**NIRMA UNIVERSITY**
**Integrated B. Tech. (CSE)-MBA programme**
**Term - I**

| L | T | P | C |
|---|---|---|---|
| 3 | 1 | 0 | 4 |

| | |
|---|---|
| **Course Code** | CSI0101 |
| **Course Title** | Linear Algebra |

## Course Outcomes:

At the end of the course, students will able to-

1. acquire basic knowledge of matrix theory
2. comprehend basic concept of vector space and linear transformation
3. apply the knowledge of linear algebra in engineering problems

## Syllabus:

**Teaching hours: 30**

**Unit I** **14**

**Matrix Theory:** Review of algebra of matrices, Rank of matrix, Inverse of matrix by Gauss-Jordan method, Solution of system of algebraic simultaneous equations, Linearly dependent and Linearly independent functions, eigen values and eigen vectors, Cayley-Hamilton Theorem (without proof), Eigen values and eigen vectors of orthogonal, symmetric, skew-symmetric matrices, Hermitian matrix, skew-Hermitian matrix, Unitary matrix, Normal matrix, Algebraic and geometric multiplicity, Diagonalization.

**Unit II** **16**

**Vector Space and Linear Transformation:** Vector space, subspaces, linear combination, Wronskian, Basis of a vector space, Dimension, Rank-Nullity theorem (statement and verification by examples), Definition of linear transformation, types of linear transformations (Rotation, Reflection, Expansion, Contraction, Projection), Matrix of linear transformations, Change of a basis.

## Tutorials:

This shall consist 8 tutorials based on the syllabus.

## Self-Study:

Self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from the self-study contents.

## Suggested Readings^:


1. D C Lay, Linear Algebra and its Application; Pearson Publication.
2. E Kreyszig, Advanced Engineering Mathematics; John Wiley Publication.
3. H Anton, Elementary linear algebra with applications; John Wiley Publication.
4. K Hoffman and R Kunze, Linear Algebra; PHI Publication.
5. S Kumaresan, Linear algebra - A Geometric approach; PHI Publication.
6. J P Sharma and M Yeolekar, Engineering mathematics Vol-II; PHI Publication.


L=Lecture, T=Tutorial, P=Practical, C=Credit

^this is not an exhaustive list

**NIRMA UNIVERSITY**
**Integrated B. Tech. (CSE)-MBA programme**
**Term - I**

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 2 | 3 |

| | |
|---|---|
| **Course Code** | CSI0102 |
| **Course Title** | English I |

## Course Outcomes:

At the end of the course, students will be able to-

1. develop their vocabulary
2. determine the use of correct spellings
3. assess, review and recompose different pieces of writing
4. construct grammatically correct English

## Syllabus:

**Teaching hours: 20**

**Unit I** **07**

**Grammar:** Overview of English Grammar, Tenses and Verb Structure, Articles, Prepositions, Voices (Passive and Active), Direct and Indirect Speech, Punctuations and Capitalization, Typical Mistakes by Non-English Speaking Individuals

**Unit II** **07**

**Vocabulary and Orthography:** Confusable Words, One Word Substitute, Synonyms & Antonyms, Homophones, Idioms & Phrases, Plurals, Prefix & Suffix

**Unit III** **06**

**Comprehension and Usage:** Unseen Passages, Precise & Summarizing, Expansion of Ideas

## Laboratory Work:

The Term work and Exercises will be based on the topics covered in the syllabus. Minimum 8 exercise should carried out.

## Self-Study:

Self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from the self-study contents.

## Suggested Readings^:


1. Bear, D., Invernizzi, M., Templeton, S. & Johnson, F. Words Their Way: Word Study for Phonics, Vocabulary, And Spelling. New Jersey: Merrill/Prentice-Hall.
2. Beck, I.L., Mckeown, M.G. &Kucan, L. Bringing Words to Life: Robust Vocabulary Instruction. New York: Guilford Press.
3. Brieger, N., Pohl, A. Technical English, Vocabulary and Grammar.
4. Eastwood, J. Oxford Guide to English Grammar. Oxford University Press.
5. Ibbotson, M. Cambridge English for Engineering. Cambridge: Cambridge University Press.
6. McCarthy, M. & O'Dell, F. Academic Vocabulary in Use. Cambridge: Cambridge University Press.
7. Mohan, K & Raman, M. Effective English Communication. New Delhi: Tata Mcgraw Hill.
8. Nick, K. &Laque-Mortimer, L. Practice Tests. Harlow: Pearson Longman.
9. Osborne, C. Practice Tests. London: HeinleCengage Learning.
10. Seely, J. The Oxford Guide to Effective Writing & Speaking. Oxford University Press.
11. Sethi, J. &Dhamija, P. V. A Course in Phonetics and Spoken English. New Delhi: Prentice Hall of India Pvt. Ltd.
12. Swan, M. Practical English Usage. Oxford: Oxford University Press.
13. Wren P. C. & Martin, M. High School English Grammar & Composition. Delhi: Sultan Chand.


L=Lecture, T=Tutorial, P=Practical, C=Credit

^this is not an exhaustive list

**NIRMA UNIVERSITY**
**Integrated B. Tech. (CSE)-MBA programme**
**Term - I**

| L | T | P | C |
|---|---|---|---|
| 2 | 1 | 2 | 4 |

| | |
|---|---|
| **Course Code** | CSI0103 |
| **Course Title** | Physics |

## Course Outcomes:

At the end of the course, students will be able to -

1. Acquire the knowledge of fundamental principles of physics and relate to the engineering science,
2. Apply the concepts of Physics for solving Engineering problems,
3. Relate principles of Physics for solving new and challenging problems of technology.

## Syllabus:

**Teaching hours: 20**

**Unit I** **10**

**Elementary Quantum Physics**: Introduction to Quantum Physics: Particle in a three dimensional box,
**Physics of Nanomaterials**: Introduction – Nanoscale; Nanomaterials: Methods for synthesis of nanomaterials, Properties of nanomaterials – Electrical, Magnetic, Optical, Mechanical, Characterization techniques – X ray Diffraction (XRD) - Single Crystal, Powder and Laue techniques, Low energy Electron Diffraction (LEED), Scanning Electron Microscopy, Tunnelling Electron Microscopy, Nanostructures; Carbon nanotubes Characteristics and applications, Nanotechnology and environment.

**Unit II** **6**

**Lasers and Holography:** Introduction, Basics of Interaction of radiation with matter, Condition for light Amplification, Population inversion and metastable state, pumping, the principle pumping scheme: Three and Four level scheme, Construction and working of optical resonator, Optical amplifier, Applications of laser beam, Holography.

**Unit III** **4**

**Introduction to Fiber Optics**: Introduction of fiber-optic system, Principle and construction of fiber cable, Acceptance angle and numerical aperture, Types of Optical fiber: Based on material & based on mode of propagation, Index profile, Fiber optic communication link, Fiber optic sensor, Advantages of fiber optic system.

## Self- Study:

Self-study contents will be declared at the commencement of the semester. Around 10% of the questions will be asked from the self-study contents.

## Suggested Readings^:


1. M N Avadhnulu and P. Kshirsagar, A Text Book of Engineering Physics, S Chand.
2. T. Pradeep, Nano: The Essentials, New Central book Agency.
3. B. L. Theraja, Physics for Engineers, S Chand Publication


L=Lecture, T=Tutorial, P=Practical, C=Credit

^this is not an exhaustive list

## Experiments:

1. To estimate the solar energy in terms of solar power and V-I characteristics, Power load characteristics of the solar cell.
2. To evaluate the charge to mass ratio for electron by applying perpendicular magnetic field on the electron beam in CRT.
3. To measure the resistivity of semiconductor by four point probe method at different temperature.
4. Determination of forbidden energy band gap in a semiconductor using a junction diode.
5. To measure electrical resistivity by Hall Effect for semiconductor chip.
6. To measure the wavelength of light from sodium vapor lamp and find the thickness of thin film using Newton's rings method.
7. Curie Temperature measurement of ferromagnetic materials.

**NIRMA UNIVERSITY**
**Integrated B. Tech. (CSE)-MBA programme**
**Term - I**

| L | T | P | C |
|---|---|---|---|
| 2 | 1 | 2 | 4 |

| | |
|---|---|
| **Course Code** | CSI0104 |
| **Course Title** | Fundamentals of Programming |

## Course Outcomes:

After successful completion of the course, a student will be able to –

1. explain the fundamental programming concepts and methodologies essential to build programs
2. analyze given problem and apply appropriate operator/control construct for programming the same
3. apply array structure and manipulate strings in programming

## Syllabus

**Teaching hours:20**

**Unit I**

**Introduction to Computers and Programming:** Introduction to Computers, its Applications and Characteristics, Hardware and Software, Computer Organization, Algorithms and Flowcharts, Programming Languages, Program Development Environment. **3**

**Unit II**

**Basic structure of C program:** Character set, Tokens, Identifiers in C, Variables and Data Types, Constants, Console I/O Operations. **5**

**Operators and Expressions:** Expressions and Arithmetic Operators, Relational and Logical Operators, Conditional operator, size of operator, Assignment operators and Bitwise Operators.

**Unit III**

**Decision Making and Control Statements:** If Statement, Switch Statement, Unconditional Branching using go to statement, While Loop, Do While Loop, For Loop, Break and Continue statements. **6**

**Unit IV**

**Arrays:** Defining Arrays, Sorting and Searching Arrays, Multidimensional Arrays, Variable-Length Arrays. **6**

**Characters and Strings:** Fundamentals of Characters and Strings, Character-Handling Library Functions, Standard Input/Output Library Functions for strings, String-Manipulation Functions.

## Self-Study:

The self-study contents will be declared at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

## Laboratory Work:

Laboratory work will be based on above syllabus with minimum 8 experiments to be incorporated.

## Tutorial Work:

The tutorial work will be based on the topics covered in the syllabus. Minimum 8 tutorials should be carried out.

## Suggested Readings^:


1. Deitel and Deitel, 'C How to program', Pearson.
2. E Balagurusamy, 'Programming in ANSI C', McGraw Hill.
3. YashwantKanitkar, 'Let Us C', BPB Publications.
4. Kernighan., Ritchie, 'ANSI C Language', Prentice Hall of India.
5. V Rajaraman, 'Fundamentals of Computers', Prentice Hall of India.


L=Lecture, T=Tutorial, P=Practical, C=Credit

^this is not an exhaustive list

**NIRMA UNIVERSITY**
**Integrated B. Tech. (CSE)-MBA programme**
**Term - I**

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 2 | 3 |

| | |
|---|---|
| **Course Code** | CSI0105 |
| **Course Title** | Elements of Electrical Engineering |

## Course Outcomes:

At the end of the course, students will be able to –

1. interpret the electrical energy terms and relate its usage in various applications
2. illustrate the role of circuit elements in different system conditions
3. distinguish the operational aspects of ac-dc systems

## Syllabus

**Teaching hours:20**

**Unit I** **8**

**Review of DC Circuits**: Kirchhoff's laws, solution of star-delta circuits, charging and discharging of capacitor, series-parallel magnetic circuits, fringing effect, comparison between electric and magnetic circuit, concept of induced emfs, series-parallel connection of inductors, rise and decay of current in inductive circuit.

**Unit II** **7**

**Single-phase AC Circuits**

Generation of alternating emf, instantaneous, rms, peak, average values and related other terms, vector representation of AC quantities, Steady state analysis of R, L, C series circuits, power triangle, resonance in series circuits.

**Unit III** **5**

**Three-phase AC Circuits:** Generation of three-phase emf, star connection, delta connection, relationship between line and phase quantities, power measurement in three-phase circuit, variation in wattmeter reading with power factor.

## Self-Study:

The self-study contents will be decided at the commencement of semester. Around 10% of the questions will be asked from self-study contents.

## Laboratory Work:

This shall consist of at least 8 experiments based on the above syllabus.

## Suggested Readings^:


1. B.L.Theraja, A.K. Theraja, Textbook of Electrical Technology Volume I, S. Chand & Co.
2. U. A. Patel, Textbook of Elements of Electrical Engineering, Mahajan Publishing House, Ahmedabad.
3. J. Nagrath, Basic Electrical Engineering, TMH Publishing Co. Ltd.
4. Vincent Del Toro, Textbook of Principles of Electrical Engg. Prentice Hall of India Pvt. Ltd., New Delhi.


L=Lecture, T=Tutorial, P=Practical, C=Credit

^this is not an exhaustive list