

**DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY**  
**CIRCULAR NO.SU/Engg./B.Tech./06/2019**



It is hereby inform to all concerned that, the syllabi prepared by the Board of Studies & recommended by the Dean, Faculty of Science & Technology, the Hon'ble Vice-Chancellor **has accepted revised syllabus of B.Tech. First Year in accordance with Choice Based Credit & Grading System for all Branches as per guidelines of AICTE** in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as enclosed herewith.

This is effective from the Academic Year 2019-20 and onwards.

All concerned are requested to note the contents of this circular and bring the notice to the students, teachers and staff for their information and necessary action.

University Campus,  
 Aurangabad-431 004.  
 REF.NO.SU/2019/1745-79  
 Date:- 28-08-2019.

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**Deputy Registrar,**  
**Syllabus Section**

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- 1] **The Principals, affiliated concerned Colleges, Dr. Babasaheb Ambedkar Marathwada University.**
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

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- 1] The Director, Board of Examinations & Evaluation,
- 2] **The Section Officer, [ Engineering Unit ] Examination Branch,**
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- 6] The Public Relation Officer,
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**Dr. Babasaheb Ambedkar Marathwada  
University, Aurangabad**



**Revised Syllabus of Bachelor of Technology  
First Year  
(I & II Semester)**

**Under Choice Based Credit System (CBC&GS)**

**Under Faculty of Science and Technology**

**(Effective from 2019-20 and onwards)**

FACULTY OF SCIENCE AND TECHNOLOGY															
Syllabus Structure w.e.f. 2019-2020 (Choice Based Credit System)															
First Year (FY) B. Tech. (All branches)															
Semester-I															
Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks							Credits			
		Theory	Practical	Tutorial	MSE-I	MSE-II	TA	ESE	TW	PR/OR	Total	TH	TW/PR	TUT	Total
BSH 101	Engineering Mathematics I	3	-	1	15	15	10	60	25	-	125	3	-	1	4
BSH102/103	Engineering Physics/Engineering Chemistry	3	2	-	15	15	10	60	25	-	125	3	1	-	4
BSH 104	Basic Electrical Engineering	3	2	-	15	15	10	60	25	-	125	3	1	-	4
BSH 105	Engineering Drawing	2	2	-	-	-	-	50	50	-	100	2	1	-	3
BSH 106/107	Programming and Problem Solving/Engineering Mechanics	3	2	-	15	15	10	60	25	-	125	3	1	-	4
BSH108	Development of Skills I	-	2	-	-	-	-	-	-	25#	25	-	1	-	1
BSH 109	Workshop	-	2	-	-	-	-	-	-	25	25	-	1	-	1
BSH 801/BSH 802	Audit Course	2	<-----ENGINEERING EXPLORATION/ENVIRONMENTAL STUDIES----->												
		16	12	1	60	60	40	290	150	25	650	14	6	1	21
Semester-II															
Course Code	Course Name	Teaching Scheme (Hours/Week)			Examination Scheme and Marks							Credits			
		Theory	Practical	Tutorial	MSE-I	MSE-II	TA	ESE	TW	PR/OR	Total	TH	TW/PR	TUT	Total
BSH 151	Engineering Mathematics II	3	-	1	15	15	10	60	-	-	100	3	-	1	4
BSH102/103	Engineering Physics/Engineering Chemistry	3	2	-	15	15	10	60	25	-	125	3	1	-	4
BSH 152	Basic Electronics Engineering	3	2	-	15	15	10	60	25	-	125	3	1	-	4
BSH 106/107	Programming and Problem Solving/Engineering Mechanics	3	2	-	15	15	10	60	25	-	125	3	1	-	4
BSH 153	Fundamentals of Mechanical Engineering	3	2	-	15	15	10	60	25	-	125	3	1	-	4
BSH 154	Development of Skills II	0	2	-	-	-	-	-	-	50	50	-	1	-	1
BSH 801/BSH 802	Audit Course	2	<-----ENGINEERING EXPLORATION/ENVIRONMENTAL STUDIES----->												
		17	10	1	75	75	50	300	100	50	650	15	5	1	21
		#	Online Examination												
MSE- Mid Semester Exam, ESE- End Semester Examination, TH-Theory, OR- Oral, TA-Teacher Assessment, TW- Term Work, PR- Practical, Tut- Tutorial															

<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b> (Faculty of Science & Technology) Syllabus of F. Y. B. Tech (All)					
Course Code: BSH101 Course: Engineering Mathematics I <b>Teaching Scheme:</b> Theory: 3 Hrs/week Tutorial: 1 Hr/week		Credits: 3-1-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks Term Work: 25 Marks End Semester Examination: 60 Marks End Semester Examination (Duration):3 Hrs			
<b>Objectives</b>	<ol style="list-style-type: none"> <li>To provide basic knowledge about Engineering Mathematics</li> <li>To develop skills and create interest to use Mathematics in Engineering and Technology</li> <li>To understand applications of Mathematics in Engineering and Technology</li> </ol>				
<b>Unit-I</b>	Linear Algebra-Matrix Introduction to matrix, rank of matrix-echelon form and normal form, consistency of linear system of equations (6 Hrs)				
<b>Unit-II</b>	Applications of Matrix Eigen values and eigen vectors, Cayley-Hamilton theorem, linear dependence and independence of vectors, linear and orthogonal transformations (8 Hrs)				
<b>Unit-III</b>	Differential Calculus Successive differentiation, Maclaurin's series, indeterminate forms, L' Hospital's rule, evaluation of limits Infinite Series: Introduction to infinite series, test of convergence and divergence of positive term series-comparison test, D' Alembert's ratio test, Cauchy's root test (10 Hrs)				
<b>Unit-IV</b>	Complex Numbers and its Applications Introduction to complex number, De Moivre's theorem and its applications, circular functions and hyperbolic functions of a complex variable, relation between hyperbolic and circular function, inverse hyperbolic functions, real and imaginary parts of circular and hyperbolic functions, logarithmic function of a complex variable (12 Hrs)				
<b>Unit-V</b>	Partial Differentiation: Partial derivatives-Introduction, homogeneous functions of two variables-Euler's Theorem, implicit functions, total derivative, change of variables (7 Hrs)				
<b>Unit-VI</b>	Applications of Partial Derivatives Maxima and minima of functions of two variables, Jacobians and its properties (05 Hrs)				
<b>References</b>	<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publication</b>	<b>Edition</b>
	1	A Text Book of Applied Mathematics Volume-I	P.N. Wartikar J.N.Wartikar.	Pune Vidyarthi GrihaPrakashan	9 <sup>th</sup>
	2	Advanced Engineering Mathematics	H.K.Dass.	S.Chand And Co.Ltd	18 <sup>th</sup>

	3	Higher Engineering Mathematics	Dr.B.S.Grewal	Khanna Publishers	46 <sup>th</sup>
	4	Higher Engineering Mathematics	B.V.Ramana	Tata McGraw-Hill Publishing Co.Ltd.	1 <sup>st</sup>
	5	Advanced Engineering Mathematics	Erwin Kreyszig	Willey Eastern Ltd. Mumbai	10 <sup>th</sup>
	6	A Text Book of Engineering Mathematics	Peter O'Neil	Thomson Asia Pvt. Ltd., Singapore	7 <sup>th</sup>
	7	Advanced Engineering Mathematics	C. R. Wylie & Barrett	Mc Graw Hill Publishing Company Ltd.	6 <sup>th</sup>
	8	Advanced Engineering Mathematics	M. D. Greenberg	Pearson Publication	2 <sup>nd</sup>

<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b> (Faculty of Science & Technology) Syllabus of F. Y. B. Tech (All)	
Course Code: BSH102 Course: Engineering Physics <b>Teaching Scheme:</b> Theory: 3 Hrs/week Practical: 2 Hrs/week	Credits: 3-0-1 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks Term Work: 25 Marks End Semester Examination (Duration): 3 Hrs
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. To study physical properties, concepts and physical quantities required for the solution of complex engineering problems</li> <li>2. To learn basic principles of Physics and laws of scientific investigation to identify, formulate and analyse complex engineering problems</li> <li>3. To gain competency in engineering career by understanding the engineering applications of Physics.</li> </ol>
<b>Unit-I</b>	Optics Introduction to electromagnetic waves and electromagnetic spectrum, Newton's ring in reflected light, Applications of interference - Determination of thickness of very thin wire or foil; determination of refractive index of liquid; wavelength of incident light; radius of curvature of lens; testing of surface flatness; Anti-reflecting films. Diffraction of light, diffraction grating, Dispersive power and resolving power of grating, Application of diffraction grating in spectroscopic devices. Polarization, Nicol prism, optical activity and specific rotation, Laurent's half shade polarimeter, applications of polarization. (6 Hrs)
<b>Unit-II</b>	Acoustics Reverberation and reverberation time, absorption coefficient, Sabine's formula (derivation not necessary) acoustical design of hall. Ultrasonics Properties, Production of ultrasonic waves by piezo-electric and magnetostriction generator, engineering applications of ultrasonic waves, sensors, acoustic grating – Non Destructive Testing – pulse echo system. (6 Hrs)
<b>Unit-III</b>	Crystal Structure Crystalline and amorphous material, lattice and unit cell, Miller indices, atomic radius, coordination number, packing factor calculation for SC, BCC, FCC, diamond structure, NaCl, relation between lattice constant and density. X-Rays Continuous and characteristics spectrum, Bragg's law of X-ray diffraction, Bragg's spectrometer, powder crystal method. (6 Hrs)
<b>Unit-IV</b>	Nuclear Physics Nuclear fission and fusion, chain reaction, nuclear reactor, P-P cycle, C-N cycle, cyclotron, GM counter, applications of nuclear physics in various fields. Modern Physics Black body radiation, Planck's law, Wave particle duality, De-Broglie's concept

	of matter wave, Davisson-Germer experiment, Scanning tunneling microscope, Quantum computing. (6 Hrs)				
<b>Unit-V</b>	<p>Superconductivity Superconductivity, effect of temperature and magnetic fields, Meissner effect, type I and II superconductors, BCS theory, Applications.</p> <p>Semiconductors Intrinsic and extrinsic semiconductors (Descriptive and Analytical), Hall effect and its applications, solar cells.</p> <p>Magnetic Materials Basic concepts in magnetism, classification of magnetic materials, BH characteristics, applications.</p> <p>Nanomaterials and Nanotechnology Properties of nanomaterials optical, electrical, mechanical, and magnetic, Introduction to nanotechnology and applications in computer chips, storage devices, catalysis, sensors, environmental, space, defense and automobile. (6 Hrs)</p>				
<b>Unit-VI</b>	<p>Laser Properties of laser, spontaneous and stimulated emission, requisites of a Laser system. Condition for laser action, ruby laser, He-Ne laser, CO<sub>2</sub> laser and semiconductor Laser, applications.</p> <p>Fiber Technology Propagation of light through optical fiber, acceptance angle and cone numerical aperture, Single and Multi-Mode Fibers, applications, sensors, Holography, applications of holography. (6 Hrs)</p>				
<b>References</b>	<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publication</b>	<b>Edition</b>
	1	A Text book of Engineering Physics	M. N. Avadhanulu P. G. Kshirsagar	S. Chand & Co.	7th
	2	A Text book of Engineering Physics	R. K. Gaur S. L. Gupta	Dhanpat Rai	3 <sup>rd</sup>
	3	Fundamentals of Physics	David Halliday, Jearl Walker, and Robert Resnick	Wiley	6 <sup>th</sup>
	4	Elements of X-ray Diffraction	B. D. Cullity	Addison-Wesley Metallurgy Series	1 <sup>st</sup>
	5	Nuclear Physics	Irving Kaplan	Narosa Publishing house	2 <sup>nd</sup>
	6	Introduction to Solid State Physics	C. Kittel	John Wiley & Sons, Inc	8 <sup>th</sup>
7	Lasers and Non-Linear Optics	B.B. Laud	New age international	3 <sup>rd</sup>	

<b>Websites</b>	1	<a href="http://science.howstuffworks.com/laser1.htm">http://science.howstuffworks.com/laser1.htm</a>
	2	<a href="http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html">http://hyperphysics.phy-astr.gsu.edu/hbase/hframe.html</a>
	3	<a href="http://nptel.ac.in/courses/122107035/">http://nptel.ac.in/courses/122107035/</a>
	4	<a href="http://nptel.ac.in/courses/122104016/">http://nptel.ac.in/courses/122104016/</a>
<p><b>List of Practical (Any 10 practical to be conducted)</b></p> <ol style="list-style-type: none"> <li>1. Newton's ring: To determine wavelength of monochromatic light</li> <li>2. G. M. Counter: dead time calculation</li> <li>3. Grating: To determine wavelength of LASER light.</li> <li>4. Polarimeter: To determine concentration of solution.</li> <li>5. Reverberation time: To determine Reverberation time of a hall.</li> <li>6. Characteristics of solar cell</li> <li>7. Ultrasonic interferometer</li> <li>8. Zener diode: To study characteristics of zener diode &amp; to determine zener voltage.</li> <li>9. Dielectric constant: to determine dielectric constant.</li> <li>10. Forbidden gap: To determine forbidden gap of semiconductors.</li> <li>11. Transistor Characteristics in CE Configuration.</li> <li>12. To determine the Hall coefficient of a semiconductor material and then evaluate carrier type and its density of charge carrier.</li> </ol>		



<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b> (Faculty of Science & Technology) Syllabus of F. Y. B. Tech (All)	
Course Code: BSH103 Course: Engineering Chemistry <b>Teaching Scheme:</b> Theory: 3 Hrs/week Practical: 2 Hrs/week	Credits: 3-0-1 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks Term Work: 25 Marks End Semester Examination (Duration): 3 Hrs
<b>Objectives</b>	1. To relate the concepts of chemistry in all engineering discipline. 2. To acquaint students with modern techniques in Engineering Chemistry this can be applied in engineering field. 3. To identify, formulate and solve engineering problems.
<b>Unit-I</b>	Water Chemistry Hardness of water, types and units, Estimation of hardness by EDTA method, numerical on hardness; alkalinity and numerical on alkalinity; Boiler troubles: scale, sludge, priming, foaming and caustic embrittlement; Water treatment: Ion exchange process. (6 Hrs)
<b>Unit-II</b>	Fuels and Biofuels Fuel: Classification, calorific value: gross and net; solid fuel: proximate analysis of coal & importance; liquid: petroleum and its refining by Fractional distillation; gaseous fuel: properties and applications of hydrogen gas. Biofuels: Classification, properties and applications of ethanol. (6Hrs)
<b>Unit-III</b>	Lubricants Classification; solid Lubricant-Graphite; semisolid lubricant-greases; liquid lubricant- Petroleum oil, properties of liquid lubricants: viscosity and viscosity index, flash point and fire point, acid value. Numerical on viscosity index.(6Hrs)
<b>Unit-IV</b>	Engineering Materials Plastics: Properties and engineering applications of thermoplastics (PVC), thermosetting (Bakelite); Biodegradable polymers (polyvinyl acetate, polyvinyl alcohol); Rubber: Properties and engineering applications of natural rubber, semi-synthetic rubber: vulcanization of rubber; Refractories – Types, properties and applications. (6Hrs)
<b>Unit-V</b>	Corrosion and its prevention Definition, types of dry and wet corrosion (Pitting, intergranular corrosion, Galvanic and stress corrosion). Prevention of corrosion: Methods- Hot dipping: Galvanizing and Tinning; Electroplating, Powder coating (6Hrs)
<b>Unit-VI</b>	Phase Rule Gibb's phase rule, Concept of components, phase, degree of freedom. One component System: Water system, Two component system: Lead-Tin system (Pb-Sn). Alloys: Iron- Properties and applications of stainless steel. Aluminium- Properties and applications of duralumin(6Hrs)

	<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publication</b>	<b>Edition</b>
<b>References</b>	1	Engineering Chemistry (made easy)	Shelly, Oberi and Malik	Cingage Publication	1 <sup>st</sup>
	2	Principles of Polymerization	Odian, G.G	John Wiley & Sons, Inc	4 <sup>th</sup>
	3	Engineering Chemistry	B. Siva Shankar	Mc Graw Hills Publications	3 <sup>rd</sup>
	4	Engineering Chemistry	Jain & Jain	Dhanpat Rai Publishing	16 <sup>th</sup>
<b>Websites</b>	1	<a href="http://science.howstuffworks.com/laser1.htm">http://science.howstuffworks.com/laser1.htm</a>			
<p><b>List of Practical (Any 10 practical to be conducted)</b></p> <ol style="list-style-type: none"> <li>1. Determination of hardness (Total, temporary &amp; permanent) of water by EDTA method.</li> <li>2. To determine total Alkalinity of water sample.</li> <li>3. Determination of pH value of different solutions by pH paper &amp; pHmeter.</li> <li>4. Determination of percentage of moisture and ash in given coal sample.</li> <li>5. Determination of Acid value of lubricating oil.</li> <li>6. Determine Viscosity of oil by Redwood viscometer</li> <li>7. Determination of flash and fire point of lubricating oil.</li> <li>8. Preparation of Bakelite or Urea formaldehyde plastic.</li> <li>9. To Study the factors affecting rate of corrosion.</li> <li>10. To construct a phase diagram for a binary system you have studied.</li> <li>11. Determination of melting or boiling point of organic compound.</li> <li>12. Study of microstructure of alloys.</li> </ol>					

<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b> (Faculty of Science & Technology) Syllabus of F. Y. B. Tech (All)	
Course Code: BSH104 Course: Basic Electrical Engineering <b>Teaching Scheme:</b> Theory: 3 Hrs/week Practical: 2 Hrs/week	Credits: 3-0-1 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks Term Work: 25 Marks End Semester Examination (Duration):3 Hrs
<b>Objectives</b>	1. To know fundamentals of Electrical Engineering. 2. To understand behavior of R with DC circuits and DC theorems. 3. To study Electromagnetism & Fundamentals of AC Circuits. 4. To study construction, working of single phase transformer.
<b>Unit-I</b>	General Concept EMF, P.D. & Current, Resistance for Metal, Alloys, Insulators. Factors affecting resistance values, specific Resistance ' $\rho$ ' - Conductance 'G', Effect of temperature on resistance pure metals, alloys, insulators and semiconductors, RTC, SI Units of work, power & Energy Comparison of AC and DC (6 Hrs)
<b>Unit-II</b>	D.C. Circuit Ohm's Law, Kirchhoff's Laws. Ideal & practical voltage & Current sources, Simplification of Networks using series & parallel combinations, Star Delta conversions, Current and Voltage Divider, Nodal, loop analysis - Theorems - Thevenin's, Superposition and Maximum power transfer theorem. (6 Hrs)
<b>Unit-III</b>	Electromagnetism. A. Magnetic Effect of an Electric Current, Right Hand Thumb Rule, Nature of Magnetic field of Long Straight Conductor, Solenoid & Toroid. B. MMF, Flux, Flux Density, Reluctance, Permeability & Field Strength, Their units & Relationships. Simple series magnetic circuit, Comparison of Electrical & Magnetic Circuits, Force on current carrying conductor placed in magnetic field (Fleming's left hand rule and right hand rule), Faraday's laws of Electromagnetic Induction, Lenz's law, Statically & Dynamically induced EMF. Self & Mutual induced emf, Energy stored in magnetic field. (8 Hrs)
<b>Unit-IV</b>	Measuring Instruments Basic principles of measuring instruments, Application of voltmeter, Ammeter, wattmeter, Construction of moving coil, moving iron, Dynamometer Type, Single phase induction type Energy meter. (4 Hrs)
<b>Unit-V</b>	AC Fundamentals Sinusoidal voltages & Currents, Their Mathematical & Graphical Representation, Concept of Instantaneous Peak (Maximum) Average & RMS Values, Frequency, Cycle, Time Period, Peak Factor & Form Factor, Phase

	difference, Lagging, Leading Phasor representation for pure R, L, C. R-L, R- C & R-L-C series and parallel resonance Circuits & Qfactor. (8 Hrs)				
<b>Unit-VI</b>	Single Phase Transformer Working principle, Construction and Types, (Core type & Shell Type), EMF equation, Ideal & Practical transformer on no load, on resistive load. Regulation & efficiency of transformer on direct resistive load. (4 Hrs)				
<b>References</b>	<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publication</b>	<b>Edition</b>
	1	Electrical Technology Vol. I & II	B. L. Thereja	S. Chand Delhi	
	2	Basic Electrical Engineering	J. B. Gupta	Katsons Books, Delhi	
	3	Basic Electrical Engineering	V. K. Mehta	S. Chand, Delhi	
	4	ABC Of Electrical Engineering	B. L. Thereja A. K. Thereja	S. Chand, Delhi	
	5	Basic Electrical Engineering	E. Huges	Mc-Graw Hill, New Delhi	
<p align="center"><b>List of Practical (Any 10 practical to be conducted)</b></p> <ol style="list-style-type: none"> <li>1. To Study of the accessories to be used in householdwirings and awareness of electric safety.</li> <li>2. i) To understand the Concept of Phase, Neutral &amp; Earthling in Electrical Installation. ii) Single Lamp controlled by single switch circuit.</li> <li>3. To Study &amp; Demonstrate circuit of Fluorescent TubeLight.</li> <li>4. To Study &amp; Demonstrate StaircaseWiring.</li> <li>5. To study &amp; understand importance of Series Lamp.</li> <li>6. To Verify Ohm'sLaw.</li> <li>7. To verify SuperpositionTheorem.</li> <li>8. To verify Thevenin's Theorem.</li> <li>9. To study R-L-C series circuit.</li> <li>10. To verify Voltage Ratio of single phaseTransformer.</li> <li>11. To verify power in Star/Delta Circuits (resistive load) by measuring voltage and current by ammeter and voltmeter is same in both thecase.</li> <li>12. To calculate Efficiency &amp; Regulation of single phaseTransformer.</li> </ol>					

<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b> (Faculty of Science & Technology) Syllabus of F. Y. B. Tech (All)					
Course Code: BSH105 Course: Engineering Drawing <b>Teaching Scheme:</b> Theory: 2Hrs/week Practical: 2 Hrs/week		Credits: 2-0-1 End Semester Examination: 50 Marks Term Work: 50 Marks End Semester Examination (Duration):3 Hrs			
<b>Objectives</b>	<ol style="list-style-type: none"> <li>To acquire basic knowledge and skills about engineering drawing language, types of lines, dimensioning methods and simple geometrical construction.</li> <li>To be able to draw projection of lines, planes, solids and cut solids</li> <li>To acquire basic knowledge about visualisation of engineering objects and shall be able to draw its different views.</li> </ol>				
<b>Unit-I</b>	Introduction and projections of lines- Importance of engineering drawing, types of lines, lettering and dimensioning, obtaining projections of lines inclined to both the planes, and determination of true length and true inclinations of the line. (4 Hrs)				
<b>Unit-II</b>	Projections of planes - Planes with surface inclined to one reference plane only. Planes such as- triangles, quadrilaterals, pentagon, hexagon and circle etc. (4 Hrs)				
<b>Unit-III</b>	Projections of solids- Projections of solids such as prism, cylinder, pyramid, cone, cube with axis inclined to one reference plane. (4 Hrs)				
<b>Unit-IV</b>	Sections of solids –Projections of regular cut solids such as prism, cylinder, pyramid and cone. (2 Hrs)				
<b>Unit-V</b>	Orthographic projections: - Obtaining orthographic projections of different simple objects from the given 3D view, sectional orthographic projections. (5 Hrs)				
<b>Unit-VI</b>	Isometric projections- Introduction to three-dimensional drawing projections, isometric drawing and isometric projections. Drawing isometric views for given orthographic views. (5 Hrs)				
<b>References</b>	<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publication</b>	<b>Edition</b>
	1	Engineering Drawing	N. D. Bhatt and V.M. Panchal	Charotar Publishing House	3 <sup>rd</sup>
	2	Engineering Drawing	Basant Agarwal and Agarwal C.M	Tata McGraw Hill Publishing Company Limited, New Delhi	2 <sup>nd</sup>
	3	Engineering Drawing	B. V. R. Gupta	IK International Publishing House	3 <sup>rd</sup>

**List of Practical**

**Sheet No. 1:** Projections of Lines: To solve at least four problems based on line inclined to both the planes with following objectives,

- i. Obtaining projections of line inclined to both the planes,
- ii. Determination of true length and true inclinations of the line,

**Sheet No. 2:** Projections of Planes: To solve at least four problems on planes inclined to one reference plane with following objectives

- i. Obtaining projections of planes of different (polygonal, circular etc.) shapes, inclined to one of the reference planes.
- ii. Determination of true shape and inclinations of the plane.

**Sheet No. 3:** Projections of Solids: To solve at least four problems based on solids with axis inclined to one of the reference planes with following objective,

- i. Obtaining projections of different regular geometrical solids

**Sheet No. 4:** Sections of Solids: At least two problems based on sections of solids with following objectives,

- i. Drawing section line view of the cutting plane in correct view,
- ii. Drawing sectional view and true shape of the section,
- iii. Determining inclination of the cutting plane from the given true shape of the section.

**Sheet No.5** Orthographic Projections: At least two problems to be solved on, orthographic projections with following objective

- i. Reading the 3D drawings and converting it in 2D views

**Sheet No. 6:** Sectional Orthographic Projections: At least two problems to be solved on Sectional Orthographic Projections

**Sheet No.7:** Isometric Views: Solving at least two problem for drawing isometric view with following objective

- i. Reading the 2D drawings and converting it in 3D views

<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b> (Faculty of Science & Technology) Syllabus of F. Y. B. Tech (All)					
Course Code: BSH106 Course: Programming and Problem Solving <b>Teaching Scheme:</b> Theory: 3 Hrs/week Practical: 2 Hrs/week		Credits: 3-0-1 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks Term Work: 25 Marks End Semester Examination (Duration): 3 Hrs			
<b>Objectives</b>	1. Students will learn the basics of 'C' programming. 2. Students will be able to think about basic problems, develop algorithms and write programs using 'C' language.				
<b>Unit-I</b>	Programming Languages and Introduction to C Introduction to programming language, Types of programming language- Machine language, Assembly Language, High Level Language, compiler, assembler, interpreter, loader, linker, editor. C character set, constants, Variables keywords and operators, Basic data types, Instructions, Type conversion, Algorithm, Flow Chart, C program structure, Simple C program. (6 Hrs)				
<b>Unit-II</b>	The Decision control structure If, if-else, nested if statements, Use of logical operators- AND, OR and NOT, Conditional operator, relational operator, Loops- While, for and do-while, Break and continue statements, Switch -case statement. (6 Hrs)				
<b>Unit-III</b>	Arrays and Strings Array declaration, Initialization, One dimensional and Two dimensional arrays, Matrix operations. Introduction to Strings, Standard Library Functions -strlen(), strcpy(), strcat(), strcmp(), strcmp() (6 Hrs)				
<b>Unit-IV</b>	Functions Introduction to function, Uses of functions, Function declaration and definition, Scope rule of functions, Call by value, Recursion (6 Hrs)				
<b>Unit-V</b>	Pointers Introduction to pointers, Pointer notation, Call by Reference, Passing an array and array elements to a function (6 Hrs)				
<b>Unit-VI</b>	Structures Introduction to Structure, Uses of Structures, Declaring a Structure, Accessing structure elements, Array of structures (6 Hrs)				
<b>References</b>	<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publication</b>	<b>Edition</b>
	1	Introduction to computers	Peter Norton	Tata McGrawHill	4 <sup>th</sup>
	2	Let us C	Yeshwanth Kanetkar	BPB	8 <sup>th</sup>
	3	The C Programming language	Kernighan B.W and Ritchie D.M	Pearson Education	2 <sup>nd</sup>
	4	Programming with C	Byron S Gottfried	Tata McGraw-Hill,	2 <sup>nd</sup>





<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b> (Faculty of Science & Technology) Syllabus of F. Y. B. Tech (All)					
Course Code: BSH107 Course: Engineering Mechanics <b>Teaching Scheme:</b> Theory: 3 Hrs/week Practical: 2 Hrs/week			Credits: 3-0-1 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks Term Work: 25 Marks End Semester Examination (Duration): 3 Hrs		
<b>Objectives</b>	1. To understand the basics of Engineering mechanics 2. To study fundamentals and to impart knowledge about role of statics and dynamics 3. To resolve the forces of various systems				
<b>Unit-I</b>	Force System: Basic definitions, Force, Rigid Body, Particle, Moment of a force, Principle of Transmissibility, Principle of Superposition, Varignon's Theorem, Lami's Theorem, Law of Parallelogram of Force, Resolution and Composition of Forces, Force Systems (co-planar 2-D System only), Analytical method to determine resultant, equivalent force couple. Free body Diagrams, concept of Equilibrium, Equilibrium of 2-D Force System, Analysis of pin-jointed plane frames, types of supports, types of loading, Beam Reactions. (6Hrs)				
<b>Unit-II</b>	Plane Trusses: Analysis of pin jointed plane Trusses by Method of Joint, Method of Section. (4Hrs)				
<b>Unit-III</b>	Friction: Basic definitions, Laws of Friction, Cone of Friction, Angle of repose, Limiting Equilibrium for bodies under force systems. Centre of Gravity and Moment of Inertia: Derivation of CG and MI of standard shape of lines, plane Lamina, Radius of Gyration, Parallel and Perpendicular Axis Theorem. (8Hrs)				
<b>Unit-IV</b>	Kinematics of Particles: Linear motion, Motion with constant acceleration, Motion with variable acceleration, Motion Diagrams, Relative Velocity and Resultant Velocity. (6Hrs)				
<b>Unit-V</b>	Kinematics of Rigid Bodies: Plane motion of particles and connected bodies, Linear Motion, Translation, Combined Linear and Translation Motion. (6 Hrs)				
<b>Unit-VI</b>	Kinetics of Rigid Bodies: Rotational motion, rolling without slipping, D'Alembert's Principle, Impact and Impulse. (6 Hrs)				
<b>References</b>	<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publication</b>	<b>Edition</b>
	1	Engineering Mechanics	R. K. Bansal	Laxmi Publication	4 <sup>th</sup>
	2	Engineering Mechanics	A. R. Basu	Dhanpatrai and Sons	2 <sup>nd</sup>
	3	Engineering Mechanics	Nelson and Mclean	Mc Graw Hill Book, Inc	2 <sup>nd</sup>
	4	Engineering Mechanics	B. Prasad	Khanna Publications	9 <sup>th</sup>
5	Vector Mechanics for	F.B. Beer and	Mc Graw Hill Book, Inc	6 <sup>th</sup>	

		Engineers	E.R.Johnston		
<b>List of Practical</b>					
<b>Part I: Graphical Solutions: (Two problems each)</b>					
1. Resultant of Concurrent and Non- Concurrent Coplanar Force System					
2. Problems on Beam Reaction					
3. Problems on Analysis of Pin-jointed Trusses					
<b>Part II: Laboratory Experiments: (Any Six)</b>					
1. Parallelogram Law of Forces					
2. Lami's Theorem					
3. Beam Reactions					
4. Member Forces in Trusses					
5. Jib Crane					
6. Moment of Inertia of Fly Wheel					
7. Simple Screw Jack					
8. Differential Axle and Wheel					
9. Belt Friction					

<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b> (Faculty of Science & Technology) Syllabus of F. Y. B. Tech (All)					
Course Code: BSH108 Course: Development of Skills I <b>Teaching Scheme:</b> Practical: 2 Hrs/week			Credits: 0-0-1 Term Work: 25 Marks(Online Examination:)		
<b>Objectives</b>	1. To apply English Grammar in day to day communication. 2. To pronounce and articulate English words and sentences accurately 3. To communicate in English effectively by using updated vocabulary. 4. To apply Soft Skills from campus to corporate. 5. To exhibit etiquettes through their behaviour from campus to corporate.				
<b>Unit-I</b>	Grammar Parts of Speech (4 Hrs)				
<b>Unit-II</b>	Tenses and the Concept of Time (6 Hrs)				
<b>Unit-III</b>	Transformation of sentences and Conditional Clauses (4 Hrs)				
<b>Unit-IV</b>	Vocabulary Enhancement <ul style="list-style-type: none"> <li>• Types of Vocabulary</li> <li>• Basic techniques to Enhance Vocabulary</li> <li>• Vocabulary Enhancing Activities(2 Hrs)</li> </ul>				
<b>Unit-V</b>	Introduction to Phonetics Phonetics and problems in learning and using pronunciation, <ul style="list-style-type: none"> <li>• Vowel sounds &amp; Consonant Sounds,</li> <li>• Articulation of Sounds</li> <li>• Word accent (4 Hrs)</li> </ul>				
<b>Unit-VI</b>	Soft Skills <ul style="list-style-type: none"> <li>• Importance of Soft Skills in general,</li> <li>• Campus to Corporate Etiquettes:(Grooming, Mobile, Class room)(4Hrs)</li> </ul>				
<b>References</b>	<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publication</b>	<b>Edition</b>
	1	The Essence of Effective Communication	Adrian Budday, Ron Ludlow and Fergus' Panton	Prentice Hall of India-Private Ltd.	
	2	Professional Communication Skills	A. K. Jain, Pravin, S. R. Bhatia, A. M. Sheikh	S. Chand & Company Ltd.	
	3	Business Communication	Urmila Rai, S. M. Rai	Himalya Publishing House	
	4	Technical Communication- Principles and Practice	Meenakshi Raman & Sangeeta Sharma	Oxford University Press	
	5	A course in Phonetics & Spoken English	J.Sethi,P.V.Dharmatma	PHI Publication	
	6	Communication Skills for Engineers	Sunita Mishra, C. Murli Krishna	Pearson Education	
7	Grammar of Spoken and Written English	DauglasBiber, Geoffrey Leech	Longman		

<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b> (Faculty of Science & Technology) Syllabus of F. Y. B. Tech (All)	
Course Code: BSH109 Course: Workshop <b>Teaching Scheme:</b> Practical: 2 Hrs/week	Credits: 0-0-1 Practical Examination: 25 Marks
<b>Objectives</b>	To have hands on practice for Mechanical Workshop
<b>Section</b>	<b>Content</b>
Fitting	Study of different tools of fitting & processes involved in fitting. Workshop Diary – Sketches & description of fitting tools, Sketches of the job. Practical: One composite job involving simple fitting operation like sawing, marking, filing & tapping operation: minimum one job (Male – female fitting)
Black Smithy	Study of different smithy tools & processes Workshop diary - Sketches & description of smithy tools, Sketches of the job. Practical: Preparation of one job making round cross section to square bar.
Sheet Metal Working	Study of different sheet metal tools Workshop diary - Sketches & description of sheet tools. Sketches of the job. Practical: one job involving development of surfaces, marking on sheet metal cutting, bending, joint preparation by folding.

<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b> (Faculty of Science & Technology) Syllabus of F. Y. B. Tech (All)	
Course Code: BSH801 Course: Engineering Exploration	Audit course <b>Teaching Scheme:</b> Theory: 2 Hrs/week
<b>Objectives</b>	1. To make student understand the role of an Engineer as a problem solver. 2. To enable students to build simple systems using engineering design process. 3. To introduce ethical, sustainability perspectives. 4. To get students familiar with engineering project management skills. 5. To make students explore different aspects of engineering.
<b>Unit-I</b>	Introduction to Engineering and Engineering study Introduction to Engineering and Engineering Study: Difference between science and engineering, scientist and engineer needs and wants, various disciplines of engineering, some misconceptions of engineering, Expectation for the 21st century engineer and Graduate Attributes.
<b>Unit-II</b>	Engineering Design Engineering Design Process, Multidisciplinary facet of design, Pair wise comparison chart, Introduction to mechatronics system, generation of multiple solution, Pugh Chart, Motor and battery sizing concepts.
<b>Unit-III</b>	Mechanisms Basic Components of a Mechanism, Degrees of Freedom or Mobility of a Mechanism, 4 Bar Chain, Crank Rocker Mechanism, Slider Crank Mechanism.
<b>Unit-IV</b>	Platform based development Introduction to various platform-based development (Arduino) programming and its essentials, Introduction to sensors, transducers and actuators and its interfacing with Arduino.
<b>Unit-V</b>	Data Acquisition and Analysis Types of Data, Descriptive Statistics techniques as applicable to different types of data, Types of graphs as applicable to different types of data, Usage of Microsoft Excel tool for descriptive statistics, Data Acquisition (Temperature and humidity) using Sensors interfaced with Arduino, Exporting acquired data to Microsoft Excel and analysis using visual represent
<b>Unit-VI</b>	Project Management Introduction to Agile practices, Significance of team work, Importance of communication in engineering profession, Project management tools: Checklist, Timeline, Gantt Chart, Significance of documentation.
<b>Unit-VII</b>	Engineering Ethics Identifying Engineering as a Profession, Significance of Professional Ethics, Code of Conduct for Engineers, Identifying Ethical Dilemmas in different tasks of engineering, Applying Moral Theories and codes of conduct for resolution of Ethical Dilemmas.
<b>Unit-VIII</b>	Sustainability in Engineering Introduction to sustainability, Sustainability leadership, Life cycle assessment, carbon foot print.

	<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publication</b>	<b>Edition</b>
<b>References</b>	1	ABC of Sustainable Development	V Govindrajan	Bookboon.com	2 <sup>nd</sup>
	2	Engineering Design: A Project Based Introduction	C.L. Dym, P. Little	Wiley Publication	4 <sup>th</sup>
	3	Project Design & Development	Karl Ulrich	McGraw Hill Publication	5 <sup>th</sup>
	4	Theory of Machines	R.S. Khurmi	S. Chand Publication	14 <sup>th</sup>
	5	Getting Started with Arduino	Massimo Banzi	O'Reilly	1 <sup>st</sup>
	6	Data Mining Concepts & Techniques	Jiawei Han	MK Publications	3 <sup>rd</sup>
	7	Engineering Ethics	C. Fledderman	PHI Publication	4 <sup>th</sup>

<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b> (Faculty of Science & Technology) Syllabus of F. Y. B. Tech (All)					
Course Code: BSH802 Course: Environmental Studies			Audit course <b>Teaching Scheme:</b> Theory: 2 Hrs/week		
<b>Objectives</b>	1. To study environment as a whole with all the basic concepts related to it. 2. To study different types of pollution and their ill effects on mankind. 3. To study various technologies used for betterment of environment and health. 4. To study various rules and regulations specially developed for environmental betterment				
<b>Unit-I</b>	Multidisciplinary nature of Environmental science Scope and Importance; Components of Environment: Atmosphere, Hydrosphere, Lithosphere and biosphere; Structure of atmosphere, Environmental Degradation. (4 Hrs)				
<b>Unit-II</b>	Natural Resources and Conservation Classification of Natural Resources; Non-conventional Energy resources – Solar, Wind, Hydropower, Nuclear, Bioenergy, Tidal Energy; Conservation Techniques – Rainwater harvesting. (4 Hrs)				
<b>Unit-III</b>	Environmental Biotechnology Biofuels, Biofertilizer, Biosensors, biochips; Green Technology: Green solvents (Water & CO <sub>2</sub> ) (4 Hrs)				
<b>Unit-IV</b>	Air and Noise Pollution Sources, Effects, standards and Controlling methods of pollution; Carbon footprint; case study as Bhopal gas tragedy. (4 Hrs)				
<b>Unit-V</b>	Water and Land Pollution Sources, Effects, standards and Controlling methods of water and land pollution. Solid Waste management- Classification of solid waste, disposal of solid waste (Composting, Pulverization). (4 Hrs)				
<b>Unit-VI</b>	Environmental Legislation Functions & Powers of Central Pollution control board & state pollution control board; Environmental Protection Act; Environmental Impact assessment. (4 Hrs)				
<b>References</b>	<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publication</b>	<b>Edition</b>
	1	Textbook of environmental	ErachBharucha	University Press	
	2	Handbook of Environmental Laws, Rules guidelines, compliances and standards Volume I and II		EnviroMedia	3 <sup>rd</sup>
	3	Environmental Biotechnology	S. N. Jogdand	Himalaya	
4	Environmental chemistry and pollution control	Dr. S. S Dara & Dr. D. D. Mishra	S. Chand	7 <sup>th</sup>	

<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b> (Faculty of Science & Technology) Syllabus of F. Y. B. Tech (All)					
Course Code: BSH151 Course: Engineering Mathematics - II <b>Teaching Scheme:</b> Theory: 3 Hrs/week Tutorial: 1 Hr/week		Credits: 3-1-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs			
<b>Objectives</b>	1. To develop mathematical skills and logical understanding of the subject. 2. To analyze and find solutions of problems in engineering. 3. To apply knowledge of mathematics in engineering and technology.				
<b>Unit-I</b>	Differential Equations Solution of differential equation of first order and first degree: Exact, Linear and Reducible to linear (Bernoulli's equation) (8 Hrs)				
<b>Unit-II</b>	Application of Differential Equations Application of Differential Equations of the first order and the first degree to electrical circuit, mechanics and orthogonal trajectories (4 Hrs)				
<b>Unit-III</b>	Curve Tracing and Rectification Tracing of curves in Cartesian form, Tracing of curves in Polar form, Rectification of plane curves (Cartesian and Polar) Curvature: Radius of Curvature for Cartesian curve, Radius of curvature at the origin (12 Hrs)				
<b>Unit-IV</b>	Integral Calculus Reduction Formulae, Beta Function, Gamma Function, Relation between Beta and Gamma Function (without proofs) (6 Hrs)				
<b>Unit-V</b>	Multiple Integrals and Their Applications Double Integration in Cartesian and Polar co-ordinates, Change of order of Integration, Change to polar co-ordinates, Triple integral. Application to areas, volumes, surfaces areas and volume of revolutions (12 Hrs)				
<b>Unit-VI</b>	Fourier Series Dirichlet's conditions, Euler-Fourier formulae, Fourier series for function having period $2L$ , Fourier series for even and odd function, Half range expansions: Fourier sine and cosine series (6 Hrs)				
<b>References</b>	<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publication</b>	<b>Edition</b>
	1	A Text Book Of Applied Mathematics Volume-I	P.N. Wartikar J.N.Wartikar.	Pune Vidyarthi GrihaPrakashan	9 <sup>th</sup>
	2	Advanced Engineering Mathematics	H.K.Dass.	S.Chand And Co.Ltd	18 <sup>th</sup>
	3	Higher Engineering Mathematics	Dr.B.S.Grewal	Khanna Publishers	46 <sup>th</sup>
	4	Higher Engineering Mathematics	B.V.Ramana	Tata McGraw-Hill Publishing Co.Ltd.	1 <sup>st</sup>



	5	Advanced Engineering Mathematics	Erwin Kreyszig	Willey Eastern Ltd. Mumbai	10 <sup>th</sup>
	6	A Text Book of Engineering Mathematics	Peter O'Neil	Thomson Asia Pvt. Ltd., Singapore	7 <sup>th</sup>
	7	Advanced Engineering Mathematics	C. R. Wylie & Barrett	Mc Graw Hill Publishing Company Ltd	6 <sup>th</sup>
	8	Advanced Engineering Mathematics	M. D. Greenberg	Pearson Publication	2 <sup>nd</sup>

<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b> (Faculty of Science & Technology) Syllabus of F. Y. B. Tech (All)					
Course Code: BSH152 Course: Basic Electronics Engineering <b>Teaching Scheme:</b> Theory: 3 Hrs/week Practical: 2 Hrs/week		Credits: 3-0-1 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks Term Work: 25 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs			
<b>Objectives</b>	1. To give knowledge of some electronic devices and rectifier circuits. 2. To understand configuration of operational amplifier and know its applications. 3. To study Logic gates and their usage in digital circuits. 4. To expose the students to working of transducers and their applications. 5. To introduce basic aspects of electronic communication systems.				
<b>Unit-I</b>	Semiconductor Devices and its Application Semiconductor and its types, Brief: PN Junction Diode, Zener Diode, LED, BJT, FET, MOSFET and their applications, Introduction to oscillator. (8Hrs)				
<b>Unit-II</b>	Rectifiers Definition – Need of Rectification, Half wave, Full wave, Bridge rectifiers, Uses of filters in rectifier circuit, Ripple factor, Efficiency and PIV, Comparison, Basic block of Regulated Power Supply. (6 Hrs)				
<b>Unit-III</b>	Operational Amplifier Block diagram of Operational Amplifier, Inverting and Non-Inverting Configuration and parameters, Ideal Characteristics, Op-Amp as Summing amplifier, Difference amplifier, Integrator, Differentiator and Comparator (Brief). (6Hrs)				
<b>Unit-IV</b>	Digital Circuit Basic logic gates, universal logic gates, Boolean algebra, Introduction to logic families, Half Adder, Full Adder, Multiplexer, De-multiplexer, D-Flip-Flop. (7Hrs)				
<b>Unit-V</b>	Transducers Definition, Transducer, Classification of Transducer, Basic operation of Transducers like RTD, Thermocouple, Thermistor, Flow measurement, Level measurement, Pressure measurement, Displacement measurement. (8Hrs)				
<b>Unit-VI</b>	Electronics Communication The elements of a Communication System, Transmission Media, Need for Modulation, Basic block of AM and FM, Introduction to Mobile Communication System. (5Hrs)				
<b>References</b>	<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publication</b>	<b>Edition</b>
	1	Integrated Electronics	Miliman, Halkies	TataMc-Graw Hill, New Delhi	
	2	Linear Integrated Circuit and operational amplifier	Ramakant Gaikwad	Prientice Hall of India	

	3	Modern Digital Electronics	R.P.Jain	TataMc-Graw Hill, New Delhi	3 <sup>rd</sup>
	4	Electronics and Electrical Measurement and instrumentation	A.K.Sawhney	Dhanpat Rai & sons	
	5	Applied Electronics	R.S. Sedha	S.Chand& Co , New Delhi	
	6	Principles of Electronics	V.K. Mehta	S.Chand& Co , New Delhi	
	7	Electronics Communication System	George Kenedy	TataMc-Graw Hill, New Delhi	4 <sup>th</sup>
	8	Electronics Instrumentation	H. S. Kalasi	TataMc-Graw Hill, New Delhi	2 <sup>nd</sup>

**List of Practical**

1. Study of different active and passive electronics component.
2. Study of different measuring instruments.
3. To plot VI Characteristics of PN Junction Diode.
4. To observe and perform the operation of rectifier
5. To measure voltage and observe waveforms at input and output terminals of Single stage BJT Common Emitter amplifier circuit.
6. To Plot Drain Characteristics of FET.
7. To Study of Op-Amp based amplifiers circuits.
8. To Verify truth table of basic logic and universal gates.
9. Study of Measurement of displacement using LVDT.
10. To Study transducer: Strain gauge/Bourdon tube.

<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b> (Faculty of Science & Technology) Syllabus of F. Y. B. Tech (All)	
Course Code: BSH153 Course: Fundamentals of Mechanical Engineering <b>Teaching Scheme:</b> Theory: 3 Hrs/week Practical: 2 Hrs/week	Credits: 3-1-0 Mid Semester Examination-I: 15 Marks Mid Semester Examination-II: 15 Marks Teacher Assessment: 10 Marks Term Work: 25 Marks End Semester Examination: 60 Marks End Semester Examination (Duration): 3 Hrs
<b>Objectives</b>	1. To understand fundamental concepts of thermal engineering 2. To study engineering applications of thermal engineering 3. To understand working principle of machine tools 4. To understand the functions of various power transmitting elements
<b>Unit-I</b>	Fundamental concepts and Definitions Scope of thermodynamics, brief idea about various fields of applications. Macroscopic & microscopic description of matter, pure substance, working substance, thermodynamic system & its types, thermodynamic state of system, thermodynamic properties, reversible and non reversible process, cyclic and non-cyclic processes, thermodynamic equilibrium, Zeroth law of thermodynamics. Concept and measurement of temperature, temperature scales, pressure measuring devices. (Numerical treatment on pressure and temperature measurement) (6Hrs)
<b>Unit-II</b>	Work Heat and First Law of Thermodynamics Thermodynamic definition of work, types of work, quasi static process, PdV work for different processes, Definition of heat, specific heat, modes of heat transfer, laws governing the modes of heat transfer, comparison between heat & work. (Numerical on types of works), Statement of First law of thermodynamics, verification of first law by Jules experiment, First law for cyclic and non cyclic (Non flow ) processes. (Numerical on single process only) (6Hrs)
<b>Unit-III</b>	Thermal Machines Classification of boiler, construction and working of Lancashire boiler only, boiler mountings and accessories location and applications only. Working of 2 stroke & 4 stroke CI & SI engines. Principle and working of vapor compression refrigerator. Principle and working of air conditioner and air cooler. (6Hrs)
<b>Unit-IV</b>	Introduction to Engineering Materials Introduction, Classification, Properties, Selection and application of materials Basic heat treatment Processes: Annealing, Normalizing and Hardening. Metal forming and Metal Joining Processes: Introduction and classification only. (6Hrs)
<b>Unit-V</b>	Machine Tools Introduction and classification of machine tools, working principle block diagram and operations carried on Lathe machine, Drilling machine, Milling machine, Shaping machine and Grinding machines. (6Hrs)
<b>Unit-VI</b>	Power Transmission Elements Belt: Types of belt and its material, Belt Drives-types and application, velocity ratio, creep and slip in belt. Pulleys: Idler pulley stepped pulley, fast and loose

	pulley. Gears: Definition, Terminology, types and uses. Gear drives. Bearings-types and application. Keys and Coupling: Types of keys, coupling types, rigid flange and bushed pin flexible coupling. Clutch: Types, description friction clutches. (6Hrs)				
<b>References</b>	<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publication</b>	<b>Edition</b>
	1	Fundamentals of classical Thermodynamics	P. K.Nag	Tata Mc Graw Hill	8 <sup>th</sup>
	2	Thermodynamics An Engineering Approach	Y.Cengel & M.Boles	Mc Graw Hill	5 <sup>th</sup>
	3	Thermal Engineering	R.K.Rajput	Laxmi Publication	
	4	Engineering Thermodynamics (Principles and Practices)	Dr.D.S.Kumar	Katsons Publications	2 <sup>nd</sup>
	5	Workshop Technology	Hajara Chowdhary	Media Promoters	
	6	Manufacturing Science	Amitabha Ghosh and Mallik	East West Press	
	7	Manufacturing Technology	P. N. Rao	Tata Mc Graw Hill	
8	Comprehensive Workshop Technology (Manufacturing Processes)	S.K. Garg	Laxmi publications.		
<b>List of Practical (Any 10 practicals to be conducted)</b> <ol style="list-style-type: none"> <li>1. Study and demonstration of low pressure boiler (any one)</li> <li>2. Study and demonstration of high pressure boiler (any one)</li> <li>3. Study and demonstration of 2 stroke and 4 stroke petrol engine</li> <li>4. Study and demonstration of 2 stroke and 4 stroke diesel engine</li> <li>5. Study and demonstration of domestic refrigerator</li> <li>6. Study and demonstration of window type airconditioner</li> <li>7. Study and demonstration of Lathemachine</li> <li>8. Study and demonstration of Millingmachine</li> <li>9. Study and demonstration of Shapermachine</li> <li>10. Study and demonstration of Radial drillingmachine</li> <li>11. Assignment on Unit I, II, IV and VI</li> </ol>					

<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b> (Faculty of Science & Technology) Syllabus of F. Y. B. Tech (All)																			
Course Code: BSH154 Course: Development of Skills II <b>Teaching Scheme:</b> Practical: 2 Hrs/week	Credits: 0-0-1 End Semester Practical Examination: 50 Marks																		
<b>Objectives</b>	<ol style="list-style-type: none"> <li>1. The course enables Basic Problem Solving.</li> <li>2. The course introduces Python Input/ Output and Data Types with basic operations.</li> <li>3. The course will build up understanding on Python Conditional Statements and Loops.</li> <li>4. The course will uncover the use of Python Functions.</li> </ol>																		
<b>Lab 1</b>	<p><b>(Any 10 practicals to be conducted)</b></p> <p>Introduction: Introduction to Programming Languages, generations of languages. Introduction to Python Programming- History, Features, applications in various branch of Engineering.            Installing Python.            Installing IDE for Python Programming – Pycharm/ Eclipse            Getting familiar with IDE- creating projects, packages. Exploring various options</p>																		
<b>Lab 2</b>	<p>Problem Solving: Using Flowcharts for problem solving- Flowchart Notations: start, end, input-output, conditions.            Guided Exercise:            Implement flowcharts for following category of problems:</p> <ol style="list-style-type: none"> <li>1. Applying Arithmetic operators</li> <li>2. Applying Conditions</li> <li>3. Repeating a set of statements</li> </ol> <p>Work Independently:            Implement flowcharts for following problems:</p> <ol style="list-style-type: none"> <li>1. Input a number and find if it is Prime or Composite               <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>Prime Number</td> </tr> <tr> <td>30</td> <td>Composite Number</td> </tr> </tbody> </table> </li> <li>2. Input a number and find if it is perfect square               <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>9</td> <td>Perfect Square</td> </tr> <tr> <td>12</td> <td>Not a Perfect Square</td> </tr> </tbody> </table> </li> <li>3. Input a number and print its reverse               <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>123</td> <td>321</td> </tr> <tr> <td>9876</td> <td>6789</td> </tr> </tbody> </table> </li> </ol>	Input	Output	3	Prime Number	30	Composite Number	Input	Output	9	Perfect Square	12	Not a Perfect Square	Input	Output	123	321	9876	6789
Input	Output																		
3	Prime Number																		
30	Composite Number																		
Input	Output																		
9	Perfect Square																		
12	Not a Perfect Square																		
Input	Output																		
123	321																		
9876	6789																		
<b>Lab 3</b>	<p>Problem Solving: Using Algorithms for problem solving. Format of an Algorithms- Input, Output, Steps.            Guided Exercise:            Write Algorithms for following category of problems:</p> <ol style="list-style-type: none"> <li>1. Applying Arithmetic operators</li> <li>2. Applying Conditions and Repeating a set of statements</li> </ol>																		

	<p>3. Calling an algorithm within other Work Independently: Write algorithms for following problems:</p> <ol style="list-style-type: none"> <li>Input a number and find if it is Prime or Composite <table border="1" data-bbox="459 398 1072 515"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>Prime Number</td> </tr> <tr> <td>30</td> <td>Composite Number</td> </tr> </tbody> </table> </li> <li>Input three sides of triangle and print if its is- Equilateral, Isosceles, Scalene <table border="1" data-bbox="459 584 1072 734"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>1 2 3</td> <td>Scalene</td> </tr> <tr> <td>1 2 1</td> <td>Isosceles</td> </tr> <tr> <td>1 1 1</td> <td>Equilateral</td> </tr> </tbody> </table> </li> <li>Input a number and print it is palindrome or not reverse <table border="1" data-bbox="459 768 1072 884"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>123</td> <td>Not a Palindrome</td> </tr> <tr> <td>1221</td> <td>Palindrome</td> </tr> </tbody> </table> </li> </ol>	Input	Output	3	Prime Number	30	Composite Number	Input	Output	1 2 3	Scalene	1 2 1	Isosceles	1 1 1	Equilateral	Input	Output	123	Not a Palindrome	1221	Palindrome
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<b>Lab 4</b>	<p>Input-Output and Basic Arithmetic Operations: Syntax for input-output in python. Primitive data types. Arithmetic operators in Python. Guided Exercise: Implement Python Programs for following category of problems:</p> <ol style="list-style-type: none"> <li>Various ways of output- use of \n, \t, \', \\\</li> <li>Input two numbers and print their – sum, difference, product, quotient, power, remainder</li> <li>Problems on finding area of figure</li> <li>Problems on banking calculations based on input values</li> <li>Problems on billing</li> </ol> <p>Work Independently: Implement for following problems:</p> <ol style="list-style-type: none"> <li>Input a x and y coordinates of two points and find length of line <table border="1" data-bbox="459 1346 1219 1424"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>x1=1 y1=1 x2= 2 y2= 2</td> <td>Length of line= 1.4</td> </tr> </tbody> </table> </li> <li>Input radius and height of a cylinder find radius of sphere which can be formed by melting this cylinder. <table border="1" data-bbox="459 1494 1219 1572"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Radius= 5, height= 10</td> <td>Radius of sphere= 5.72</td> </tr> </tbody> </table> </li> <li>Input a float number and display its integer part and float part separately. <table border="1" data-bbox="459 1606 1219 1713"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>5.45</td> <td>Integer Part= 5 Float Part=0.45</td> </tr> </tbody> </table> </li> </ol>	Input	Output	x1=1 y1=1 x2= 2 y2= 2	Length of line= 1.4	Input	Output	Radius= 5, height= 10	Radius of sphere= 5.72	Input	Output	5.45	Integer Part= 5 Float Part=0.45								
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<b>Lab 5</b>	<p>Conditional Statement: Syntax of simple if-else, logical operators in python. Guided Exercise: Implement Python Programs for following category of problems:</p> <ol style="list-style-type: none"> <li>Use of simple if-else</li> <li>Use of logical operators</li> </ol> <p>Work Independently: Implement for following problems:</p> <ol style="list-style-type: none"> <li>Enter sides of a triangle and print if it is a Pythagorean Triplet. <table border="1" data-bbox="459 2000 1219 2045"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table> </li> </ol>	Input	Output																		
Input	Output																				

	<table border="1"> <tbody> <tr> <td>5 3 4</td> <td>Pythagorean Triplet</td> </tr> <tr> <td>2 4 3</td> <td>Not A Pythagorean Triplet</td> </tr> </tbody> </table> <p>2. In a farm there are ducks and chickens. Input total number of heads and feet and output number of ducks and chickens. For wrong pair or heads and feet print -1.</p> <table border="1"> <tbody> <tr> <td>Input</td> <td>Output</td> </tr> <tr> <td>Head= 5, feet = 14</td> <td>Rabbit= 2 Chicken= 3</td> </tr> <tr> <td>Head= 2, Feet= 10</td> <td>-1</td> </tr> </tbody> </table> <p>3. Program to input an year and print if it is leap year or not</p> <table border="1"> <tbody> <tr> <td>Input</td> <td>Output</td> </tr> <tr> <td>2000</td> <td>Leap Year</td> </tr> <tr> <td>1999</td> <td>Not a Leap Year</td> </tr> </tbody> </table>	5 3 4	Pythagorean Triplet	2 4 3	Not A Pythagorean Triplet	Input	Output	Head= 5, feet = 14	Rabbit= 2 Chicken= 3	Head= 2, Feet= 10	-1	Input	Output	2000	Leap Year	1999	Not a Leap Year
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1999	Not a Leap Year																
<b>Lab 6</b>	<p>Conditional Statement: Syntax of simple if-elif-else. Use of relational operators</p> <p>Guided Exercise:</p> <p>Implement Python Programs for following category of problems:</p> <ol style="list-style-type: none"> <li>Use of if-elif-else</li> <li>Using multiple relational operator over one value in a conditional statement.</li> </ol> <p>Work Independently:</p> <p>Implement for following problems:</p> <ol style="list-style-type: none"> <li>A certain grade of steel is graded according to the following conditions. <ul style="list-style-type: none"> <li>Hardness must be greater than 50.</li> <li>Carbon content must be less than 0.7.</li> <li>Tensile strength must be greater than 5600.</li> </ul> <p>The grades are as follows:</p> <ul style="list-style-type: none"> <li>Grade is 10 if all three conditions are met.</li> <li>Grade is 9 if conditions (i) and (ii) are met.</li> <li>Grade is 8 if conditions (ii) and (iii) are met.</li> <li>Grade is 7 if conditions (i) and (iii) are met.</li> <li>Grade is 6 if only one condition is met.</li> <li>Grade is 5 if none of three conditions are met.</li> </ul> </li> <li>Enter the grade (be- A++, A+, A, B+, B, C+, C, D) print equivalent marks, starting from 10, grade other than these print "This Grade Does not exist.</li> </ol> <table border="1"> <tbody> <tr> <td>Input</td> <td>Output</td> </tr> <tr> <td>A+</td> <td>9</td> </tr> <tr> <td>B</td> <td>6</td> </tr> <tr> <td>F</td> <td>Grade Does not Exist</td> </tr> </tbody> </table>	Input	Output	A+	9	B	6	F	Grade Does not Exist								
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B	6																
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<b>Lab 7</b>	<p>Conditional Statement: Syntax of Nested if.</p> <p>Guided Exercise:</p> <p>Implement Python Programs for following category of problems:</p> <ol style="list-style-type: none"> <li>Use of nested if</li> </ol> <p>Work Independently:</p> <p>Implement for following problems:</p> <ol style="list-style-type: none"> <li>Enter a number check if it is: <ol style="list-style-type: none"> <li>Even and factor of 3</li> <li>Even and not a factor of 3</li> <li>Odd and factor or 3</li> <li>Odd and not a factor of 3</li> </ol> </li> </ol> <table border="1"> <tbody> <tr> <td>Input</td> <td>Output</td> </tr> </tbody> </table>	Input	Output														
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		6	Even and factor of 3													
		9	Odd and factor or 3													
		16	Even and not a factor of 3													
		23	Odd and not a factor of 3													
<b>Lab 8</b>	<p>Loops: Syntax of for loop, use of range () function.            Guided Exercise:            Implement Python Programs for following category of problems:</p> <ol style="list-style-type: none"> <li>Use of loops- range () function with default value.</li> <li>Use of loops- range () function with start, end and increment.</li> </ol> <p>Work Independently:            Implement for following problems:</p> <ol style="list-style-type: none"> <li>Input start and end numbers – print even numbers between start and end               <table border="1" data-bbox="459 689 1217 804"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Start= 6 End = 20</td> <td>6 8 10 12 14 16 18</td> </tr> <tr> <td>Start= 5 End = 20</td> <td>6 8 10 12 14 16 18</td> </tr> </tbody> </table> </li> <li>Input number of terms and print Fibonacci series               <table border="1" data-bbox="459 840 1217 913"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>5</td> <td>0 1 1 2 3</td> </tr> </tbody> </table> </li> </ol>				Input	Output	Start= 6 End = 20	6 8 10 12 14 16 18	Start= 5 End = 20	6 8 10 12 14 16 18	Input	Output	5	0 1 1 2 3		
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	<p>Loops: Using conditional statements in loops.            Guided Exercise:            Implement Python Programs for following category of problems:</p> <ol style="list-style-type: none"> <li>Use of conditional statements in loop.</li> </ol> <p>Work Independently:            Implement for following problems:</p> <ol style="list-style-type: none"> <li>Input number and print if it is prime or not               <table border="1" data-bbox="459 1167 1217 1281"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>Not Prime</td> </tr> <tr> <td>5</td> <td>Prime</td> </tr> </tbody> </table> </li> <li>Input a Start and End number, print all the numbers between them which are factor of 7               <table border="1" data-bbox="459 1350 1217 1464"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Start= 6 End = 20</td> <td>7 14</td> </tr> <tr> <td>Start= 20 End = 71</td> <td>21 28 35 42 49 56 63 70</td> </tr> </tbody> </table> </li> </ol>				Input	Output	6	Not Prime	5	Prime	Input	Output	Start= 6 End = 20	7 14	Start= 20 End = 71	21 28 35 42 49 56 63 70
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<b>Lab 9</b>	<p>Loops: Nested loops            Guided Exercise:            Implement Python Programs for following category of problems:</p> <ol style="list-style-type: none"> <li>Use of nested loops.</li> </ol> <p>Work Independently:            Implement for following problems:</p> <ol style="list-style-type: none"> <li>Input number and print list of prime numbers from 1 to that number               <table border="1" data-bbox="459 1715 1217 1789"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>15</td> <td>1 2 3 5 7 11 13</td> </tr> </tbody> </table> </li> <li>Print following patterns               <table border="1" data-bbox="459 1825 1217 2011"> <tbody> <tr> <td>* ** *** **** *****</td> <td>***** **** *** ** *</td> </tr> </tbody> </table> </li> </ol>				Input	Output	15	1 2 3 5 7 11 13	* ** *** **** *****	***** **** *** ** *						
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15	1 2 3 5 7 11 13															
* ** *** **** *****	***** **** *** ** *															

	1 12 123 1234 12345	1 22 333 4444 55555															
<b>Lab 10</b>	<p>Functions: Syntax of functions, define and call function.            Guided Exercise:            Implement Python Programs for following category of problems:</p> <ol style="list-style-type: none"> <li>1. Define and call function with no arguments</li> <li>2. Define and call function with one argument</li> <li>3. Define and call function with more than one argument</li> </ol> <p>Work Independently:            Implement for following problem:</p> <ol style="list-style-type: none"> <li>1. Develop a Menu Driven Calculator            Sample Output:            Welcome to Calculation World            1.Sum 2. Difference 3. Product 4. Integer Division 5. Power 6. Exit            Enter your choice: 3            Enter two numbers 4 5            Result is 20</li> </ol> <p>Welcome to Calculation World            1.Sum 2. Difference 3. Product 4. Integer Division 5. Power 6. Exit            Enter your choice: 6</p> <p>Thank you for using MyCalculator</p>																
<b>Lab 11</b>	<p>Simple Ideas            Guided Exercise:</p> <ol style="list-style-type: none"> <li>1. Enter the current date in form on day, month, year and print next date.           <table border="1" data-bbox="459 1332 1217 1594"> <thead> <tr> <th>Input</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>Day= 26 Month= 4 year 1999</td> <td>27-4-1999</td> </tr> <tr> <td>Day= 30 Month= 3 year 1998</td> <td>31-3-1998</td> </tr> <tr> <td>Day= 30 Month= 6 year 2001</td> <td>1-7-2001</td> </tr> <tr> <td>Day= 31 Month= 12 year 1999</td> <td>1-1-2000</td> </tr> <tr> <td>Day= 28 Month= 2 year 2000</td> <td>29-02-2000</td> </tr> <tr> <td>Day= 28 Month= 2 year 2001</td> <td>1-3-2001</td> </tr> </tbody> </table> </li> <li>2. Jaya would like to withdraw Rs. X from an ATM. The cash machine will only accept the transaction if X is a multiple of 5, and Jaya's account balance has enough cash to perform the withdrawal transaction (including bank charges). For each successful withdrawal the bank charges Rs. 0.50 Calculate her account balance after an attempted transaction.            Input            The amount of cash which Jaya wishes to withdraw.            Jaya's initial account balance.            Output            Output the account balance after the attempted transaction, given as a number with two digits of precision. If there is not enough money in the account to complete</li> </ol>			Input	Output	Day= 26 Month= 4 year 1999	27-4-1999	Day= 30 Month= 3 year 1998	31-3-1998	Day= 30 Month= 6 year 2001	1-7-2001	Day= 31 Month= 12 year 1999	1-1-2000	Day= 28 Month= 2 year 2000	29-02-2000	Day= 28 Month= 2 year 2001	1-3-2001
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Day= 31 Month= 12 year 1999	1-1-2000																
Day= 28 Month= 2 year 2000	29-02-2000																
Day= 28 Month= 2 year 2001	1-3-2001																

	<p>the transaction, output the current bank balance.          Example - Successful Transaction          Input: 30 120.00 Output: 89.50          Example - Incorrect Withdrawal Amount (not multiple of 5)          Input: 42 120.00 Output: 120.00          Example - Insufficient Funds          Input: 300 120.00 Output: 120.00          You have x no. of 5-rupee coins and y no. of 1-rupee coins. You want to purchase an item for amount z. The shopkeeper wants you to provide exact change. You want to pay using minimum number of coins. How many 5-rupee coins and 1-rupee coins will you use? If exact change is not possible then display -1.</p>				
<b>Lab 12</b>	<p>Cool Ideas          Work Independently:          1. You are given a number A which contains only digits 0's and 1's. Your task is to make all digits same by just flipping one digit (i.e. 0 to 1 or 1 to 0) only. If it is possible to make all the digits same by just flipping one digit, then print 'YES' else print 'NO'.          ExampleInput:          101          Output:          YES          3. Two integers A and B are the inputs. Write a program to find GCD and LCM of A and B.          Input          The first line contains an integer T, total number of testcases. Then follow T lines, each line contains an integer A and B.          Output          Display the GCD and LCM of A and B separated by space respectively.          Example          Input 3 120 140 10213 312 10 30 Output 20 840 1 3186456 10 30</p>				
<b>References</b>	<b>Sr. No.</b>	<b>Title</b>	<b>Author</b>	<b>Publication</b>	<b>Edition</b>
	1	Think Python	Allen B. Downey	, O'Really Publication	2 <sup>nd</sup>
	2	Dive into Python 2	Mark Pilgrim	Apress Publication	2 <sup>nd</sup>
	3	Learning with Python	Allen B. Downey	Dreamtech Press	1st