

# **I B.TECH I SEMESTER SYLLABUS**

## LINEAR ALGEBRA AND CALCULUS

### I B. TECH- I SEMESTER

Course Code	Category	Hours / Week			Credits	Maximum Marks		
		L	T	P		C	CIE	SEE
A5BS02	BSC	3	1	-	4	30	70	100
		<b>Contact Classes: 44</b>			<b>Tutorial Classes: 8</b>		<b>Practical Classes: Nil</b>	

#### COURSE OBJECTIVES

To learn

1. The concept of differential equations and solve them using appropriate methods.
2. Usage of the appropriate test to find the convergence and divergence of the given series.
3. Concept of Rank of a matrix, Consistency and solving system of linear equations.
4. The Rank and Nullity of vectors.
5. Concept of eigen values, eigen vectors and diagonalization of the matrix.

#### COURSE OUTCOMES

**At the end of the course, student will be able to:**

1. Identify the different types of differential equations and solve them using appropriate methods
2. Apply the appropriate test to find the convergence and divergence of the given series
3. Solve the system of linear equations using rank of a matrix.
4. Find Rank and Nullity of given vectors.
5. Diagonalize the matrix using eigen values and eigen vectors.

<b>UNIT - I</b>	<b>ORDINARY DIFFERENTIAL EQUATIONS</b>	<b>CLASSES: 12</b>
Introduction- Exact and reducible to Exact differential equations-Newton's Law of cooling-Law of Growth and Decay. Linear differential equations of second and higher order with constant coefficients - Non-Homogeneous term of the type $Q(x) = e^{ax}$ , $\sin ax$ , $\cos ax$ , $e^{ax}v(x)$ , $x^n v(x)$ - Method of variation of parameters.		
<b>UNIT - II</b>	<b>SEQUENCES AND SERIES</b>	<b>CLASSES: 08</b>
Basic definitions of Sequences and series – Convergence and divergence –Comparison Test- Ratio Test –Raabe's Test - Cauchy's $n^{\text{th}}$ root Test –Integral Test – Absolute and Conditional convergence – Power Series.		
<b>UNIT - III</b>	<b>THEORY OF MATRICES</b>	<b>CLASSES:12</b>
Real matrices: Symmetric-skew-symmetric and orthogonal matrices –Complex matrices: Hermitian, Skew –Hermitian and Unitary matrices –Elementary row and column transformations –Elementary matrix-Finding rank of a matrix by reducing to Echelon form and Normal form-Finding the inverse of a matrix using elementary row/column transformations (Gauss-Jordan method)-Consistency of system of linear equations (homogeneous and non-homogeneous) using the rank of a matrix –Solving $m \times n$ and $n \times n$ linear system of equations by Gauss Elimination		
<b>UNIT - IV</b>	<b>VECTOR SPACES</b>	<b>CLASSES: 10</b>
The $n$ -dimensional Vectors –Vector space – linear dependence of vectors –Basis and dimensions –linear transformations-range and kernel of a linear map – rank and nullity - rank and nullity theorem – inverse of a linear transformation-composition of linear map- Matrix associated with a linear map.		
<b>UNIT - V</b>	<b>EIGEN VALUES, EIGEN VECTORS AND INNER PRODUCT SPACES</b>	<b>CLASSES: 10</b>

Eigen values and Eigen vectors of a matrix- Eigenbases - Diagonalization- Inner product space – Norm of a vector – Schwarz’s Inequality – Normed vector space – Orthogonal and orthonormal sets – Gram Schmidt orthogonalization process.

**TEXT BOOKS:**

1. Ervin Kreyszig, Advanced Engineering Mathematics, 9<sup>th</sup> Edition, John Wiley & Sons, 2006.
2. B.S.Grewal, Higher Engineering Mathematics, Khanna publishers, 36<sup>th</sup> Edition, 2010.
3. V. Krishnamurthy, V.P. Mainra and J.L. Arora, An introduction to Linear Algebra, Affiliated East – West press, Reprint 2005.

**REFERENCE BOOKS:**

1. G.B.Thomas, calculus and analytical geometry,9<sup>th</sup> Edition, Pearson Reprint 2006.
2. N.P Bali and Manish Goyal ,A Text of Engineering Mathematics,Laxmi publications,2008.
3. E.L.Ince, Ordinary differential Equations,Dover publications,1958.

**WEB REFERENCES:**

1. [https://www.efunda.com/math/math\\_home/math.cfm](https://www.efunda.com/math/math_home/math.cfm)
2. <https://www.ocw.mit.edu/resources/#Mathematics>
3. <https://www.sosmath.com/>
4. <https://www.mathworld.wolfram.com/>

**E -TEXT BOOKS:**

1. <https://www.e-booksdirectory.com/details.php?ebook=10166>

**MOOCS COURSE:**

1. <https://swayam.gov.in/>
2. <https://onlinecourses.nptel.ac.in/>

## APPLIED PHYSICS

<b>I B. TECH- I SEMESTER</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
<b>A5BS08</b>	<b>BSC</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>Total</b>
		3	1	-	4	30	70	100
<b>Contact Classes:44</b>	<b>Tutorial Classes:8</b>	<b>Practical Classes: 0</b>			<b>Total Classes: 52</b>			
<b>COURSE OBJECTIVES</b>								
<p><b>The course should enable the students to:</b></p> <ol style="list-style-type: none"> <li>1. Learn the behavior of matter waves and applications of Schrödinger wave equations</li> <li>2. Understand the formation of energy bands in solids</li> <li>3. Acquire the fundamental knowledge of semiconductor devices and their applications</li> <li>4. Learn the basic principles of laser and optical fiber</li> <li>5. Describe the fundamentals in quantum computations and explain how it can be used in cryptography</li> </ol>								
<b>COURSE OUTCOMES:</b>								
<p><b>At the end of the course students will be able to:</b></p> <ol style="list-style-type: none"> <li>1. Apply principles of quantum mechanics to calculate observables on known wave functions.</li> <li>2. Apply the concept of band theory to explain the behavior of different electronic materials.</li> <li>3. Analyze the inner working of semiconductor p-n diodes, LED and new semiconductor devices.</li> <li>4. Explain the basic principles of laser physics, working of lasers, principle of propagation of light in Optical fibers and Solve the numerical problems associated</li> <li>5. Apply the basic tools and techniques of quantum computation and quantum information in a problem solving scenario</li> </ol>								
<b>UNIT - I</b>	<b>INTRODUCTION TO QUANTUM PHYSICS</b>						<b>CLASSES: 10</b>	
<p>Black body radiation, Planck's law, photoelectric effect, Compton effect, Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer's experiment, Heisenberg's Uncertainty Principle, Schrodinger's Time Independent Wave Equation-Physical Significance of the wave Function, Particle in One Dimensional Potential Box.</p>								
<b>UNIT - II</b>	<b>BAND THEORY OF SOLIDS</b>						<b>CLASSES: 10</b>	
<p><b>Band theory</b> - Quantum theory of free electron, Bloch theorem, Kronig-Penny model, E-k diagram, effective mass of electron.</p> <p><b>Energy bands in Solids:</b> Origin of energy band formation in solids, Fermi energy level, Fermi-Dirac Statistics (Qualitative treatment), classification of materials as conductors, insulators and semiconductors.</p>								
<b>UNIT - III</b>	<b>SEMI-CONDUCTORS</b>						<b>CLASSES:12</b>	
<p><b>Semiconductor Physics:</b> Intrinsic and Extrinsic Semiconductors – formation of p-type and n-type, Fermi Level. Direct and Indirect Band gap semiconductors, Hall Effect and applications.</p> <p><b>Physics of Semiconductor Devices:</b> PN Junction Diode, V-I characteristics and applications. LED - Construction, working and applications. Solar cells- working and its applications. Efficiency issues of Solar cell.</p>								

<b>UNIT - IV</b>	<b>LASER &amp; FIBER OPTICS</b>	<b>CLASSES: 10</b>
<p><b>Lasers:</b> Characteristics of Laser, Basic processes between two energy levels. Pumping mechanism, Meta stable state and Population inversion. Working of Nd-YAG laser, applications of lasers in different fields.</p> <p><b>Fiber Optics:</b> Structure of fibers, Principle of fiber (TIR), Acceptance angle and NA. Types of fibers- SI and GI fibers- R.I profiles. Single and Multimode fibers-SMSI, MMSI, MMGI. OFC System with block diagram. Fiber optic sensors – Basic principle, working of Pressure and Temperature Sensors. Applications of fibers in different fields.</p>		
<b>UNIT - V</b>	<b>QUANTUM COMPUTATION AND CRYPTOGRAPHY</b>	<b>CLASSES: 10</b>
<p><b>Quantum computation:</b> Idea of classical bits and qubits, Bloch vector representation of state of qubit. Single qubit logic gates- Pauli X, Y, Z and Hadmard gate in matrix form. Two level gates: CNOT and SWAP gates. Comments on No cloning theorem. Quantum Teleportation – Basic Idea.</p> <p><b>Cryptography Methods:</b> Introduction to cryptography, Classical and Public key cryptosystems, Verman cipher, The RSA protocol; Quantum Key distribution protocol - BB84 protocol.</p>		
<b>TEXT BOOKS:</b>		
<ol style="list-style-type: none"> <li>1. Engineering Physics, B.K. Pandey, S. Chaturvedi – Cengage Learning</li> <li>2. R. Robinett, "Quantum Mechanics", OUP Oxford, 2006.1IndEdn.</li> <li>3. P.K Palanisamy, Engineering Physics, Sitech Publications, 2013, IVthEd</li> <li>4. Nielsen M. A., I. L Chung, Quantum Computation &amp; Quantum Information, Cambridge Univ. Press</li> </ol>		
<b>REFERENCE BOOKS:</b>		
<ol style="list-style-type: none"> <li>1. J. Singh, Semiconductor Optoelectronics: Physics and Technology, Mc Grew-Hill inc.(1995)</li> <li>2. O. Svelto, "Principles of Lasers", Springer Science &amp; Business Media, 2010</li> <li>3. D. A. Neamen, "Semiconductor Physics and Devices", Times Mirror High Education Group, Chicago, 1997</li> <li>4. Principles of Quantum computation and Information – By G. Benenti, G. Casati, G. Strini, World Scientific</li> </ol>		
<b>WEB REFERENCES:</b>		
<ol style="list-style-type: none"> <li>1. <a href="https://www.edx.org/course?search_query=semiconductor+physics">https://www.edx.org/course?search_query=semiconductor+physics</a></li> <li>2. <a href="https://www.edx.org/course/nanotechnology-fundamentals-purdue-nano530x">https://www.edx.org/course/nanotechnology-fundamentals-purdue-nano530x</a></li> </ol>		
<b>E-TEXT BOOKS:</b>		
<ol style="list-style-type: none"> <li>1. <a href="http://www.phys.sinica.edu.tw/TIGP-ANO/Course/2010_Fall/classnotes/NanoB_week14.pdf">http://www.phys.sinica.edu.tw/TIGP-ANO/Course/2010_Fall/classnotes/NanoB_week14.pdf</a></li> <li>2. <a href="https://www.scribd.com/document/70908178/Semiconductor-Devices-Basic-Principles-Jasprit-Singh">https://www.scribd.com/document/70908178/Semiconductor-Devices-Basic-Principles-Jasprit-Singh</a></li> <li>3. <a href="https://www.scribd.com/doc/105174065/Fundamentals-of-Photonics">https://www.scribd.com/doc/105174065/Fundamentals-of-Photonics</a></li> <li>4. <a href="ftp://nozdr.ru/biblio/kolxo3/P/PE/PEo/Thyagarajan%20K.,%20Ghatak%20A.%20Lasers..%20Fundamentals%20and%20Applications%20(2ed.,%20GTP,%20Springer,%202010)(ISBN%20144196441X)(O)(674s)_PEo_.pdf">ftp://nozdr.ru/biblio/kolxo3/P/PE/PEo/Thyagarajan%20K.,%20Ghatak%20A.%20Lasers..%20Fundamentals%20and%20Applications%20(2ed.,%20GTP,%20Springer,%202010)(ISBN%20144196441X)(O)(674s)_PEo_.pdf</a></li> <li>5. <a href="https://subodhtripathi.files.wordpress.com/2012/01/optical-fiber-communications-by-gerd-keiser_2.pdf">https://subodhtripathi.files.wordpress.com/2012/01/optical-fiber-communications-by-gerd-keiser_2.pdf</a></li> </ol>		
<b>MOOCS COURSE</b>		
<ol style="list-style-type: none"> <li>1. <a href="http://nptel.ac.in/courses/115102025/">http://nptel.ac.in/courses/115102025/</a> (Fundamental concepts of semiconductors)</li> <li>2. <a href="http://nptel.ac.in/courses/104104085/2">http://nptel.ac.in/courses/104104085/2</a>(Lasers and its applications)</li> <li>3. <a href="https://nptel.ac.in/courses/115/101/115101092/">https://nptel.ac.in/courses/115/101/115101092/</a>( Quantum computing)</li> </ol>		

## BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

<b>I B. TECH- I SEMESTER</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
A5EE70	ESC	L	T	P	C	CIA	SEE	Total
		3	1	-	4	30	70	100
<b>COURSE OBJECTIVES</b>								
<ol style="list-style-type: none"> <li>1. Develop fundamentals, including Ohm's law, Kirchhoff's laws and be able to solve for currents, voltages and power in electrical circuits.</li> <li>2. Develop EMF equation and analyze the operation of DC Machines.</li> <li>3. Analyze the working principle of Transformer.</li> <li>4. Discuss the operation of AC Machines.</li> <li>5. Analyze the operation of PN junction diode and rectifiers.</li> <li>6. Discuss the operation and characteristics of Transistors.</li> </ol>								
<b>COURSE OUTCOMES:</b>								
Upon successful completion of this course, student will be able to :								
<ol style="list-style-type: none"> <li>1. Analyze and solve for current values in resistive circuits with independent sources.</li> <li>2. Analyze the working of DC machines and solve the numerical problems..</li> <li>3. Analyze the working of AC electrical machines and solve the numerical problems.</li> <li>4. Analyze the V-I characteristics of PN – junction diode and describe the operation of rectifiers.</li> <li>5. Analyze the different configurations of Transistors and obtain its characteristics.</li> </ol>								
<b>UNIT - I</b>	<b>ELECTRICAL CIRCUITS</b>						<b>CLASSES: 12</b>	
Basic definitions-Ohm's Law, types of elements, types of sources , Kirchhoff's Laws – simple problems., series & parallel resistive networks with DC excitation, star to delta and delta to star transformations.								
<b>UNIT - II</b>	<b>DC MACHINES</b>						<b>CLASSES: 12</b>	
Principle of Operation of DC Motor, types of DC motor, Torque equation & Losses and problems. DC Generator construction and working Principle, EMF Equation types of generators and problems.								
<b>UNIT - III</b>	<b>AC MACHINES</b>						<b>CLASSES:12</b>	
Working principle and Construction of transformer, Emf Equation & problems, Principle operation of 3-phase induction motor, slip and torque Equation, Torque –slip characteristics & problems, principle operation of 3-phase Alternator, Emf Equation of Alternator & problems.								
<b>UNIT - IV</b>	<b>DIODE AND ITS CHARACTERISTICS</b>						<b>CLASSES: 12</b>	
PN JUNCTION DIODE: Operation of PN junction Diode: forward bias and reverse bias, Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics. Rectifiers, Half wave, Full wave and bridge Rectifiers –capacitor filters, inductor filters								
<b>UNIT - V</b>	<b>TRANSISTORS</b>						<b>CLASSES: 10</b>	

Bipolar Junction Transistor - NPN & PNP Transistor, CB, CE, CC Configurations and Characteristics – Transistor Amplifier.

**TEXT BOOKS:**

1. Basic Electrical Engineering by *M.S.Naidu and S.Kamakshaiah* TMH
2. Electronic Devices and circuits by *J.Millman, C.C.Halkias and Satyabrata Jit* 2ed.,

**REFERENCE BOOKS:**

1. Muthusubramanian R, Salivahanan S and Muraleedharan K A, "Basic Electrical, Electronics and Computer Engineering", Tata McGraw Hill, Second Edition, (2006).
2. Nagsarkar T K and Sukhija M S, "Basics of Electrical Engineering", Oxford press (2005).
3. Mehta V K, "Principles of Electronics", S.Chand & Company Ltd, (1994).
4. Mahmood Nahvi and Joseph A. Edminister, "Electric Circuits", Schaum' Outline Series, McGraw Hill, (2002).

## ENGINEERING GRAPHICS

<b>I B. TECH- I SEMESTER</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
A5ME02	ESC	L	T	P	C	CIA	SEE	Total
		1	-	4	3	30	70	100
<p><b>COURSE OBJECTIVES:</b></p> <p>The course should enable the students to:</p> <ol style="list-style-type: none"> <li>1. Create awareness and emphasize the need for Engineering Drawing in various branches of engineering.</li> <li>2. Enable the student with various concepts of dimensioning, conventions and standards related to engineering drawings.</li> <li>3. Follow the basic drawing standards and conventions.</li> <li>4. Develop skills in three-dimensional visualization of engineering component.</li> </ol> <p><b>COURSE OUTCOMES</b></p> <p>At the end of the course the student should be able to:</p> <ol style="list-style-type: none"> <li>1. Sketch the various curves used in engineering and their applications</li> <li>2. Apply the knowledge of quadrant system and say to which quadrant and angle of project the object belongs.</li> </ol>								
<b>UNIT - I</b>	<b>INTRODUCTION TO ENGINEERING DRAWING</b>						<b>CLASSES: 07</b>	
Introduction to Engineering Drawing: Principles of Engineering Graphics and their significance, usage of drawing instruments, lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute.								
<b>UNIT - II</b>	<b>DRAWING OF PROJECTIONS OR VIEWS: ORTHOGRAPHIC PROJECTION IN FIRST ANGLE PROJECTION ONLY</b>						<b>CLASSES: 10</b>	
Principles of orthographic projections – conventions – first and third angle projections. Projections of points-Projection of lines inclined to both the planes. PROJECTIONS OF PLANES: Projections of regular planes, inclined to both planes.								
<b>UNIT - III</b>	<b>PROJECTION OF REGULAR SOLIDS</b>						<b>CLASSES: 08</b>	
PROJECTION OF SOLIDS-Solids inclined to one plane and both planes (Auxiliary plane method ) Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone								
<b>UNIT - IV</b>	<b>DEVELOPMENT OF SURFACES/SOLIDS</b>						<b>CLASSES: 04</b>	
DEVELOPMENT OF SURFACE/SOLIDS: Theory of development, development of lateral surface along with base								
<b>UNIT - V</b>	<b>ISOMETRIC DRAWINGS</b>						<b>CLASSES: 05</b>	
Divisions of pictorial projection, theory of Isometric Drawing- Isometric view and Isometric projections; Drawing Isometric circles, Dimensioning, Isometric Objects; Conversion of Isometric view to Orthographic views and Orthographic to isometric views, Missing views.								
<b>TEXT BOOKS:</b>								



1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers .

**REFERENCE BOOKS:**

1. Johle (2009), Engineering Drawing, Tata Mc Graw Hill, New Delhi, India.

**WEB REFERENCES:**

1. [nptel.ac.in/courses/112103019/](http://nptel.ac.in/courses/112103019/)
2. [web.iitd.ac.in/~achawla/public\\_html/201/lectures/sp46.pdf](http://web.iitd.ac.in/~achawla/public_html/201/lectures/sp46.pdf)

**E-TEXT BOOKS:**

1. [https://www.researchgate.net/publication/305754529\\_A\\_Textbook\\_of\\_Engineering\\_Drawing\\_A\\_Textbook](https://www.researchgate.net/publication/305754529_A_Textbook_of_Engineering_Drawing_A_Textbook)
2. [https://www.researchgate.net/publication/305754529\\_A\\_Textbook\\_of\\_Engineering\\_Drawing](https://www.researchgate.net/publication/305754529_A_Textbook_of_Engineering_Drawing)

**MOOC COURSE**

1. [https://onlinecourses.nptel.ac.in/noc20\\_me79/preview](https://onlinecourses.nptel.ac.in/noc20_me79/preview)

## APPLIED PHYSICS LAB

<b>I B. TECH- I SEMESTER</b>								
Course Code:	Category	Hours / Week			Credits	Maximum Marks		
A5BS15	BSC	L	T	P	C	CIA	SEE	Total
		-	-	3	1.5	30	70	100
<b>Contact Classes: 0</b>	<b>Tutorial Classes: 0</b>	<b>Practical Classes: 39</b>			<b>Total Classes: 39</b>			
<p><b>COURSE OBJECTIVES:</b>  <b>The course should enable the students to:</b></p> <ol style="list-style-type: none"> <li>To provide an experimental foundation for the theoretical concepts introduced in the lectures</li> <li>To teach how to make careful experimental observations and how to think about and draw conclusions from such data</li> <li>To help students understand the role of direct observation in physics and to distinguish between inferences based on theory and the outcomes of experiments</li> <li>To introduce the concepts and techniques which have a wide application in experimental science but have not been introduced in the standard courses</li> <li>To teach how to write a technical report this communicates scientific information in a clear and concise manner</li> </ol> <p><b>COURSE OUTCOMES:</b>  <b>By the end of the course students will be able:</b></p> <ol style="list-style-type: none"> <li><b>Analyze</b> the electric properties of semiconductor materials by determining energy gap of semiconductors, threshold voltage of LEDs and efficiency issues of solar cell with careful experimental and draw conclusions from such data</li> <li><b>Evaluate</b> the mechanical properties of a given material using dynamic method in torsional pendulum</li> <li><b>Estimate</b> the optical properties of light such as diffraction by using grating material for calculation of the wavelength of Laser, and to determine acceptance angle, NA of optical fiber using OFC and determine the value off plank's constant</li> <li><b>Analyze</b> the electromagnetic properties by using Stewart Gee's experiment and determining the Quality factor, resonance frequency of a given LCR circuit</li> </ol>								
<b>LIST OF EXPERIMENTS</b>								
Experiment - 1	<b>Energy gap of P-N junction diode:</b> To determine the energy gap of a semiconductor diode							
Experiment - 2	<b>Solar Cell:</b> To study the V-I and P-I characteristics of solar cell							
Experiment - 3	<b>Light Emitting Diode:</b> Plot V-I characteristics of light emitting diode Plot V-I characteristics of light emitting diode							
Experiment - 4	<b>Hall effect:</b> To determine Hall co-efficient of a given semiconductor							

<b>Experiment - 5</b>	<b>PIN Photo Diode</b> To study the V-I Characteristics of Photo Diode by calculating the photo current.
<b>Experiment - 6</b>	<b>Optical fiber:</b> To determine the numerical aperture and acceptance angle of an optical fiber
<b>Experiment - 7</b>	<b>LASER:</b> To determine the wavelength of a given laser source by using diffraction grating method
<b>Experiment - 8</b>	<b>LCR Circuit:</b> To determine the Resonance frequency and Quality factor of a LCR Circuit
<b>Experiment - 9</b>	<b>Thermistor:</b> To study the variation of resistance with respect to temperature using thermistor.
<b>Experiment - 10</b>	<b>Torsional Pendulum:</b> To determine the rigidity modulus of a given metal wire by using Torsional pendulum
<b>Experiment - 11</b>	<b>Plank's Constant:</b> To determine value of plank's constant using by measuring radiation in fixed spectral range
<b>Experiment - 12</b>	<b>Stewart Gee's experiment:</b> To study the variation of magnetic field along the axis of a circular coil

### REFERENCE BOOKS:

1. "Semiconductor Physics and Devices: Basic Principles" by Donald A Neamen
2. "Optics, Principles and Applications" by K K Sharma.
3. "Principles of Optics" by M Born and E Wolf.
4. "Oscillations and Waves" by Satya Prakash and Vinay Dua
5. "Waves and Oscillations" by N Subrahmanyam and Brij Lal

### WEB REFERENCES:

1. <http://www.arxiv.org/pdf/1510.00032>
2. <http://www.nptel.ac.in/courses/122103010/>
3. [http://www.researchgate.net/.../276417736\\_Video\\_Presentations\\_in\\_Engineering-Ph...](http://www.researchgate.net/.../276417736_Video_Presentations_in_Engineering-Ph...)
4. <http://www.wileyindia.com/engineering-physics-theory-and-practical.html>

## INTRODUCTION TO INTERNET OF THINGS

<b>I B. TECH- I SEMESTER</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
<b>A5EC01</b>	<b>ESC</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>Total</b>
		-	-	3	1.5	30	70	100
<b>Contact Classes: Nil</b>	<b>Tutorial Classes: Nil</b>	<b>Practical Classes: 36</b>			<b>Total Classes:36</b>			
<p><b>COURSE OBJECTIVES:</b></p> <ol style="list-style-type: none"> <li>To develop basic programming skills through graphical programming</li> <li>To learn hardware interfacing and debugging techniques</li> <li>To design and develop android apps</li> </ol> <p><b>COURSE OUTCOMES:</b></p> <p><b>At the end of the course, student will be able to</b> the algorithms for simple problems</p> <ol style="list-style-type: none"> <li>CO 1: Able to demonstrate various sensor interfacing using Visual Programming Language.</li> <li>CO 2: Able to analyze various Physical Components.</li> <li>CO 3: Able to demonstrate Wireless Control of Remote Devices.</li> <li>CO 4: Able to design and develop Mobile Application which can interact with Sensors</li> </ol> <p><b>INTRODUCTION TO IOT</b></p> <ol style="list-style-type: none"> <li>Introduction to basic electronic components and digital electronic</li> <li>Introduction to sensors and Actuators</li> <li>Introduction to microcontroller</li> <li>Introduction to Arduino IDE</li> </ol>								
<b>LIST OF EXPERIMENTS</b>								
<b>WEEK - 1</b>	Blinking of LED with different delays							
<b>WEEK - 2</b>	Digital I/O Interface [IR Sensor, PIR Sensor]							
<b>WEEK - 3</b>	Analog Interface [ADC, Temperature Sensor]							
<b>WEEK - 4</b>	Motor speed And Direction control							
<b>WEEK - 5</b>	Serial Communication							
<b>WEEK - 6</b>	Wireless Interface –Bluetooth & Wi-Fi Technologies							
<b>WEEK - 7</b>	Wireless Control of wheeled robot							
<b>WEEK - 8</b>	Smart Home Android App Development							
<b>REFERENCES</b>								
<ol style="list-style-type: none"> <li>Sylvia Libow Martinez, Gary S Stager, Invent To Learn: Making, Tinkering, and Engineering in the Classroom, Constructing Modern Knowledge Press, 2016</li> <li>Michael Margolis, Arduino Cookbook, Oreilly, 2011</li> </ol>								

## ENGINEERING WORKSHOP

<b>I B. TECH- I SEMESTER</b>								
Course Code	Category	Hours / Week			Credits	Maximum Marks		
<b>A5ME04</b>	<b>ESC</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>	<b>CIA</b>	<b>SEE</b>	<b>Total</b>
		-	-	2	1	30	70	100
<b>Contact Classes: 42</b>	<b>Tutorial Classes: Nil</b>	<b>Practical Classes: 28</b>			<b>Total Classes:70</b>			
<p><b>COURSE OBJECTIVES:</b>            Student will</p> <ol style="list-style-type: none"> <li>1. Get the hands on experience on various trades.</li> <li>2. Capable to make useful products using one or more operations.</li> </ol> <p><b>COURSE OUTCOMES:</b>  <b>Student should be able to:</b></p> <ol style="list-style-type: none"> <li>1. Fabricate components with their own hands</li> <li>2. Get practical knowledge of the dimensional accuracies and tolerances.</li> <li>3. Produce small devices of their interest</li> </ol>								
<b>WEEKS</b>	<b>BASIC TRADES</b>							
	<b>Fitting</b>							
<b>Week 1</b>	Filing Four Sides of Work piece							
<b>Week 2</b>	L- Fit							
	<b>Carpentry</b>							
<b>Week 3</b>	Half Lap Joint							
<b>Week 4</b>	Dove Tail Joint							
	<b>Tin Smithy</b>							
<b>Week 5</b>	Tin Smithy- Prepare a Rectangular Tray							
<b>Week 6</b>	Prepare A Square Tin							
	<b>Electrical</b>							
<b>Week 7</b>	House Wiring Parallel and Series Connection							
<b>Week 8</b>	House Wiring Two Way Switch							
	<b>Electronics</b>							
<b>Week 9</b>	Soldering Parallel Connection							
<b>Week 10</b>	Soldering Series Connection							
<b>Week 11</b>	Useful product using 3 or more operations							