Moulding of Plastics, Thermoplastic Resins: Polyethylene, Polypropylene, Polyvinylchloride, Polyvinyl Acetate, Polystyrene, Polymethyl Methacrylate, Polytetrafluoroethylene, Nylon-6:6, Kevlar. Thermosetting Resins, Polyurethane, Epoxy Resin, etc.: Bakelite, Silicone Resins, Polymer Composites. Rubber: Classification, Vulcanization, Synthetic Rubbers (Buna-S, Buna-N), PANVC, ABS etc.  <b>Cement:</b> Introduction, Classification, Raw Materials, Gypsum, Manufacture of Portland Cement (Both Wet and Dry Process), Chemical Composition of Cement, Chemical Constitution of Cement, Setting and Hardening of Cement, Special Cements: Aluminous Cement, High Early Strength Cement, White Portland Cement, Water Proof Cement, Physical Requirements of Cement. Introduction of Concrete and RCC</p>
<b>5.</b>	<p><b>CORROSION AND ITS CONTROL</b>  Introduction and Mechanism of Chemical and Electrochemical Corrosion, Galvanic Corrosion, Concentration Cell Corrosion, Passivity, Soil Corrosion, Pitting Corrosion, Inter-granular Corrosion, Waterline Corrosion, Stress Corrosion, Galvanic Series, Factors influencing Corrosion, Ways to protect against Corrosion. Introduction of Protective Coatings, Metallic Coatings (Introduction of Anodic and Cathodic Coatings, Methods of application of Metal Coatings, Objectives and theory of Electroplating), Chemical Conversion Coatings, Paints, Varnishes and Enamels</p>
<b>List of Text Books:</b>	
<b>1.</b>	Engineering Chemistry by Jain and Jain
<b>2.</b>	Engineering Chemistry by S.S. Dara
<b>3.</b>	Engineering Chemistry by B.K. Sharma
<b>4.</b>	Engineering Chemistry by Shashi Chawla
<b>List of Reference Books:</b>	
<b>1.</b>	Engineering Chemistry by Shikha Agarwal; Cambridge University Press, 2015 edition.
<b>2.</b>	Engineering Chemistry of Wiley India Pvt. Ltd., Vairam and others, 2014 edition (second).
<b>3.</b>	Engineering Chemistry by Prasanth Rath, Cengage Learning, 2015 edition.
<b>4.</b>	Applied Chemistry by H.D. Gesser, Springer Publishers
<b>5.</b>	B. Siva Shankar, "Engineering Chemistry", Tata Mc Graw Hill Publishing Limited, 3rd Edition, 2015.
<b>6.</b>	C. V. Agarwal, C. P. Murthy, A. Naidu, "Chemistry of Engineering Materials", Wiley India, 5th Edition, 2013.
<b>7.</b>	R. P. Mani, K. N. Mishra, "Chemistry of Engineering Materials", Cengage Learning, 3rd Edition, 2015.
<b>URLs:</b>	
<b>1.</b>	<a href="https://www.iare.ac.in/sites/default/files/lecture_notes/EC-Lecture%20Notes_7.pdf">https://www.iare.ac.in/sites/default/files/lecture_notes/EC-Lecture%20Notes_7.pdf</a>
<b>2.</b>	<a href="https://nptel.ac.in/courses/105104102/">https://nptel.ac.in/courses/105104102/</a>
<b>3.</b>	<a href="https://nptel.ac.in/courses/103105110/">https://nptel.ac.in/courses/103105110/</a>
<b>4.</b>	<a href="https://nptel.ac.in/courses/113108051/">https://nptel.ac.in/courses/113108051/</a>
<b>5.</b>	<a href="http://tndte.gov.in/wp-content/uploads/2016/08/Engineering-Chemistry.pdf">http://tndte.gov.in/wp-content/uploads/2016/08/Engineering-Chemistry.pdf</a>

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

6.	<a href="https://nptel.ac.in/courses/112102014/">https://nptel.ac.in/courses/112102014/</a>	
<b>Lecture Plan (about 40-50 Lectures):</b>		
<b>Lecture No.</b>	<b>Topic</b>	
<b>1-8</b>	<b>UNIT – 1 (LUBRICANTS)</b>	
	Lecture 1	Introduction, Role and Effects of Friction, Functions of Lubricants.
	Lecture 2	Mechanism of Lubrication – Thick Layer, Thin layer and Extreme Pressure
	Lecture 3	Lubrication.
	Lecture 4	Physical and Chemical Properties of oils, Their Importance and Testing.
	Tutorial	Physical and Chemical Properties of oils, Their Importance and Testing.
	Lecture 5	Problems based on topics covered in above four lectures and discussions.
	Lecture 6	Liquid Lubricants: Detailed classification of Vegetable Oils, Animal Oils, Mineral Oils, Blended and Synthetic Oils.
	Lecture 7	Semi-solid Lubricants: Examples, Physical and Chemical Properties, Their Importance and Testing.
	Lecture 8	Solid Lubricants: Examples and Their Structures, Biodegradable Lubricants.
	Tutorial	Lubricating Emulsions; Cutting Fluids; Selection of Lubricants.
		Problems based on topics covered in above three lectures and discussions
<b>9-16</b>	<b>UNIT – 2 (Fuels)</b>	
	Lecture 1	Introduction, Classification, Calorific value, Characteristic of a Good Fuel,
	Lecture 2	Comparison between Solid, Liquid and Gaseous Fuels. Numerical Problems based on Calorific Value.
	Lecture 3	Bomb Calorimeter, Numerical Problems based on calorimeter.
	Lecture 4	Coal: Classification, Selection Criteria, Proximate Analysis, Numerical Problems based on Proximate Analysis.
	Tutorial	Problems based on topics covered in above three lectures and discussions.
	Lecture 5	Ultimate Analysis of coal, Numerical Problems based on Ultimate Analysis.
	Lecture 6	Pulverized Coal. Petroleum: Classification and separation.
	Lecture 7	Types of Cracking.
	Lecture 8	Knocking, Octane and Cetane Number.
	Lecture 9	LPG, Natural Gas, Producer Gas, Water Gas, Bio Gas.
	Tutorial	Problems based on topics covered in above three lectures and discussions.
<b>17-24</b>	<b>UNIT – 3 (Water)</b>	
	Lecture 1	Introduction, Sources of water, Specifications of Drinking Water.
	Lecture 2	Steps for Purification of water, Screening Process, Sedimentation, Sedimentation with Coagulation.
	Lecture 3	Filtration and Disinfection. Difference between Disinfection and Sterilization.
	Lecture 4	Break Point Chlorination, Hardness: Units and Disadvantages.
	Tutorial	Problems based on topics covered in above three lectures and discussions.
	Lecture 5	Scale and Sludge formation: Disadvantages, Prevention (Internal & External Treatments), Caustic Embrittlement.
	Lecture 6	Boiler Corrosion, Priming and Foaming.
	Lecture 7	Softening Methods: Lime-Soda Processes (cold and hot both).
	Lecture 8	Zeolite Process, Ion-Exchange Process.
	Tutorial	Numerical problems based on Lime-Soda Processes and water analysis.

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

<b>25-32</b>	<b>UNIT – 4 (Materials)</b>	
Lecture 1	<b>Polymer:</b> Introduction, Nomenclature, Functionality, Types of Polymerization, Mechanism of Addition Polymerization.	
Lecture 2	Thermosetting & Thermoplastic Polymers, Methods of Moulding of Plastics.	
Lecture 3	Thermoplastic Resins: Polyethylene, Polypropylene, Polyvinylchloride, Polyvinyl Acetate, Polystyrene, Polymethyl Methacrylate.	
Lecture 4	Polytetrafluoroethylene, Nylon-6:6, Kevlar. Thermosetting Resins, Polyurethane, Epoxy Resin, Alkydes etc.	
Tutorial	Problems based on topics covered in above three lectures and discussions.	
Lecture 5	Bakelite, Silicone Resins, Polymer Composites. Rubber: Classification, Vulcanization, Synthetic Rubbers (Buna-S, Buna-N), PANVC, ABS etc.	
Lecture 6	<b>Cement:</b> Introduction, Classification, Raw Materials, Gypsum, Manufacture of Portland Cement (Both Wet and Dry Process).	
Lecture 7	Chemical Composition of Cement, Chemical Constitution of Cement, Setting and Hardening of Cement.	
Lecture 8	Special Cements: Aluminous Cement, High Early Strength Cement, White Portland Cement, Water Proof Cement, Physical Requirements of Cement, Introduction of Concrete and RCC.	
Tutorial	Problems based on topics covered in above three lectures and discussions.	
<b>33-40</b>	<b>UNIT – 5 (CORROSION AND ITS CONTROL)</b>	
Lecture 1	Introduction and Mechanism of Chemical and Electrochemical Corrosion.	
Lecture 2	Galvanic Corrosion, Concentration Cell Corrosion, Passivity, Soil Corrosion.	
Lecture 3	Pitting Corrosion, Intergranular Corrosion, Waterline Corrosion, Stress	
Lecture 4	Corrosion.	
Tutorial	Galvanic Series, Factors influencing Corrosion, Ways to protect against	
Lecture 5	Corrosion.	
Lecture 6	Problems based on topics covered in above three lectures and discussions.	
Lecture 7	Introduction of Protective Coatings, Metallic Coatings.	
Lecture 8	Introduction of Anodic and Cathodic Coatings, Methods of application of Metal	
Tutorial	coatings.	
	Objectives and theory of Electroplating.	
	Chemical Conversion Coatings, Paints, Varnishes and Enamels.	
	Problems based on topics covered in above three lectures and discussions.	

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

Name of Program	B.Tech.	Semester I & II	Year 2020-21
Name of Course	Environmental Studies		
Course Code	CH-123		
Core / Elective / Other	Core		
Prerequisite:			
1.	Student should have basic understanding of environment and its components.		
2.	Knowledge of essential chemical reactions is required.		
3.	Concept of pollution, its basic sources and need for its prevention should be clear.		
Course Outcomes:			
Upon successful completion of the course the student will be able to:			
1.	Demonstrate knowledge of chemical and biochemical principles of fundamental environmental processes in air, water, and soil.		
2.	Recognize different types of toxic substances & responses and analyze toxicological information.		
3.	Apply basic chemical concepts to analyze chemical processes involved in different environmental problems (air, water & soil).		
4.	Describe water purification and waste treatment processes and the practical chemistry involved.		
5.	Describe causes and effects of environmental pollution by various industries and discuss some remedial strategies.		
6.	Explain energy crisis and different aspects of sustainability.		
7.	Discuss local and global environmental issues based on the knowledge gained throughout the course.		
Description of Contents in brief:			
1.	ATMOSPHERE AND AIR POLLUTION Structure of Atmosphere, Reactions of Air in Troposphere, Stratosphere, Mesosphere and Ionosphere, Smog formation - causes, effects and control with reactions, Classification and Effects of Air Pollutants (Oxides of S, C, N, Hydrocarbons and Particulates), Ways of Monitoring, Prevention and control of Air Pollution, Greenhouse effect and Global warming - major sources, effects and remedial measures, Ozone layer - mechanism of ozone depletion, Acid rain and their adverse effects, Indoor Pollution - causes and effects, Volatile Organic Compounds – origin and negative effects		
2.	HYDROSPHERE AND WATER POLLUTION Characteristics of water, Types and Sources of Water pollution, Classification of Water pollutants and their detrimental effects, Characterization of waste water (including DO, COD, BOD), Methods and Equipment used in wastewater treatment- Preliminary, Primary, Secondary and Tertiary treatments (including Trickling filters, Aerated lagoon , Activated sludge etc.)		
3.	LITHOSPHERE AND SOIL POLLUTION Composition and importance of Soil, Soil pollution - sources, effects and control.		
4.	BIOSPHERE AND ITS POLLUTION Basic concept of Ecology, Biogeochemical cycles (Water, Hydrogen, Oxygen, Carbon		

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

	Nitrogen, Sulphur, Phosphorus), Effect of pollution on Biosphere.	
5.	GREEN CHEMISTRY Basic principles and importance of Green Chemistry, Sustainability and its ten commandments.	
List of Text Books:		
1.	Textbook of Environmental Chemistry by BalramPani	
2.	Environmental Chemistry by Stanley E. Manahan	
3.	Environmental Chemistry by B.K.Sharma	
4.	Environmental Chemistry byA.K.De	
List of Reference Books:		
1.	astewater Engineering Treatment and Reuse” by MetCalf&Eddy ,McGraw-Hill Education	
2.	“Chemistry for Environmental Engineering and science” by Sawyer, McCarty and Parkin, McGraw Hill Education; 5 edition	
3.	“Environmental Engineering” - by Howard S. Peavy, Donald R. Rowe and George Tchobanoglous. McGraw Hill Education; First edition	
URLs:		
1.	<a href="https://nptel.ac.in/courses/123105001/">https://nptel.ac.in/courses/123105001/</a>	
2.	<a href="https://nptel.ac.in/courses/119106008/">https://nptel.ac.in/courses/119106008/</a>	
3.	<a href="https://www.youtube.com/watch?v=4AuwG2G_ERU">https://www.youtube.com/watch?v=4AuwG2G_ERU</a>	
4.	<a href="https://nptel.ac.in/content/storage2/courses/122106030/Pdfs/1_1.pdf">https://nptel.ac.in/content/storage2/courses/122106030/Pdfs/1_1.pdf</a>	
5.	<a href="https://nptel.ac.in/courses/103/107/103107084/">https://nptel.ac.in/courses/103/107/103107084/</a>	
6.	<a href="https://www.asdlib.org/onlineArticles/ecourseware/Manahan/GreenChem-2.pdf">https://www.asdlib.org/onlineArticles/ecourseware/Manahan/GreenChem-2.pdf</a>	
7.	<a href="https://www2.hcmuaf.edu.vn/data/quoctuan/Basics_of_Environmental_Sci%20(Section%201).pdf">https://www2.hcmuaf.edu.vn/data/quoctuan/Basics_of_Environmental_Sci%20(Section%201).pdf</a>	
8.	<a href="https://nptel.ac.in/courses/105104099/">https://nptel.ac.in/courses/105104099/</a>	
9.	<a href="https://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf">https://www.ugc.ac.in/oldpdf/modelcurriculum/env.pdf</a>	
10.	<a href="https://kupdf.net/download/kaushik-and-kaushik-evs_59ffb409e2b6f5c73be7cfc6_pdf">https://kupdf.net/download/kaushik-and-kaushik-evs_59ffb409e2b6f5c73be7cfc6_pdf</a>	
11.	file:///C:/Users/DR.%20R%20K%20VISHWAKARMA/Downloads/d78456fce3bebc84d9320fa2f9cf9e2a-original.pdf	
Lecture Plan (about 40-50 Lectures):		
Lecture No.	Topic	
1-6	UNIT – 1 (ATMOSPHERE AND AIR POLLUTION)	
	Lecture 1	Structure of Atmosphere, Reactions of Air in Troposphere, Stratosphere.
	Lecture 2	Reactions of Air in Mesosphere and Ionosphere, Smog formation - causes, effects and control with reactions.
	Lecture 3	Classification and Effects of Air Pollutants (Oxides of S, C, N, Hydrocarbons and Particulates).
	Tutorial	Problems based on topics covered in above three lectures and discussions.
	Lecture 4	Ways of Monitoring, Prevention and control of Air Pollution.
	Lecture 5	Greenhouse effect and Global warming - major sources, effects and remedial measures, Ozone layer - mechanism of ozone depletion.



**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

	Lecture 6	Acid rain and their adverse effects, Indoor Pollution - causes and effects, Volatile Organic Compounds – origin and negative effects
	Tutorial	Problems based on topics covered in above three lectures and discussions.
<b>7-12</b>	<b>UNIT – 2 (HYDROSPHERE AND WATER POLLUTION)</b>	
	Lecture 1	Characteristics of water, Types and Sources of Water pollution.
	Lecture 2	Classification of Water pollutants and their detrimental effects.
	Lecture 3	Characterization of waste water (including DO, COD, BOD).
	Tutorial	Problems based on topics covered in above three lectures and discussions.
	Lecture 4	Methods and Equipment used in wastewater treatment- Preliminary, Primary.
	Lecture 5	Methods and Equipment used in wastewater treatment- Secondary treatments (Trickling filters, Aerated lagoon).
	Lecture 6	Methods and Equipment used in wastewater treatment- Secondary (Activated sludge etc.) and Tertiary treatments
	Tutorial	Problems based on topics covered in above three lectures and discussions.
<b>13-16</b>	<b>UNIT – 3 (LITHOSPHERE AND SOIL POLLUTION)</b>	
	Lecture 1	Composition and importance of Soil.
	Lecture 2	Sources of Soil pollution.
	Lecture 3	Effects of Soil pollution.
	Lecture 4	Methods to control Soil pollution.
	Tutorial	Problems based on topics covered in above four lectures and discussions.
<b>17-20</b>	<b>UNIT – 4 (BIOSPHERE AND ITS POLLUTION)</b>	
	Lecture 1	Basic concept of Ecology.
	Lecture 2	Biogeochemical cycles (Water, Hydrogen, Oxygen).
	Lecture 3	Biogeochemical cycles (Carbon, Nitrogen, Sulphur, Phosphorus).
	Lecture 4	Effect of pollution on Biosphere.
	Tutorial	Problems based on topics covered in above four lectures and discussions.
<b>21-24</b>	<b>UNIT – 5 (GREEN CHEMISTRY)</b>	
	Lecture 1	Basic principles of Green Chemistry.
	Lecture 2	Importance of Green Chemistry.
	Lecture 3	Sustainability and its ten commandments.
	Lecture 4	Sustainability and its ten commandments.
	Tutorial	Problems based on topics covered in above four lectures and discussions

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

<b>Name of the Program:</b>		<b>B.Tech.</b>	<b>Semester- I &amp; II</b>	<b>Year: 2020-21</b>
<b>Name of the Course:</b>		<b>Basic Electrical and Electronics Engineering</b>		
<b>Course Code:</b>		<b>EE-124</b>		
<b>Core/Elective/Other:</b>		<b>Core</b>		
<b>Pre-requisites:</b>		<b>Engineering Physics</b>		
<b>Course Outcomes:</b>				
1	Understand and solve simple AC and DC electric circuits.			
2	Identify types of transformers and calculate its efficiency for a given application			
3	Identify types of electric machines for a given application.			
4	Understand the working principle of basic semiconductor devices.			
5	Differentiate the characteristics of semiconductor devices.			
<b>Description of Content in Brief:</b>				
1	<b>DC circuits:</b> Review of basic concepts of charge, voltage and current, power and energy, Voltage & Current sources, Ohm's Law and its application, effect of temperature on resistance of conductors, semiconductors and insulators. Voltage & Current sources, KCL, KVL, loop and nodal equations, Network theorems, Star-Delta transformations for resistances, Simple series and parallel circuits.			
2	<b>AC Circuits:</b> Alternating quantities, RMS and average value, Phase and Phase Difference, Power and power factor, Series and Parallel AC circuits, resonance, Concept of Single Phase and Three Phase Supply; 3-phase Star-Delta connections, Inter-Relation between phase and line values of voltages and currents. Faraday's law of electromagnetic induction, its application to transformer and machines.			
3	<b>Transformers:</b> construction, principle of operation, phasor diagrams, equivalent circuit, losses and efficiency, OC/SC tests.			
4	<b>DC machines:</b> Types of DC machines and their Construction, principle of operation, emf and torque equations, speed and torque control methods, starters.			
5	<b>Semiconductor devices and applications:</b> Characteristics of PN Junction Diode and Zener Diode, applications of Zener diodes, half wave and full wave rectifiers, ripple factor, conversion efficiency,			
6	<b>Bipolar Junction Transistor:</b> Principle of operation, Input/output & transfer characteristics of BJT in CB, CE, CC configurations and their applications.			
<b>List of Text Books:</b>				
1	Hughes, Electrical and Electronic Technology, 10 <sup>th</sup> Edition, Pearson Education, 2010			
2	D.P.Kothari& I.J. Nagrath, Basic Electrical Electronics and Engineering, MC Graw Hill Education, 2006.			
3	V.N.Mittle, Basic Electrical Engineering, MC Graw Hill Education, 2005.			
<b>List of Reference Books</b>				
1	V. Del Toro, Electrical Engineering Fundamentals, 2 <sup>nd</sup> Edition, Pearson Education, 2015.			
2	A P Malvino and D J Bates, Electronic Principles, 7 <sup>th</sup> Edition, MC Graw Hill, 2017			

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

3	Schaum's Outline Series, Electrical Circuits, 6th, MC Graw Hill Education, 1 Jan 2014.
4	Boylestad&Nashelsky, Electronic Devices and circuit Theory, Pearson Education, 2009.
<b>URLs:</b>	
1	<a href="https://nptel.ac.in/courses/108/104/108104139/">https://nptel.ac.in/courses/108/104/108104139/</a>
2	<a href="https://nptel.ac.in/courses/108/101/108101091/">https://nptel.ac.in/courses/108/101/108101091/</a>
3	<a href="https://nptel.ac.in/courses/108/105/108105053/">https://nptel.ac.in/courses/108/105/108105053/</a>
<b>Lecture Plan</b>	
1.	Review of basic concepts of charge, voltage and current, power and energy, Voltage & Current sources, Ohm's Law and its application, effect of temperature on resistance of conductors, semiconductors and insulators.
2.	Kirchoff's current law (KCL) and nodal equations for simple DC circuits
3.	Practice problems based on KCL for simple DC circuits
4.	Practice problems based on KCL for simple DC circuits
5.	Practice problems based on KCL for simple DC circuits
6.	Kirchoff's voltage law (KVL) and loop equations for simple DC circuits
7.	Practice problems based on KVL for simple DC circuits
8.	Practice problems based on KVL for simple DC circuits
9.	Practice problems based on KVL for simple DC circuits
10.	Network (Superposition) Theorem for simple DC circuits
11.	Practice problems based on Superposition theorems for simple DC circuits
12.	Practice problems based on Superposition theorems for simple DC circuits
13.	Practice problems based on Superposition theorems for simple DC circuits
14.	Network (Thevenin and Norton) Theorems for simple DC circuits
15.	Practice problems based on Thevenin and Norton theorems
16.	Practice problems based on Thevenin and Norton theorems
17.	Practice problems based on Thevenin and Norton theorems
18.	Star-Delta transformations for resistances
19.	Practice problems based on Star-Delta transformations for resistances
20.	Alternating quantities, RMS and average value, Phase and Phase Difference, Power and power factor
21.	Series and Parallel AC circuits, Practice problems
22.	Practice problems based on Series and Parallel AC circuits
23.	Resonance in AC circuits, Practice problems
24.	Practice problems based on Resonance in AC circuits

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

25.	Concept of Single Phase and Three Phase Supply, 3-phase Star-Delta connections, Inter-Relation between phase and line values of voltages and currents.
26.	Practice problems based on three phase AC circuits
27.	Practice problems based on three phase AC circuits
28.	Faraday's law of electromagnetic induction, its application to transformer and machines.
29.	Transformers: construction, principle of operation
30.	Transformers: equivalent circuit
31.	Transformers: Phasor diagrams
32.	Transformers: losses and efficiency
33.	Transformers: OC and SC tests
34.	Practice problems based on Transformers
35.	Practice problems based on Transformers
36.	DC machines: Types of DC machines and their Construction
37.	DC machines: principle of operation, emf and torque equations
38.	DC machines: Starters
39.	DC machines: Speed and torque control
40.	Practice problems based on DC Machines
41.	Practice problems based on DC Machines
42.	Characteristics of PN Junction Diode and Zener Diode
43.	Applications of Zener diodes
44.	Half wave rectifiers: Circuit operation, Ripple factor, conversion efficiency
45.	Full wave rectifiers: Circuit operation, Ripple factor, conversion efficiency
46.	Bipolar Junction Transistor (BJT): Principle of operation, Input/output and transfer characteristics of BJT in CB configuration and its applications
47.	Input/output and transfer characteristics of BJT in CE configuration and its applications
48.	Input/output and transfer characteristics of BJT in CC configuration and its applications
49.	Problem solving related to any topics above
50.	Problem solving related to any topics above

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

Name of Program	B.Tech. (All Branches)	Semester I & II	Year 2020-21
Name of Course	Engineering Mechanics		
Course Code	CE-125		
Core / Elective / Other	Core		
Prerequisite:			
1.	The knowledge of physics with special reference to concept of forces, concept of rigid and elastic bodies.		
2.	General Concept of conditions of static/dynamic equilibrium.		
3.	Basic knowledge of Engineering mathematics involving differentiation and integration, matrix algebra etc.		
Course Outcomes:			
1.	Learn how a solid body (rigid body/elastic body) behaves when it is subjected to static/dynamic forces/loads.		
2.	The concept of elastic structure subjected to various types of forces or their combination and response developed in the structure.		
3.	Learn to evaluate deformation and stress resultants to investigate safety of the structure or remedial measures to avoid failure, Provide students the fundamental basis for solving real field problem in the area of structural analysis/design, material science, and fracture mechanics etc.		
Description of Contents in brief:			
1.	Force systems and concept of equilibrium		
2.	Analysis of statically determinate trusses		
3.	Centroid and moment of Inertia of plane sections		
4.	Shear force and Bending moment in Beams		
5.	Simple stresses and strains and Mechanical Properties of Materials		
List of Text Books:			
1.	Engineering Mechanics by S.S. Bhavikatti		
2.	Mechanics of Materials by S.S. Bhavikatti		
3.	Mechanics of Materials by E.J. Hearn		
List of Reference Books:			
1.	Introduction to Solid Mechanics by I H Shames		
2.	Schaum's Outline of Engineering Mechanics by E Nelson		
3.	Engineering Mechanics Statics and Dynamics by A Nelson		
URLs:			
1.	<a href="https://nptel.ac.in/courses/112106286/">https://nptel.ac.in/courses/112106286/</a>		
2.	<a href="https://nptel.ac.in/courses/112103109/">https://nptel.ac.in/courses/112103109/</a>		
3.	<a href="https://nptel.ac.in/courses/122104014/">https://nptel.ac.in/courses/122104014/</a>		

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

<b>Lecture Plan (about 40-50 Lectures):</b>	
<b>No. of Lectures</b>	<b>Topic</b>
<b>1-7</b>	Types of forces, force systems, coplanar, concurrent force systems, determination of resultant for different types of forces, Lami's theorem, law of triangle and law of polygon of forces, Conditions of static equilibrium, supports, reactions in beams, free body diagrams
<b>8-14</b>	Meaning of trusses, types of trusses, technical terms related to truss analysis, Assumptions in the analysis of trusses, method of joint, method of section, method of tension coefficients and graphical method
<b>15-20</b>	Methods of finding centroid of any plane figures, moment of Inertia of plane figures, polar moment of inertia, perpendicular and parallel axes theorems, product moment of inertia, principal axes and principal moment of inertia, Moh'r circle for finding moment of inertia
<b>21-28</b>	Meaning and importance of bending moment and shear force in structures and their definitions, sign conventions for bending moment and shear force, Shear force and Bending moment diagrams for simply supported, cantilever and overhanging beams, relationship between shear force and bending moment
<b>29-36</b>	Meaning of stress, various types of stresses, direct/normal stress and strain, Normal and true stresses, shear stress and strain, Generalized Hook's law, Modulus of elasticity, modulus of rigidity, volumetric strain and bulk modulus, Poisson's ration, Relationship between elastic constants, Evaluation of stresses and strains in compound, tapering and composite bars, Temperature stress and strain, Mechanical properties of materials
<b>37-40</b>	Different properties of materials like ductile, brittle, hardness, resilience, etc. Experimental techniques for mechanical testing of engineering materials subjected to tension, compression, bending or torsion. Tension test for mild steel, tor-steel and iron bars to evaluate tensile strength yield strength, elastic modulus, percent elongation and the reduction in area and other properties like toughness, resilience, Poisson's ratio

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

Name of Program		B.Tech.	Semester I &II	Year I
Name of Course		Workshop Practice		
Course Code		ME-126		
Core / Elective / Other		Core		
Pre-requisite:				
1.	Basic knowledge of manufacturing process and drawing thoughts.			
2.	Basic skills like cutting, molding, painting and knowledge of physical and chemical processes.			
3.	Capability to visualize and make the objects with different shapes and sizes.			
Course Outcomes:				
1.	Workshop practice provides the basic practical knowledge required for working with various materials used in the production of different Engineering components.			
2.	Workshop practice explains the construction, function, use and application of different working tools, equipment, machines as well as the technique of manufacturing a product from its raw material.			
3.	The Workshop Practice course makes students competent in handling practical work in Engineering environment.			
Description of Contents in brief:				
1.	Carpentry: Introduction to carpentry, types of timber: study of various tools used in carpentry, types of joints, JOB: Making of “L” joint.			
2.	Fitting: Introduction to fitting and its tools, JOB: Preparation of rectangular job piece by use of filling and cutting.			
3.	Foundry: Introduction to casting, study of tools used in making moulds and sands, JOB: preparation of mould.			
4.	Welding: Introduction to metal joining processes, types of welding processes and joints, JOB: Joining of two M.S plates by metal arc welding. JOB: Joining of two M.S plates by metal arc welding			
List of Text Books:				
1.	A text book of Workshop Technology by R.S.Kurmi and J.K Gupta.			
2.	A Textbook of Workshop Technology: Manufacturing Processes N Khurmi R.S Khurmi			
List of Reference Books:				
1.	Workshop Prattice, K.C.John, PHI Learning Pvt. Ltd			
2.	Elements of Workshop Technology, Vol I and II by S.K.Hajra Choudhury.			
URLs:				
1.	<a href="https://nptel.ac.in">https://nptel.ac.in</a>			
2.				
3.				
Practical classes plan (about 32-40 Laboratory session): (2 Hrs. Each)				
Practical classes (02 Hrs.)	Topic			

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

<b>1.</b>	Introduction to workshop practice. Introduction to various instruments and tools used in workshop practical. Brief study and demonstration of instruments and tools.
<b>2.</b>	Carpentry: Introduction to carpentry and types of wood used in carpentry.
<b>3.</b>	Study and demonstration of various tools used in carpentry.
<b>4.</b>	Types of joints and other components.
<b>5.</b>	JOB: Making of "L" joint.
<b>6.</b>	Fitting: Introduction to basics of machining and fitting process.
<b>7.</b>	Demonstration of measuring tools and of and its tools.
<b>8-9</b>	JOB: Preparation of rectangular job piece by use of filing and cutting.
	JOB: Providing shape (L or V) from rectangular job piece.
<b>10.</b>	Foundry: Introduction to casting and black smithy
<b>11.</b>	Study and demonstration of tools used in making casting and black smithy
<b>12.</b>	JOB: Molding processes practical
<b>13.</b>	JOB: Black smithy practical
<b>14.</b>	Welding: Introduction to metal joining processes, types of welding processes and joints.
<b>15.</b>	Study and demonstration of tools used in welding processes.
<b>16-17</b>	JOB: Joining of two M.S plates by metal arc welding.
	JOB: Joining of two M.S plates by metal arc welding.



**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

<b>Name of the Program:</b>		<b>B.Tech</b>	<b>Semester- I &amp; II</b>	<b>Year: 2020-21</b>
<b>Name of the Course:</b>		<b>Basic Electrical and Electronics Engineering Laboratory</b>		
<b>Course Code:</b>		<b>EE-127</b>		
<b>Core/Elective/Other:</b>		<b>Core</b>		
<b>Pre-requisites:</b>		<b>Engineering Physics</b>		
<b>Course Outcomes:</b>				
1	Understand the safety measures of handling electrical equipment			
2	Identify and use different electrical tools and equipments			
3	Connect the measuring instruments and record the measured values correctly			
4	Analyze the results of given electrical circuit and plot the desired characteristics			
<b>Description of Content in Brief:</b>				
1	Study of basic electrical safety equipment's such as Fuses, Earthings, MCBs, ELCBs and their operation.			
2	Study of various Electrical lab tools and their applications.			
3	Fault diagnosis and removal in general electrical connection /apparatus.			
4	Selection and replacement of different passive components e.g. fuses, lamps and lamp holders, switches, cables, cable connectors etc.			
5	Verification of Kirchoff's current law (KCL).			
6	Verification of Kirchoff's voltage law (KVL).			
7	Measurement of various characteristic values of a Sinusoidal waveform with the help of CRO.			
8	Measurement of power and power factor in single phase AC circuits.			
9	Measurement of losses in a single-phase transformer using OC and SC Tests.			
10	Load test and voltage regulation measurement in a single-phase transformer.			
11	Starting and reversing various AC and DC motors.			
12	Speed control of DC shunt motor below and above base speed.			
13	Measurement of output voltage of Half wave diode rectifier and visualization of its waveforms.			
14	Measurement of output voltage of full wave diode rectifier and visualization of its waveforms.			
<b>List of Text Books:</b>				
1.	Laboratory Manual of Basic Electrical and Electronics Engineering Lab, MANIT Bhopal			
2.	S G Tarnekar, Laboratory Courses in Electrical Engineering, S Chand, 2006.			
<b>List of Reference Books</b>				
1.	D.P.Kothari& I.J. Nagrath, Basic Electrical Electronics and Engineering, MC Graw Hill Education, 2006.			
2.	V.N. Mittle, Basic Electrical Engineering, MC Graw Hill Education, 2005			
<b>URLs:</b>				
1	<a href="https://nptel.ac.in/courses/108/108/108108076/">https://nptel.ac.in/courses/108/108/108108076/</a>			

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

<b>Lab Plan</b>	
1.	Introduction of lab equipments, experiments and demonstration of safety measures
2.	Study of basic electrical safety equipments such as Fuses, Earthings, MCBs, ELCBs and their operation.
3.	Study of various Electrical lab tools and their applications.
4.	Fault diagnosis and removal in general electrical connection /apparatus.
5.	Selection and replacement of different passive components e.g. fuses, lamps and lamp holders, switches, cables, cable connectors etc.
6.	Verification of Kirchoff's current law (KCL).
7.	Verification of Kirchoff's voltage law (KVL).
8.	Measurement of various characteristic values of a Sinusoidal waveform with the help of CRO.
9.	Measurement of power and power factor in single phase AC circuits.
10.	Measurement of losses in a single-phase transformer using OC and SC Tests.
11.	Load test and voltage regulation measurement in a single-phase transformer.
12.	Starting and reversing various AC and DC motors.
13.	Speed control of DC shunt motor below and above base speed.
14.	Measurement of output voltage of Half wave diode rectifier and visualization of its waveforms.
15.	Measurement of output voltage of full wave diode rectifier and visualization of its waveforms.

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

Name of Program	B.Tech.	Semester: I and II	Year 2020-21
Name of Course	Chemistry Laboratory		
Course Code	CH-128		
Core / Elective / Other	Core		
Prerequisite:			
1.	Student should be capable of handling glass-wares like burette, pipette etc., and minorequipments like pH meter, weighing balance etc.		
2.	Student should understand the sensitivity of working in the chemistry lab with utmost care so that no harm should come to him or others.		
3.	Knowledge of basic mathematics is required.		
Course Outcomes:			
Upon successful completion of the course the student will be able to:			
1.	Acquire basic analytical and technical skills to work effectively in the various fields of chemistry.		
2.	Gain the ability to perform accurate quantitative measurements with an understanding of the theory.		
3.	Able to present scientific and technical information resulting from laboratory experimentation in both written and oral formats.		
4.	Acquire knowledge and understanding of the issues of safety regulations.		
Description of Contents in brief:			
1.	<b>Oxidation - Reduction Titrations</b> Estimation of percentage of iron using potassium dichromate by internal indicator method Estimation of percentage of iron using potassium dichromate by external indicators		
2.	IODOMETRIC TITRATIONS Iodometric titration of copper sulphate by hypo. Iodometric titration of potassium dichromate by hypo.		
3.	<b>Water Analysis</b> Determination of alkalinity of water sample by acid method. Determination of total hardness in water using EDTA titrations Determination of pH of tap water sample (Demonstration)		
4.	<b>Lubricant Testing</b> Determination of viscosity and viscosity-index of lubricating oil by a. Red Wood Viscometer Number 1 b. Red Wood Viscometer number 2 Determination of cloud point and pour point of lubricating oil. Determination of drop point of semi solid lubricant. Determination of consistency of semi solid lubricant.		
5.	Determination of Flash and Fire point of liquid fuel and lubricants by a. Cleaveland's Open Cup Method b. Abel's Flash Point Apparatus c. Pensky Martin's Flash Point Apparatus		
List of Text Books:			
1.	"A Textbook of Experiments and Calculations in Engineering Chemistry" by S.S. Dara		

**MAULANA AZAD NATIONAL INSTITUTE OF TECHNOLOGY,  
BHOPAL - 462003**

2.	Practical Engineering Chemistry" by A.Mittal, J.Mittal and H.L.Kapoor
<b>List of Reference Books:</b>	
1.	Laboratory manual on Engineering Chemistry" by Sudha Rani
2.	Theory and Practicals of Engineering Chemistry by Shashi Chawla
<b>URLs:</b>	
1.	<a href="https://www.youtube.com/watch?v=yPNhAks7mtE&amp;list=PLmB0ThS_49Y6sr4kXOr-KPBtKEOyy7tPn">https://www.youtube.com/watch?v=yPNhAks7mtE&amp;list=PLmB0ThS_49Y6sr4kXOr-KPBtKEOyy7tPn</a>
2.	<a href="https://www.youtube.com/watch?v=JhBs_8DrPYo&amp;list=PLz311NKW0XBtP0jV9_LaHcQSyArlDxIPX">https://www.youtube.com/watch?v=JhBs_8DrPYo&amp;list=PLz311NKW0XBtP0jV9_LaHcQSyArlDxIPX</a>